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Exploring Accessibility in Three Quebec Parks, Canada for People with Disabilities

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ABSTRACT

For people with disabilities, participation in outdoor spaces has many physical and psychological benefits. Despite advances in legislation in Canada, outdoor spaces such as national parks remain difficult to access. The goal of this research was to identify barriers and facilitators that people with disabilities face when accessing parks. The research was conducted in several phases in two Canadian provinces (British Columbia and Quebec). This article presents the findings from one phase in Quebec. A qualitative approach using go-along interviews was used, and a content analysis was performed. Fifteen participants with various disabilities were interviewed in three parks (Forêt Montmorency, Parc de la Jacques-Cartier and Parc Des Plaines d'Abraham). Four main categories emerged, including: 1) trails, 2) access to information, 3) infrastructure, and 4) external factors. Perceived barriers and facilitators resulted from interactions between elements within categories 1, 2 and to 3 and external factors at play in the park.

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1. Introduction

The Canadian government adopted the Accessible Canada Act in 2019, in effort to eliminate barriers for people with disabilities (PWDs) by developing federal accessibility standards by 2040 (Accessible Canada Act, 2019). Barriers, defined as anything that hinders the full and equal participation in society for PWDs (including a physical, mental, intellectual, cognitive, learning, communication or sensory impairment (CAN-ASC-2.1)) may be physical (i.e. lack of accessible toilets) or social (e.g. stigma) (Armstrong et al., 2023;

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Burns et al., 2009; Burns & Graefe, 2007; Burns et al., 2013). A better understanding of the barriers by people with different type of disabilities when accessing parks may inform accessibility standards as outlined in the Accessible Canada Act.

Outdoor experiences in green and blue spaces, such as parks, trails and recreation spaces by lake and other water bodies, provide physical and psychosocial health benefits, including accelerated physical recovery and reduced stress, depression and anxiety (Abraham et al., 2010; Gascon et al., 2017; Holt et al., 2019; Jakubec et al., 2016; Maller et al., 2006; Martin, 2013; Pearson & Craig, 2014; Saitta et al., 2019). Municipal, provincial, and national parks are examples of such outdoor spaces. However, for people living with disabilities, outdoor spaces such as parks are less accessible (Armstrong et al., 2023; Burns et al., 2009; Burns & Graefe, 2007; Burns et al., 2013). Limited accessibility to outdoor experiences represents part of the inequities faced in many societal spheres by people living with disabilities (i.e. housing, employment) (Kavanagh et al., 2015).

Addressing the barriers and facilitators that consider the needs of people with various disabilities (i.e. people who use assistive devices, people with sensory and cognitive needs) poses significant challenges. For example, use of some mobility devices limit access to some architectural structures due to their shape, size, and weight (Jang et al., 2020). Furthermore, there are variations in environmental accommodation to facilitate navigation across different types of disabilities and environmental features that may facilitate access for some people, while may hinder others. For example, raised tactile surfaces that aid people with vision impairment can limit access for some wheelchair users (Ormerod et al., 2015). Moreover, green spaces in urban areas have been found to be more conducive to accessibility than their rural counterparts (Groulx et al., 2022). To illustrate this point, consider the presence of sidewalks or paved pathways. These features can facilitate the experience of PWD depending on the context (i.e. whether in an urban or rural park) (Groulx et al., 2022).

The accessible journey, which includes all the steps needed for a person to plan and use and outdoor spaces (CAN-ASC-2.1, n.d), is critical when addressing park barriers. The accessible journey can be looked at through wayfinding, defined as the process of choosing a path to a destination while providing an experience that is safe, accessible, and enjoyable. Wayfinding is critical in planning accessible routes and navigation in outdoors spaces for people with all types of disabilities. Given seasonal changes in Canadian national parks (e.g. snowfall, rainfall) and usage (e.g. trail maintenance), alternative routes are needed in outdoor spaces.

1.1. Objectives

The aim of this paper was to identify barriers and facilitators faced by people with various types of disabilities (visible and invisible) in Canadian parks.

2. Methods

This study was conducted in three phases over two years in two Canadian provinces (British Colombia and Quebec) (Prescott et al., 2022). This paper presents findings from the second phase in Quebec. Reporting finding from the Quebec site ensure

important nuances of climate and language (French) that is different than Vancouver. An advisory committee of eight people, including nonprofit organization (NPO) leaders, PWDs and lived experience, guided the research and ensured that concerns of PWDs were considered throughout the project.

This phase of the study used qualitative interviews conducted in three steps: 1) pre-interview survey; 2) on-site go-along interview; and 3) post-route interview. Go-along interviews allowed for the exploration and understanding of people's experiences in a local context (Bartlett et al., 2023; Carpiano, 2009; Tracy, 2013). It also allowed the researchers to understand the physical context of the study area that cannot be understood or measured using survey methods alone and to gain a better understanding of lived experiences of participants (Bartlett et al., 2023; Carpiano, 2009).

2.1. Participants

Fifteen people with four types of disabilities (mobility, visual, auditory, cognitive) participated in the interviews. The heterogeneity and varied personal experiences allowed for a better understanding of various situations due to the possibility of contrasting experiences (Pires, 1997). To be included, participants had to: have a self-reported disability; be 18 years of age or older; be able to walk or wheel for 3 km (with rest) over a period of a maximum of 3 h; and be able to communicate with or without assistant or caregiver (to facilitate communication).

Participants were recruited using various purposive and convenience sampling methods. First, a detailed email was sent to members of different nonprofitable organization (NPO) (through leaders on the advisory committee). Selective advertising was also done with posters describing the study distributed in the community (e.g. social media). Finally, participants were recruited from a database of participants from previous research project who agreed to be contacted for future research.

2.2. Data collection

Three parks that represented the broadest range of park features found across the province of Quebec and that were in close proximity to Quebec City were selected for the mobiles interviews (as shown in Table 1): 1) Forêt Montmorency, a University Laval park dedicated to research, (https://www.ffgg.ulaval.ca/domaine-forestier/territoires/foret-montmorency) was the most natural and remote site with limited services or activities, and located about 45 min by car from Quebec City; 2) the provincial Parc de la Jacques-Cartier (https://www.sepaq.com/pq/jac/) is centered around a river that is considered the main attraction with many activities and services offered in a natural environment located about 30 min by car drive from Quebec City; 3) Parc Des Plaines d'Abraham (https://www.ccbn-nbc.gc.ca/fr/), a federal urban park located in Quebec City was chosen because of the many services and activities offered.

In each park, a predetermined route was planned a priori by the research team, selected to ensure representation of various park characteristic (e.g. bench, map, trails, table, washroom) and safety of the participants (see Prescott et al., 2022 for details). Two members of the research team were present for data collection to observe the barriers to access, which enhanced the credibility, one conducted go-along interviews

Table 1. Park context and additional information.

	Forêt Montmorency	Parc de la Jacques-Cartier	Parc des Plaines d'Abraham
Numbers of visitors	N/A	+/− 220 000 visitors annually	+/− 4 million visitors annually
Accessibility features	No	Yes, i.e.: accessible washroom at the campsite, automatic door at the Welcome pavilion.	Yes, i.e..: accessible picnic table, free of charge parking space.
Open to visitors	Year round (depending on the activity)	Year round	Year round
Description	The Forêt Montmorency is a park dedicated to university research and teaching, offering recreational activities to the public. These activities (i.e.. hiking) are carried out autonomously and are not under the supervision of the managing organism (Université Laval).	Parc de le Jacques-Cartier is a national park in the Société des Établissement de Plein Air du Québec (SEPAQ) network, located near Quebec City. It offers a variety of outdoor activities (i.e.. camping and hiking) in all seasons.	The Plains of Abraham Park is a historic site located in the heart of Quebec City. The park offers a variety of activities related to the historic nature of the site and welcomes several million visitors every year due to the many events taking place there. Under Canadian government jurisdiction, the site also offers outdoor activities such as cross-country skiing (winter) and walking (summer and winter).

and the other videorecorded the session using a microphone, GoPro camera, and an audio recorder. The semi-structured interview guide consisted of open-ended questions about participants' experiences in the park and the park features (ex., activities, amenities, furniture). The data collection was completed in French.

2.3. Data analysis

Go-along interviews were transcribed verbatim by one team member and verified by another team member for accuracy. A content analysis was then conducted using a 3-level non-linear process of line-by-line coding, categorization of codes, and interpretation of results through the generation of descriptive themes (Williams & Moser, 2019, p. 47). To enhance confirmability, interviews and codes were discussed among research team members (including one person with a disability). The same process was repeated for the second and third level of coding to ensure a consistency in the process and reduce coder bias. The analysis was completed in French, code and quote we translated in English for the article.

3. Results

Fifteen participants (8 women, 7 men) with a wide range of mobility, visual, hearing, and cognitive disabilities, 11 of whom used various assistive devices (see Table 2) completed go-along interviews between November 2021 and September 2022 at the Foret Montmorency ($n = 4$), Parc de la Jacques-Cartier ($n = 4$) and Parc Des Plaines d'Abraham ($n = 7$). Participants used a variety of means of transport to get to the parks, some arriving in their own vehicles while others took paratransit. The latter could be organized by one of the partner organizations at the participant's request. Each participant came alone, without friends, family or caregivers.

Table 2. Participant characteristics.

Part. #	Park visited	Main disability	Mobility device	Age	Gender
1	Forêt Montmorency	Mobility	Manual wheelchair	54	M
2	Forêt Montmorency	Mobility	Walker	51	W
3	Forêt Montmorency	Visual	Service dog	–[a]	W
4	Forêt Montmorency	Auditive	N/a	29	W
5	Plaines d'Abraham	Mobility	Manual wheelchair	47	M
6	Plaines d'Abraham	Mobility	Powered wheelchair	57	M
7	Plaines d'Abraham	Mobility	Scooter	–[a]	W
8	Plaines d'Abraham	Mobility	Cane or Crutch	58	W
9	Plaines d'Abraham	Mobility	Cane or Crutch	–[a]	M
10	Plaines d'Abraham	Visual	N/a	42	M
11	Plaines d'Abraham	Cognitive	N/a	29	W
12	Parc de la Jacques-Cartier	Mobility	Powered wheelchair	73	M
13	Parc de la Jacques-Cartier	Mobility	Manual wheelchair	–[a]	M
14	Parc de la Jacques-Cartier	Visual	Service dog	52	W
15	Parc de la Jacques-Cartier	Cognitive	N/a	45	W

[a]This information was either not given or has not been adequately entered by the participant on the web platform.

Four categories related to park barriers and facilitators were created: 1) Trails, including characteristics of the trail and park arrival (e.g. various steps upon park arrival); 2) Access to information, covering information availability in the park and related infrastructure (i.e. maps, signs and their respective support); 3) Infrastructure, including park services, facilities, activities and furniture (i.e. the various park elements with which people interact); and 4) External factors, which were described as the personal and environmental factors that may affect experience. As shown in the Figure 1, twelve external factors were identified. Categories 1, 2 and 3 were in constant relation with the fourth, such that external factors (e.g. maintenance), had considerable influences on what was qualified as a facilitator or a barrier for PWDs in parks. Figure 1 depicts the interaction between the four categories.

During the go-along interviews most participants expressed how they would have liked to access the different experiences offered in the parks, but they were unable to because of the presence of many barriers. As shown in Figure 1, the activities were categorized under 'Infrastructure'. Of the three parks visited in this study, no activities were considered accessible due to the current facilities. Hiking was the only activity that could be practiced on certain trail segments, as shown in the section on 'Barriers to trail' (Described in the Figure 1 caption).

3.1. Category 1: Trails

As shown in Figure 1, the combination between an element found in the park (e.g. path) and an external factor (e.g. maintenance) limited accessibility. This category also includes the steps taken when arriving at the park due to the many similarities in facilitators and barriers identified.

3.1.1. Facilitators to trails

Participants mentioned that the surface condition of the trail could really influence enjoyment. The absence of roots, stones or having a surface that was flat without any asperities was helpful as one of the participants said:

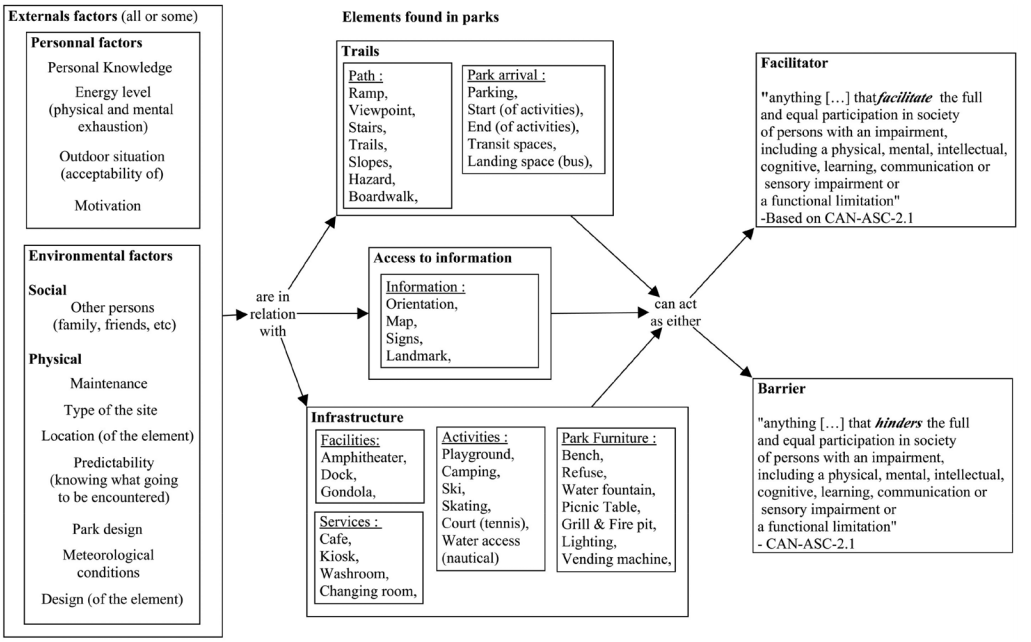

Figure 1. Relationship between elements found in park and external factors. It was the externals factors (on the left side) and their relationship with the three categories of element identified in the parks (in the Middle) that may positively or negatively influence park experiences (on the right side). For example, the relation between trail and the external factor (poor) park maintenance created barriers to mobility, access and participation for people using different types of mobility assistive devices.

> "The surfaces were flat, there were no obstacles, there were no rocks, no bricks… it was a flat surface. It was much easier. It was probably these surfaces that hurt my legs, much more than the hills. My legs couldn't handle the uneven surfaces." – Participant #8

Park maintenance was important for most participants, including how the various park elements are maintained (e.g. the trail and trail surface). In the quote above, the participant demonstrated clearly how the maintained trail could act as a facilitator in their experience. The absence of cracks or hole on some trails was pointed out by some participants.

The absence of steep slopes also influenced people's experiences. Indeed, participants said they were "very comfortable" when the slopes they encountered were not steep. For some, their own personal knowledge contributed to this feeling of ease, as one participant explained "Yes, there were inclines and slopes, but you know, it was predictable. There was not any surprises of unexpected potholes." (Participant #9).

It was mentioned that certain elements that could act as facilitator were missing. One example given by Participant #9 was the use of "something visual to be able to see it, a yellow line. Something that stands out" to identify any potholes or crack on the trail that could potentially be problematic. Another example given involved the drop-off zones for adapted transport upon arrival at the park. In this case, a second drop-off area behind the main pavilion would make it easier to get around the park, giving people quicker access to the attractions they want to see.

3.1.2. Barriers within trails

Park maintenance and park location (e.g. urban, peri-urban or remote) had a significant impact on participant's perception of barriers. Other external factors, such as park design and the location of elements found in the park also had an impact.

For all participants, unmaintained trails represented a barrier to experiences. Encountering an unmaintained trail required participants to pay particular attention to the maneuvers they performed, adding stress for some people.

Several participants mentioned that they had to be aware of roots, holes, and crevasses on the trails to avoid falling or getting stuck with the equipment they were using. One participant said: "Well, we are on the flat, there are a few stones, but I still have to survey the front wheel to make sure it doesn't get blocked" (Participant #1), while another person expressed the risk of falls and injury: "I have to look, I have to look where I'm going, so I don't fall of course. The roots, the rocks, also, because you can get hurt hiking." (Participant #4). Cracks, holes and gaps in the pavement could also pose a barrier for people who use white canes, as the white cane could get stuck. Moreover, participants described the increased probability of mechanical failure of mobility aids, such as punctures on wheelchair wheels or a broken white cane.

Ascending and descending slopes also presented barriers for participants dependent on the type of site. Climbing steeper slopes was perceived generally challenging and led to fatigue, but descending slopes could be even harder. In addition, the accumulation of ascents and descents on several small slopes throughout the sites were perceived as a potential barrier.

Some participants mentioned that encountering stairs and ramps posed barriers. The lack of handrails due to poor design were perceived to create a risk of falling. In this case, participants mentioned using their technical skills to reduce the challenge of using the ramp.

The design of these elements was not the only external factor influencing the steps and ramps that were encountered. Maintenance of steps and ramps also caused barriers. In addition, cross slopes that developed in certain park areas (possibly due to the movement of the ground caused by freeze-thaw during seasonal changes) were also perceived as potential barriers. Likewise, the use of cobblestones and decorative stones posed the same risks as when encountered on the trails.

Several barriers also existed upon arrival at the park. Many sites were difficult to reach for many participants who use adapted transportation services. The distance from the city can partly be an explanation. However, the lack of a drop-off points or a clear indication of its location was one of the main barriers identified upon arrival when using adapted transportation services. Moreover, the lack of a clear path or trails between the parking lot and the trailhead posed a barrier, even if the adapted transportation dropped the participants off at the right place. For example, one participant explained,

> "it's that once you've arrived with the transport [service] …, is that there is clear directions between, let's say, the drop-off point and the entrance to the site, because otherwise, … it's like I was saying, me earlier arriving at the Plains [of Abraham] Museum, to get here on my own, it would not have been possible for me." - Participant #10

3.2. Category 2: Access to information

Access to information, represented the most significant factor influencing the outdoor experience for all participants. This theme encompassed a multitude of tangible elements (i.e. signage, maps) and intangible elements (i.e. orientation, the presence of other individuals). Having advance knowledge of what may be encountered and what would be available at the site was a critical factor for enjoying park experiences for all participants.

3.2.1. Facilitator to the access to information

Signage elements, such as maps and signs with graphic features that facilitate the comprehension of information, were perceived as facilitators. Most participants felt that signs should be black and white with a font size that is easily readable, even when viewed from a seated position. Additionally, the use of detailed landmarks on maps, such as buildings, was also described as a facilitator the process of obtaining the necessary information, such that one participant affirmed " It's written in French and English. I think it's well indicated. The map is very well designed also, because it's easy to spot the large main buildings." (Participant #11). The presence of pictograms on signs were perceived a facilitator to access to information, particularly when the font or color contrast in the writing is not optimal.

The design factor could influence the graphic characteristics of signs. In addition, the formal features of park elements, such as height, size, and materials, could also facilitate comprehension. First, height was perceived by many participants as an aspect that could facilitate comprehension. A site map that could be read from a seated position (such as a wheelchair) was perceived as a facilitator. The materials used could also influence access, as a matte texture that did not reflect the sun was described as a facilitator for reading signs.

All participants described how orientation and gathering information involved the use of a variety of visual, tactile, and auditory cues. Some participants also indicated that they used olfactory cues (i.e. gardens) in specific areas of the sites they visited. The external factors exerting an influence on these elements were largely based on the personal knowledge of participants involved and the type of the site itself. One illustrative example was the use of surrounding buildings by participants to navigate the site,

> "The Concorde, yeah. I'm trying to look for a main element a bit to get my bearings. Otherwise, at the bottom of the Concorde there, the red roofs there, it's the color aspect, the size too. The Concorde is a bigger building than the others. That would be my main landmark" – Participant #11

From a tactile perspective, trail surfaces represented an integral aspect of the park that facilitated orientation for many participants. To illustrate, the distinction between asphalt, crusher dust, and cobblestone trails, when properly maintained, enabled individuals to establish reference points that facilitated their understanding of their location within the site. As one participant observed, in addition to providing a sense of orientation, the change in surface assisted in determining the direction in which they should proceed:

> "For me, it's much more than a signpost like we saw earlier, you know, such that, if you have alternating surfaces at ground level, well, you know, you are where you are, and then you know how. Let's say there is a fork in the road at some point, one going towards the service building, let's say, then the other continuing on [the service road]. Well, you get there also, there's a fork in the road, it's cobblestone; that could be a really good indication." - Participant #10

The personal knowledge factor was significant in the use of tactile cues for orientation among participants. Indeed, for several participants, the knowledge that certain elements were present could serve as a facilitator. Consequently, participants modified their strategies to orient themselves and locate these elements. When a feature was located near the trail (which rendered it more accessible), one participant indicated that they used the edges of the trail as a reference point to navigate their surroundings.

The presence of other individuals on the site, whether accompanying or unknown to the participant, was mentioned by several participants as an influential factor. The presence of other people, particularly those known to the participant, provided a sense of reassurance during the activity. Asked whether a specific element could potentially be a source of stress in a park, one participant answered as follows, "Yes, yes, but I also knew you were there, so I wasn't alone. But I wouldn't come alone." (Participant #4). In addition, other people were perceived as facilitator when the participant could acquire information about the park prior to engaging in an activity. Indeed, all participants indicated that they had consulted with friends, family, and other close individuals before accessing the site. In instances where these individuals were unable to provide the required information, several participants indicated they contacted the park customer services department to request specific information. The presence of other people, either known to the participant or part of the customer services, was one a commonly reported facilitator.

3.2.2. Barriers to the access to information

External factors posed barriers to accessing information. Despite the identification of several facilitators on the sites under analysis, numerous barriers remained. These barriers had a greater impact than those identified under the Trail or Infrastructure themes, as they had a more significant effect on participants' sense of security and stress. It could be observed that signage elements, such as maps or road signs, displayed a multitude of graphic characteristics without clear explanations that resulted in confusion and overload of information making them challenging to use (Figure 2).

First, participants reported an excessive use of signage elements, resulting in over stimulation for some participants. In certain locations, such as trail crossings, multiple signage elements were installed. For many participants, however, this made it more challenging to decide on the correct direction. One participant questionned: "But where are we going? Is it here? (Participant #2). For others, the abundance of information led to the belief that it would be possible to become lost, despite the presence of signs.

This over stimulation of elements was also observed in the signage elements themselves. For instance, in addition to providing a site map, numerous maps on the sites presented a multitude of images, icons or texts. Additionally, several participants noted

Figure 2. Example of how can the over presence of signage can create a sense of confusion.

the absence of a "you are here" indication, which made it challenging to use the map and to orient themselves. The designs of maps and other signage elements created additional barriers.

The design factor also had an influence on other features of signage elements. A significant number of participants observed that many signage elements lacked sufficient contrast. For example, "Green writing on beige is a very bad contrast" (Participant #8). Another participant added, "Well, that would be difficult for me, because there's not much contrast, blue with white… it needs better contrast, [such as] black on white." (Participant #3). Moreover, the surface selected for the signage elements reflected the sun, thereby making it even more challenging to read and comprehend.

The location of the signs also played an important role to ensuring access to information. The difficulty or impossibility of locating maps and signs presented barriers. In some instances, maps were situated at a distance from the trail, while in others, they were positioned behind advertising signs. These locations required additional effort by the participant to locate and use the signs. For example, one map was situated behind a display board and a number of participants indicated that they would not have noticed it, and even if they had, its position made it challenging to use. Finally, it was observed that certain elements (such as signage or maps) were absent in certain locations, with some trail crossings not having any signage indicating the correct trail to follow.

The use of visual, tactile, and auditory cues was also complex in many situations when it came to wayfinding. For many participants, these markers with which they orient themselves became apparent only after several visits to a park. Moreover, even when the sites were familiar, the participants sometimes found it challenging to orient themselves. The task required concentration, which could be affected by the energy level factor, as one participant noted:

> "Let's say I was on my own, it would be very difficult because when it comes to finding my bearings […], landmarks aren't necessarily easy to find, and it would take a lot of concentration to try to find my bearings, to situate myself, and then perhaps locate certain sounds that could help me get my bearings." – Participant #10

3.3. Category 3: Infrastructure

3.3.1. Facilitators in infrastructure

The presence of Park furniture enhanced experiences for all participants. When the design of the park furniture met the needs of the user, it further facilitated access. For example, characteristics such as adequate clearance and benches with continuous back support (i.e. no opening between the seat and backrest) were considered facilitators for someone with chronic pain or cerebral palsy who may experience difficulty in maintaining a seated position without adequate back support. The influence of the design factor could also be observed in the context of picnic tables, where the optimal shape and configuration facilitated ease of use, as observed by one participant, "You see how these tables are all round. Well, the fact that they're round means you can sit down easily." (Participant #8).

The maintenance of the various infrastructure components also facilitated park access. The presence of a well-maintained element, without any structural deficiencies or accumulation of waste (e.g. a clean and fully operational accessible bathroom), facilitated park use. Park maintenance also influenced participants' perception of safety, such that an impression of cleanliness instilled a sense of safety for the participant, reducing their stress and thereby enhancing their experience.

As mentioned by a participant, landscaping and certain natural elements could act as park furniture (for some people).

> " You know, it can be a pile of big rocks too. It doesn't have to be a bench, you know, a couple of big rocks in the corner, you lean back, you sit down and that's it. There's worse than that." - Participant #15

In this instance, the type of the site, the design of the element and the park design all contribute to overall access. These spaces, if designed for use as rest areas or possessing similar characteristic, could facilitate the experience of PWDs in a manner analogous to that of a well-conceived and well-maintained bench.

Additionally, the layout, which was a component of park design, influenced accessibility of service areas and associated spaces. Indeed, the ability to move around with a larger mobility aid (i.e. scooter, motorized wheelchair) enabled individuals to better use the available services. This was also the case with accessible bathrooms.

3.3.2. Barriers in infrastructure

The factors that enabled infrastructure elements to facilitator access were the same factors that could also pose barriers to access. In many cases, the absence of certain elements on the sites was perceived as a barrier. For example, although bathrooms were present on several trails, they were not always accessible. For PWDs, especially those who use mobility aids (such as wheelchairs), this posed a major barrier to access.

Some furniture, such as benches and picnic tables, also posed barriers due to their design and location. For instance, depending on how the seats were positioned at picnic tables, the picnic table may be a barrier. One participant expressed how the limited space created by the design of the picnic tables limited their use,

> "I always ask people "here, I'll stand on the edge", because it's too complicated to get out if I want to go to the toilet or if I want to move. But it's complicated because I need the whole bench to get out, even if I'm on the side, because I have to move my whole leg. I have to get everyone [to move] off the bench. So, I hate picnic tables for that." - Participant #8

Moreover, some park furniture was undetectable for a participant who used a white cane due to the location. This was also the case for benches, picnic table, and garbage cans, as these items were outside the path and the participant did not come into contact with them when using the white cane: "You sweep wider [the white cane] saying we're going to find a bench. But that's too far away" (Participant #10). The positioning and location of furniture when situated at a distance from the pathways could also impede movement when the bases of the furniture were made of crushed dust or dirt. Indeed, the selection of materials for the bases and the lack of maintenance in some areas transformed the existing furniture elements along the path into barriers. Moreover, cohabitation with wildlife in some parks required that furniture be adapted to this reality. In the case of garbage cans, this meant additional handling, which could be difficult for some people. In some cases, trash cans were too high for wheelchair users to access.

Finally, it was noted that inadequate or absent lighting on trails and other areas negatively impacted the experience of participants, reducing perceived safety and adding stress. This issue was frequently discussed in conjunction with the presence of other people in the park.

3.4. Category 4: External factors

As illustrated in Figure 1, when park elements were perceived as facilitators or barriers, they were influenced by 12 external factors. These factors were grouped under personal and environmental factors, both pertinent for PWDs. While many of these factors have been discussed in previous sections, some, such as acceptance of the outdoor context and the presence of other people, could have been perceived as either barriers or facilitators.

3.4.1. The acceptability of the outdoor context

The acceptability of the outdoor context emerged as a factor when comparing facilitators and barriers in all three parks. Some elements that were perceived as barriers

at one site, were regarded as facilitators of the outdoor experience at another site. An additional illustration of this context-sensitive acceptability can be observed in the use of natural elements for resting in the absence of park furniture. It can also be defined as the acceptance of a situation that, in another context, would not be accepted by an individual. Indeed, as the sites in question exhibited disparate park contexts, namely remote and urban parks, certain distinctions were observed.

Certain trail conditions (i.e. crushed dust trail surface, uneven ground) were deemed acceptable at Parc de la Jacques-Cartier, whereas comparable trail conditions at Parc Des Plaines d'Abraham were not considered acceptable. On the subject of orientation and planning, one participant described:

> "[speaking of orientation] It depends. In the malls yes, not on the trails. But no, that's it, what's interesting when you're out there, it's not, well planning the next step somewhere. It's not knowing, what am I going to have in 300 M? It's letting yourself be surprised when you're out there." - Participant #15

The acceptability of the outdoors and the nature aspect that emerged was also related to the person's motivation and the notion of challenge. Indeed, these two factors were highlighted collectively during the go-along interviews, as one participant observed: "That's why I say to myself, well, it's better to choose something that's challenging, but has the aspect of pleasure. I'll put the aspect of fun first. You know, the aspect of being out in nature". (Participant #1)

3.4.2. Presence of other people

The presence of other people acted as both a facilitator and a barrier, without the need to relate to one or more elements of the park (in contrast to other factors). For all participants, the presence of others could be a critical factor in their ability to engage in activities within the parks.

First, the presence of other people, especially those who were known to and those who accompanied PWDs, had positively impacted sense of safety and reduced stress. Indeed, presence of others mitigated perceived risk, as one participant observed, "You know sometimes there are certain things you can do but others you… when I see there's a pretty high risk, I might as well abstain. But when I'm with someone, there's no problem." (Participant #12).

Another benefit of the presence of other individuals at the parks pertained to the assistance they offered when using the park furniture, which mitigated the impact of external factors. To illustrate, if a picnic table or bench was located in a manner that made it undetectable by a white cane, the presence of another person could compensate for this barrier. The same holds true regarding the ability to use other elements of the infrastructure, access to information, or trails. Furthermore, the presence of others when engaging in an outdoor experience can also influence motivation, as one participant observed:

> "That's it. But … I wouldn't have … I have a lot of difficulty motivating myself to walk on my own. With people, I'll do it, I'll walk with people, that's okay, but motivating myself to walk alone, because of my limitations, I have difficulties."- Participant #8

However, the presence of other people also sometimes had the opposite effect. For example, some paths on the sites were designed to accommodate both pedestrians and

cyclists, creating uncertainty and stress. Differences in speed, as well as trouble hearing bicycles and other electrical equipment, were the main issues mentioned.

4. Discussion

Several facilitators and barriers were identified to better understand how people with various types of disabilities experienced park access. Trails (and park arrival), access to information, and infrastructure represented the main park-specific elements, while the presence or absence of external factors influenced how PWDs experienced park access. Due to their respective importance, many elements reported in this study should be further addressed. In this way, the Human Development Model- Disability Production Process (HDM-DCP) model (Fougeyrollas et al., 2018) offers a conceptual model that may help to explain the nuances of the individual and the physical and social environments, and the continuum of social participation and disability depending on the outdoor context, the presence of other people and the combined influence on the experiences of PWD.

4.1. The Human Development-disability production process model as comprehensive tool

The twelve external factors that were expressed to influence park experiences for PWDs can be interpreted from the lens of the HDM-DCP model (2018). Indeed, categorized as personal and environmental factors (social and physical), these 12 factors aligned with the HDM-DCP. Although this model was not used as an analytical framework, it can help to understand the continuum between experiencing participation or disability in parks depending on whether the park element was perceived as barriers or facilitators. The findings were also consistent with many elements of the HDM-DCP.

The HDM-DCP illustrates that a facilitator and an obstacle can exert a significant influence on a wide range of factors, ranging on a scale from 1 to 7 (major obstacle to major facilitator) in both personal and environmental domains (Fougeyrollas et al., 2018). This spectrum represents one of the elements identified in this study. Indeed, the various factors identified in the parks interact with each other (in addition to the park elements) in complex ways. It is this interaction that determines the strength of the facilitator or obstacle in people's experience. This finding is consistent with the HDM-DCP. Indeed, a facilitator identified in this study had the potential to result in a situation of social participation, namely the realization of one or more lifestyle habits. It is equally plausible that a barrier may result in a situation of disability, which in turn may restrict realization of one or more life habits.

The personal factors identified in this study (Figure 1, left column) resonate with those developed in the HDM-DCP, particularly in the identity factors and aptitudes. Indeed, an influencing factor such as personal knowledge aligns with the framework developed under aptitudes, while the motivating factor and the acceptability of the outdoor context can be subsumed under identity factors. With the data obtained in this study, it is possible that these three factors may also register in part as a protective identity factor (Fougeyrollas et al., 2018).

Moreover, this model also addresses the environmental factors through which a situation of disability or social participation can arise (Fougeyrollas et al., 2018). In this case, the physical and social environmental factors fall within the micro-environment and meso-environment dimensions, as defined by Fougeyrollas et al. (2018). Indeed, the social environmental factor in this study (other people) aligns with the micro-environmental dimension, as it is a context-specific element for each participant. In contrast, physical environmental factors are classified as meso-environmental, as they are specific to the local community. The same is true of the elements identified in the parks (see the centered column in Figure 1).

Thus, according to Fougeyrollas et al. (2018), in the context of elements derived from the physical environment, it is the interaction between these elements and people's life habits (i.e. personal factors) that can generate barriers or facilitators along a continuum (as previously mentioned). The findings of this study are consistent with this. As demonstrated in Figure 1 (center columns), certain elements within the Trails and Infrastructure categories (i.e. benches, trails) can be regarded as "major" barriers or facilitators according to the HDM-DCP when interacting with personals factors (Fougeyrollas et al., 2018). Additionally, in the context of elements derived from Access to Information, the HDM-DCP can facilitate comprehension of the impact of the latter on the presence of barriers or facilitators. Indeed, the elements in this category have been shown to be part of both the physical environment (i.e. signage) and lifestyle habits (i.e. communication) (Fougeyrollas et al., 2018). According to the HDM-DCP, a situation of disability arises when life habits are hindered. The results of this research suggest that Access to information is the category of elements that can hinder the most the latter.

4.2. The outdoors contexts and its influence on the creation of barrier and facilitators

One of the personal factors identified in this study, acceptability of the outdoor context, could not only have an impact on the element found in the park, but also over some of the other factors. Indeed, as an influential factor it may mitigate the impact of existing barriers or reinforce the effects of facilitators. Several studies have identified elements that may have the same impact as acceptability. For example, the sense of pride and motivation that arises from overcoming challenges in an outdoor context (Armstrong et al., 2023) can produce experiences that are analogous to those identified in this study. Indeed, the pursuit of challenges and the presence of risks are integral components of the outdoor experience, which individuals may actively seek (Armstrong et al., 2023; Burns et al., 2013).

Furthermore, the concept of risk inherent in outdoor activities also pertains to the element of uncertainty (Burns et al., 2013). This sense of discovery, of not knowing what to expect, is illustrative of the symbolic adventure associated with outdoor activities for some people, whether disabled or not (Burns et al., 2013). In the present study, although the experience of uncertainty was acknowledged as a component of the outdoor experience, the concept of adventure was not sufficiently addressed.

4.3. The presence of other people

The presence of other individuals on the premises represents another important external factor within the social environment. This factor was observed to be a near-inevitable occurrence within the context of this research. Indeed, in every instance where a go-along interview was conducted, the presence of other individuals was noted by the participant. While the presence of other users may create barriers, the mere presence of others in parks facilitates the experience of PWDs. The literature has demonstrated that this factor is also important in other contexts, such as heritage sites (Ruiz-Rodrigo et al., 2024) and transportation (Park & Chowdhury, 2018; Poria et al., 2010).

In the context of heritage buildings and sites, the presence of family and loved ones has been found to facilitate the experience of individuals with disabilities, consistent with the findings observed in parks. Similar to the findings in our study, the presence of close relatives in the context of heritage sites has been shown to influence feelings of safety and perceptions of risk (Ruiz-Rodrigo et al., 2024). However, the presence of significant numbers of people has also been identified as a potential barrier in heritage sites (Ruiz-Rodrigo et al., 2024).

In the case of transportation, the attitude of the staff (bus driver, agent de bord) may pose barriers to the experiences of PWDs (Park & Chowdhury, 2018, Poria et al., 2010). In these contexts, the presence of other people may be perceived as a barrier. Nevertheless, this type of conduct and disposition on the part of employees was not documented in the context of national parks. Rather, the role of personnel was identified as a facilitator to accessing information about the site in advance.

Finally, the motivation to engage in an activity in diverse contexts with others was reported the literature (Armstrong et al., 2023; Pellichero et al., 2020). Engaging in an activity with other individuals, regardless of their disability status, facilitates the formation of interpersonal connections and a sense of inclusion, which in turn enhances motivation (Pellichero et al., 2020). This finding corroborates the impact of the presence of other individuals as reported in this study. Also supportive of findings in this study, a 2022 study indicated that participation in an outdoor experience enhances social connections among individuals with disabilities and non-disabled, thereby motivating them to engage in further activities (Armstrong et al., 2023).

4.4. Limitations

The results of this study should be interpreted acknowledging the following limitations. First, the relatively small and heterogenous sample presented certain limitations as it may be unrepresentative of the reality experienced by PWDs in the context of national parks. The fact that we did not collect detailed information about the persons disability or previous experience with the park may limit transferability of results. Nevertheless, the diversity of the sample in this study was consistent with the aim of exploring a range of cases and reinforces the value of the metho dological approach (Pires, 1997). Although the sample size may limit generalizability, the qualitative approach with the use of the go-along interview offered the advantage of enabling data interpretation within a contextual framework. This approach facilitated a finer understanding of the

subject matter for the researcher (Carpiano, 2009; Tracy, 2013). The use of go-along interviews with a single participant living with a cognitive or hearing disability in Parc de la Jacques Cartier and Forêt Montmorency was not sufficient for the exploration of similarities and differences within these populations on these sites. This is attributable to the constraints of the research timeline and the difficulties encountered in the recruitment of participants with this specific disability.

The remoteness of certain sites also posed limitations in this study. The locations of Parc de la Jacques-Cartier and Forêt Montmorency on the periphery of Quebec City require the people to utilize alternative transportation methods, such as personal vehicles or specialized vehicles adapted for such journeys. Therefore, recruitment may have been biased to those who were able to travel outside the city (i.e. a sample with most resources to access parks). Finally, the selection criteria for this research required participants to be able to traverse a distance of 3 km over a period of 2 to 3 h without assistance. It is possible that this criterion introduced a bias, as the individuals who participated in the project already demonstrated certain physical abilities and knowledge of navigating outdoor environments. The subject of the study, (i.e. accessibility of national parks), may also have introduced a bias, as individuals who were not already participating in or interested in such outdoor experiences were likely not be included. Further research could address this issue (i.e. the use of strategic methodologies and the adaptation of participant inclusion and exclusion criteria may be employed) in order to gain insight into the barriers encountered by this population.

5. Conclusion

Factors that facilitate or impede the experience of PWDs in national parks result from a complex interplay between the diverse elements present in the parks and external personal and environmental factors. Elements present in parks can be perceived as facilitators or barriers for PWDs depending on the trail, access to information, and infrastructure. The 12 factors identified influenced park experiences over a wide spectrum. The presence of other individuals and the acceptability of the outdoor context may help to overcome barriers, such that factors that were initially perceived as a barrier could become a facilitator. Finally, understanding the experiences of PWDs by identifying facilitators and barriers in national parks allows for the development of recommendations for governing bodies to make these spaces accessible and inclusive for all. Consequently, this study offers significant data that can inform the actions of various stakeholders. Indeed, for a park manager, understanding how barriers and facilitators develop for PWDs according to different factors can facilitate the formulation of effective strategies to address them. Knowing that access to information is one of the most important elements, for example, makes it possible for a park manager, policymaker or urban planner, to address the issues accordingly. This can be realized by ensuring that signs are both visible and readable, and that they are positioned in such a manner as to provide clear directions. By providing insight into the elements present in three types of parks, this study facilitates a comprehensive examination of the factors that can impede or facilitate the outdoor experience of PWDs.

Ethics statement

This study was approved by the ethical committee of the CIUSSS-CN, reference number #2021-2120, RIS.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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