

Improving the Accessibility of Touristic Destinations with an Assistive Technology For Hiking – Applying Universal Design Principles Through Service Design

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Abstract

Accessible Tourism focus on the logistical attributes being accessible to all and on the process to develop accessible products and services with all stakeholders of the touristic destination. Assistive technologies can be used to improve the accessibility of touristic destination and attraction. Some assistive technologies are designed for hiking. However, their integration on the customer journey has to be designed as a service. To this end, universal design principles and guidelines can be used to design products and services accessible to all. Universal design and accessible tourism are both rooted in the social model of disability, which states that it is the society who is disabling. The potential and the conceptualization of applying universal design principles for tourism has been widely discussed. However, little has been done to operationalize this idea. In this article, we demonstrate how to co-create with users an accessible touristic service based on an assistive technology who enables hiking for people using wheelchairs. Our main findings illustrate the pros and the cons of using and assistive technologies and the importance of considering the whole customer journey to improve the accessibility of touristic destinations.

Keywords: Accessible Tourism, Assistive Technology, Universal Design, Service Design, User-Centered Design

Introduction

The article 30 of the Convention on the Rights of Persons with Disabilities (CRPD) aims that equal participation in tourism is a right. Rooted in the social model of disability, accessible tourism is based on the principle that the socially constructed environment excludes people with disabilities from participating in tourism activities [1]. Accessible tourism is broader than just the issue of accessibility. It is a complex relationship between an individual, the environment in which he or she lives and the tourism industry. Therefore, it is the responsibility of touristic destinations to understand the needs of people with disabilities and to design inclusive tourism services.

People with disabilities, particularly those with reduced mobility, represent an important growing market for touristic destinations due to the ageing population. To attract these customers, it is necessary to improve the overall accessibility of destinations and of attractions. Natural environments are particularly interesting. Even if improvements are possible, such as the construction of trails, these will often not be enough to ensure accessibility. In this case, assistive technology can be used. However, the integration of assistive technology into the service chain requires service design work with all the stakeholders.

In this context, the concept of Universal Design is interesting because it aims to create products and environments that can be used by people of all ages, sizes and abilities [1]. To create accessible touristic services, the individual, the environment and all stakeholders had to work together. Therefore, universal design and its seven principles are of first importance. Universal design incorporates: “... *the design of products and environments to be usable by all people, to the greatest extent possible, without the*

need for adaptation or specialised design...” [2]. As Michopoulou et al. stated [3], competitiveness of touristic destination should be enhanced by universal design principles.

In this article, a brief literature review is done on accessible tourism, assistive technology and universal design. Then, the service design methodology is presented. The case-study and its findings are illustrated. Finally, a conclusion is done.

Literature Review

Accessible Tourism

The research field of accessible tourism focuses on the themes of inclusion, people with disabilities and the ageing of the population and their implications for tourism supply and demand. Based on the assumption that disability is a social construct, the concept of accessible tourism varies according to the cultural and historical contexts. The demands of tourists with disabilities as well as the understanding of other stakeholders in tourism environments are evolving. Rooted on the social model of disability, accessible tourism assumes that the socially constructed environment excludes people with disabilities from participating in tourism activities [1].

Accessible tourism is a niche market. Most of the research papers in the field focus on one dimension of disability, access and mainly mobility. The proposed market segmentation is based on the level of assistance that people need [1]. However, this market tends to grow. Indeed, the world's population is ageing, particularly in Western countries. This phenomenon goes hand in hand with an increase in the number of people with disabilities. Indeed, there is a significant relationship between age and disability [4].

Accessibility is based on different geographical levels, micro, meso and macro. Physical access, access to information and social activities as well as services can be distinguished at each level. On the other hand, access can be divided into three dimensions: physical access, sensory access and access to communications. Barriers to accessible tourism are also grouped into three categories of constraints: physical, attitudinal and lack of information. Access to information along the customer journey is paramount, particularly in the tourism industry where several independent providers interact to provide the experience. Natural and wilderness environments, as well as heritage sites, are often difficult to access or to improve accessibility due to legal constraints. However, their accessibility is a right [5].

An important work of accessible tourism is to understand what barriers are socially constructed and how to transform them to create accessible environments. Here, the contribution of theory on leisure constraints is important. This theory focuses on barriers, non-participation in entertainment activities and lack of leisure opportunities [1]. Constraints can be classified into three categories: intrapersonal (related to the person, his/her psychological, physical or cognitive state), interpersonal (related to social interactions or relationships in social contexts) and structural, the latter including, for example, financial issues, lack of time, laws, etc. [6]. Even if these barriers and constraints are well documented, little research has been conducted on how to design a barrier-free touristic service.

Assistive Technology in Tourism

To enable people with disability to perform some tasks, assistive technology (AT) devices are designed [7]. AT can be low-tech, as crutches or adapted cutlery, mid-tech like rollator or wheelchair and high-tech like speech-to-text engine

For touristic experiences, AT are useful along the customer journey. During the information phase, tourists can use AT to control their computer [8] or web accessibility tools like webpage readers.

During the journey, all the means of transport should be accessible. Then, at the hotel, people with disability would enjoy adapted accommodation and bathroom.

Specific AT can be used for leisure activity. Such AT exist for skiing, ice-skating and hockey or horse riding. Furthermore, a lot of sport activities are accessible for people with disabilities. The para-Olympic games are the flagship event for these activities. Besides, other AT enable people to do hiking (e.g. Freedom Trax, Ziesel, JST Multidrive and RIPCHAIR 3.0).

Universal Design

Ron Mace states that “universal design means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” [9]. The goal of Universal Design is to simplified life for everyone by designing goods, services or buildings accessible and usable by all people [10].

Universal design is based on seven principles: 1) Equitable Use, 2) Flexibility in Use, 3) Simple and Intuitive Use, 4) Perceptible Information, 5) Tolerance for Error, 6) Low Physical Effort and 7) Size and Space for Approach and Use. These principles are expanded in a set of guidelines. “The purpose of the Principles of Universal Design and their associated guidelines was to articulate the concept of universal design in a comprehensive way” [11].

From a service perspective, Universal Design is useful to address the complexity and diversity of disability considering the different disabilities, the level of support that individual needs and the methods of communication [12]. However, to be accessible, a service must be designed in respect to these seven principles. It means that the designer has to incorporate them in his work. In the tourism sector, Darcy et al. [10] recommend some strategies that a tourism operator could apply to conform to the principles of universal design. These strategies are defined as principles like “Acquiring knowledge of the appropriate laws and internationally recognised accessibility standards” or “Including people with disabilities as planning team members” (p. 244). Furthermore, the concept of “accessible tourism value chain” [13] can be linked to the customer journey techniques used in user-centered design methodologies like service design.

Service Design Methodology

The Service Design methodology developed by the HES-SO Valais-Wallis in Switzerland (www.hevs.ch/servicedesign) is used to design an inclusive and accessible touristic experience. It consists of four phases: 1) Field Research, 2) Script, 3) Staging and 4) Production. This is a user-centred design methodology. Indeed, in each of the four phases, users are strongly involved in the co-creation process.

The field research phase, based on proven qualitative research methodologies such as ethnomethodology, ethology, or phenomenology, allows the descriptive and analytical study of the context, service and problem [14]. Based on the data collected, the script phase uses service marketing tools such as customer journey, service blueprints [15], scenario and user stories to design the service. Then, the service can be prototyped and staged using theatre-based re-enactment [16]. During this third phase, experiments (pre and/or quasi) are organised as at-scale test. It enables to measures the quality of the service through feedback from users and assesses its price and willingness to pay [17]. Finally, the service can be launched on the market (phase 4, production).

For this research, we conducted a netnography [18] as phase 1, field research. Then, using a service blueprint, we designed the accessible touristic service using an assistive technology for hicking. Finally, we conducted a pre-experiment in a touristic destination to generate new knowledges about this accessible hiking service. It will help the touristic destination to launch the service on the market.

Findings

Our case-study takes place in Valais, a major touristic region in Switzerland. The attractiveness of Valais lies, among other things, in its landscape, its mountains and its wilderness. Its assets are sometimes an obstacle, particularly in terms of accessibility, especially for people with reduced mobility, whether permanent, temporary (e.g. a skiing accident) or due to age. Switzerland ratified the Convention on the Rights of Persons with Disabilities (CRPD) in April 2014. Accessibility of public places as well as information about them are rights. The Swiss federal act on the elimination of inequalities affecting people with disabilities (LHand) considers inequality as difficult or impossible access for reasons of architecture or vehicle design. In this context, assistive technologies for hiking could be used to improve the accessibility of touristic destinations and attractions, especially for natural and wilderness environments. This case-study demonstrates how to co-create with users an accessible touristic service based on an assistive technology who enables hiking for people using wheelchairs. Especially, the case of Freedom Trax, a caterpillar on which a chair is installed, illustrates the service design work to be done in order to make hiking trails accessible through an assistive technology.

During phase I – Field Research, we first conduct a netnography. On the web, we found three similar devices: Ziesel, JST Multidrive and RIPCHAIR 3.0 and Internet forums with discussions on the thematic accessible hiking through assistive technology. The comments submitted by Internet users have been analysed. The main findings of our field research are: 1) In order to allow people to walk in complete safety, the destination has to determine the practicable trails and to provide an informative leaflet listing the trails and indicating their level of difficulty. 2) The positive aspect of this type of device is that it allows accessibility to tourist attractions. As, an Internet user wrote *“it would be a great pleasure to get this type of vehicle and not stay on the beach and watch the people living, the same for the mountains”*. 3) It allows people to live an adventure, to have action and to find the pleasures of an old life that are missing. *“Also, I sometimes miss the action from my old life”*. 4) These devices allow inclusion *“but a good autonomy and 20 kilometers per hour to go for a ride with friends who are on bikes”*. 5) The problems noted are the price *“a small fortune for me, too bad it's a great machine!”*, 6) the transfer on the device *“I don't know how I could transfer to the device”* and 7) the size of the device *“on the other hand it's not versatile at all, it's only made for large spaces”*. 8) It is also interesting to note that advices given by the people sharing an experience is very much appreciated by the other users.

For the second phase – Script, we draw a blueprint of the service. We base our work on the following customer journey steps: 1) Inspiration, 2) Information, 3) Preparation, 4) Travel & Parking, 5) Discovery an handling of the assistive technology, 6) Transfer, 7) Hiking, 8) Return of the assistive technology, 9) Travel back home and 10) Sharing of experience. This blueprint helps us to organise the next phase of our service design work, the pre-experiment. Indeed, all the stakeholders and their actions are described in this document.

During the third phase – Staging, we conducted a pre-experiment in order to test some hypotheses and to generate new knowledges. During fall 2019, a first pre-experiment was conducted in Crans-Montana, a touristic destination in Switzerland. This enabled to test the entire customer journey, including getting into the cabin with the Freedom Trax, transferring a person from a wheelchair to the Freedom Trax and a trail and hiking. Unfortunately, after a few minutes the Freedom Trax was damaged. Nevertheless, this pre-experiment generates new knowledges: 1) An emergency chain must be set up in case of breakdown, 2) It is imperative that the routes be tested, marked and secured and 3) Transfers must be controlled by the personnel providing the assistive technology. These knowledges are of first importance for the fourth phase – Production.



Figure 1: Test of the Freedom Trax in Crans-Montana, Switzerland

The seven universal design principles enable to audit the service. Both the assistive technology and the hiking experience were analysed. Regarding the assistive technology, in this case the Freedom Trax, an important issue concerns the maximum degree of slope the device is capable of traversing. Indeed, the Freedom Trax did not prevent the error (principle 5) of the user with a visual and auditive signal. Another issue concerned the information (principle 4) that the Freedom Trax give regarding a breakdown. Indeed, it was impossible for the user as well as the accompanying persons to understand the problem and to solve it. Regarding the hiking experience, this first pre-experiment cannot confirm that the service is conform to the universal design principles, especially for diverse abilities. Indeed, it should be tested with more people.

Conclusion

Accessible tourism is particularly interested in accessibility issues. Rooted on the social model of disability, accessible tourism is based on the principle that the socially constructed environment excludes people with disabilities from participating in tourism activities [1]. Tourism destinations must therefore understand the needs of people with disabilities and design inclusive tourism experiences. Indeed, people with disabilities, particularly those with reduced mobility, represent an important and growing market for tourist destinations due to ageing society.

As tourist attractions, natural environments are interesting. Although there is room for development, such as trail construction, these will often not be enough to ensure accessibility. In this case, assistive technology can be used. However, its integration into the service chain requires service design work with all stakeholders involved. Indeed, the entire customer journey must be designed in an accessible manner. To illustrate this effort, a service design work is conducted with users to improve the accessibility of a touristic destination with an assistive technology for hiking.

Several knowledges have been generated during this research: 1) The entire customer journey must be accessible, including services such as parking, toilets, restaurants, and cable-car. 2) Transfers must be supervised by the staff providing the assistive technology. 3) It is imperative that the trails are tested, marked, and secured. 4) An emergency chain must be set up in case of breakdown or accident. 5) The price of such a system is high. Some people will not be able to afford it for occasional use. It would seem more sensible that touristic operators hire it. 7) Sharing experience between people seems to be a good way to reassure future users. 8) Specific training courses could be organised for tourism service providers to train their employees in the use of the assistive technology and, more generally, to raise their awareness of special needs.

These knowledges can be applied to other assistive technologies used to make a touristic attractions and destination accessible. The main finding is that the hiking experience is just one step of the accessible tourism value chain. So, the whole customer journey must be designed in accordance to the universal design principles. Furthermore, universal design principles are not enough to ensure the accessibility of touristic destination. Experiments must be conducted in order to generate knowledges

and to minimize risks before the market launch of such accessible touristic services based on an assistive technology.

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