The influence of information and service design on preventive measures for mountaineering accidents in Slovenia

A influência do design de informação e de serviços na prevenção de acidentes de montanhismo na Eslovênia

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preventive measures, mark for the difficulty of mountain trails, mountain tour selection

Despite the efforts to reduce the number of mountaineering accidents by providing accurate information about mountain tours to the mountaineers, the number of accidents is continuously rising. This study examines this phenomenon in Slovenia with a focus on the behavioural patterns of inexperienced foreign mountaineers.
The study analyses how marks for the difficulty of mountain trails are understood by foreigners in correlation to the mountain tour selection. In addition to in-depth interviews and a participatory workshop, a test focusing on the perceptual difference between textual and pictorial information was conducted. The results show that current preventive measures do not reach the target groups because they are not adapted to the specificities of tour planning and provide information that is too abstract. Textual information or marks for the difficulty of mountain trails are perceived as too ambiguous to imply an accurate selection of a suitable mountain tour. Preventive measures should therefore be complemented by visual information, preferably in the form of videos. For effective and efficient preventive measures, the simultaneous deployment of perspectives from information as well as service design is crucial.

1 Introduction

The increasing popularity of outdoor activities worldwide is reflected in a significant increase in the number of mountaineering accidents in many European countries (Lischke et al., 2001; Soulé et al., 2014). This trend is also noticeable in Slovenia, where this study was conducted with a focus on foreign inexperienced mountaineers.

In Slovenia, an increase in the proportion of mountaineering accidents with uninjured individuals is also increasingly evident (Gorska reševalna zveza Slovenije [GRZS], n.d.). Additionally, many tourist mountaineers are unable to assess their own psychological and physical abilities and have difficulties in choosing a suitable mountain tour due to their lack of experience and understanding of the information they receive. This increases the risk of an accident and indicates a misunderstanding of the preventive information that is provided to the mountaineers when planning a mountain tour.

While efforts are being made, especially by the Alpine Association of Slovenia and Mountain Rescue Association of Slovenia (GRZS), to reduce the number of mountaineering accidents, insufficient attention has been paid to the holistic understanding of preventive measures and

tour planning. As our study shows, the perspectives of information design and service design are neglected, therefore the preventive information provided is either too abstract for the target groups or does not reach them. As that is a pressing issue, especially for foreigners, this study investigates how marks for the difficulty of mountain trails as a main preventive factor are understood in the context of mountain tour selection.

The study is conducted with a focus on the geographical region of Bohinj, a tourist region with the highest number of mountaineering accidents in Slovenia (Figure 1). The topic is approached through the design for extremes (Papanek, 1985), focusing on the behavioural patterns of inexperienced tourists. These are foreigners with no previous mountaineering experience and no knowledge of Slovenian mountain trails, who come to Slovenia for a vacation.

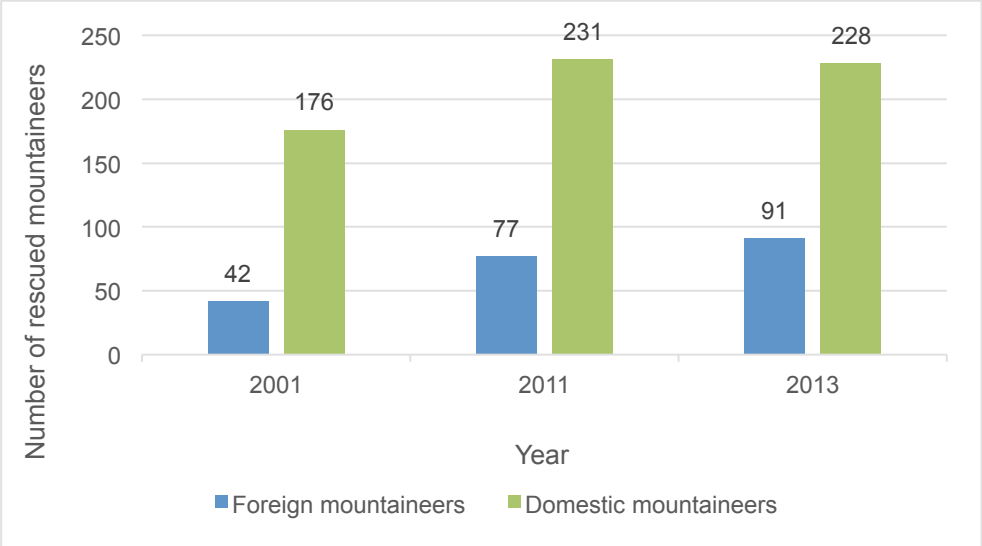
Figure 1: Location of Bohinj (Adapted from https://mapchart.net/index.html).

2 Mountaineering accidents in Slovenia

A mountaineering accident is an event on a mountain trail, pathless terrain, snowy slope, snowfield, or steep mountainside, in which a person is injured, lost, fatally injured, or buried under an avalanche (ZRC SAZU, 2013).

Review of statistics on mountain rescue interventions from GRZS throughout the years 2000, 2001, 2006, 2007, 2009, 2011, 2013, 2018 shows that the number of mountaineering accidents has been rapidly rising. The main factors are the increasing interest in mountaineering, rapid development of tourism and societal changes, which position a healthy lifestyle among the fundamental values. Additionally, the positioning of Slovenia as a green destination apt for outdoor activities (RS Ministrstvo za gospodarski razvoj in tehnologijo, 2017) has contributed to an increase in the share of rescued foreign mountaineers, especially in the summer season. This share increased from 23.9% in 2001 to 33.3% in 2011 and reached almost 40% in 2013 (Chart 1). Critical age groups are 30-39 and 20-29, who are inexperienced tourists considering the skillset (GRZS, n.d.).

Chart 1: Increase in the share of rescued foreign mountaineers.



Most mountaineering accidents are caused by a fall, slip, stray, unfamiliarity with the terrain, exhaustion, illness, or physical unpreparedness (GRZS, n.d.). Due to the increasing number of mountaineering accidents involving uninjured individuals, the causes of these accidents are being further investigated.

3 Slovenian mountain trail sign system

In Slovenia, there are more than 10,000 km of mountain trails marked with Knafelc blazes, signposts, and additional interim markings (Planinska zveza Slovenije, n.d.). These signs are unique to the Slovenian territory as there is yet no international agreement on the common marking of mountain trails (Služba vlade RS za lokalno samoupravo in regionalno politiko, 2010). In Slovenia, the appearance and legal use of the sign system are regulated in Rules on marking and equipping of mountain paths and in the Mountain Paths Act.

The Knafelc blaze is the most often seen sign in the mountains (Figure 2). It directs the mountaineer along the mountain trail and is drawn at highly visible places, such as tree trunks, rocks, and buildings at adult eye level or lower on the right side of the trail in ascending and descending direction (Ministrstvo za šolstvo in šport [MIZS] & Ministrstvo za okolje in prostor [MOP], 2008).

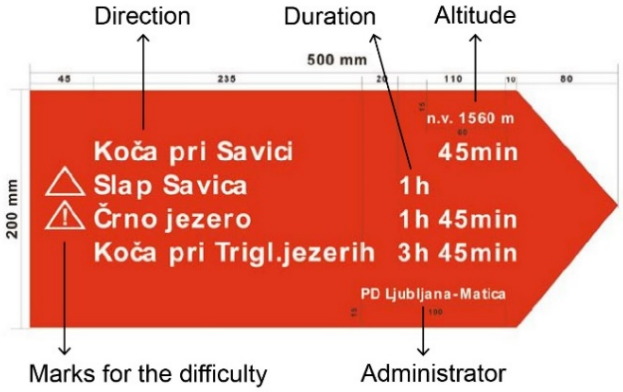
Figure 2: Knafelc blaze on a tree trunk.

In addition to the Knafelc blaze, mountain signposts are a crucial element for navigation. Mountain signposts are red signposts with white inscriptions placed on a 2-meter-high pillar, a building or other structure (Figure 3). They carry information about the mountain trail, its direction, the duration of walking to the destination, the mark for the difficulty of the mountain trail, the altitude at which the signpost is located and information about the administrator of the mountain trail. These signposts are placed at the starting points of trails and at the intersections of a mountain trail with other mountain trails (MIZS & MOP, 2008).

Figure 3: Mountain signpost on a tree trunk.

According to the difficulty, mountain trails are divided into 3 categories: easy trails that are not marked with a difficulty mark, difficult trails that are marked with a triangle, and very difficult trails that are marked with a triangle and an exclamation mark (Figure 4). The purpose of the difficulty mark is to inform the mountaineers, what type of challenges to expect on the trail. Based on the trail difficulty and duration, mountaineers should be able to assess their own abilities and decide if the trail is suitable for them.

Figure 4: Inscriptions on mountain signposts.



Mountain trail sign systems are geographically, culturally, and historically based, resulting in significant differences between the countries. In tourist destinations such as Bohinj, alongside the mountain trail sign system, other tourist signposts are in abundance. This implies that foreigners should familiarise themselves with the local mountain sign system before going on a tour in order to understand it.

According to the user research conducted, the current preventive measures aim to inform mountaineers about the mountain trail sign system but do not seem to reach the prominent objectives. They either do not reach the target groups or convey the message poorly. To holistically learn why this is so, the phenomenon was first looked upon through the lens of service design. Then, the understanding of the inadequate information transmission was deepened through the lens of information design.

4 Methodology

The research was conducted in two interconnected phases.

Phase 1

In the first phase a holistic understanding of mountaineering accident occurrence, a broad knowledge of stakeholder activities, current preventive measures and tour planning were obtained. The methods used were on-desk research, statistical research, in-depth interviews with experts and tourism sector representatives, in-depth interviews with inexperienced foreigners, contextual interviews with foreign mountaineers, netnography and participatory workshop with Slovenians. The first phase revealed a communication gap between the information provided to the tourists and information received by the tourists.

Phase 2

In the second phase, the phenomenon of an increased number of accidents involving uninjured individuals was examined with the focus on gaining a holistic understanding of the causes. Again, the communication gap between the preventive information provided and the

information understood was found to be a pressing issue. Therefore, the relationship between the marks for the difficulty of the mountain trails as one of the most important (infrastructural) preventive elements, its understanding among foreigners, and implications on tour planning were further examined.

The methods used were in-depth interviews combined with a demographic questionnaire and a test with 6 foreigners from different countries of origin. 5 interviewees were characterised as inexperienced and 1 was characterised as a well-experienced mountaineer.

Prior to the interview, the interviewees were provided with a test that was divided into 4 parts. Part 1 consisted of 23 photographs of tours with diverse difficulties, which were not known to the interviewees. This served as a basis for further comparisons in comprehension. The second part contained identical photos, supplemented with a textual description of the tour difficulty. In part 2, the definition of tour difficulty was not explained, but in part 3 the explanation was included (Figure 5). In each part, the task was to select the tour photos for which the respondents considered themselves to be fit enough. To learn how different visual information implicates self-assessment of abilities, part 4 of the test included a video of the Kepler track produced by the New Zealand Mountain Safety Council[1] and an elevation profile with a topographic map (Figure 6).

Overall, the test aimed to discover, how textual and visual information in different combinations are perceived in correlation with the ability to assess one's fitness. In this way, it was possible to determine whether individuals overestimated or underestimated their abilities, given the information from the questionnaire and the findings from the in-depth interview.

[1] Video available at: https://youtu.be/DAVfFct-y_I

Figure 5: An example of a test format conducted in Phase 2 of the research.

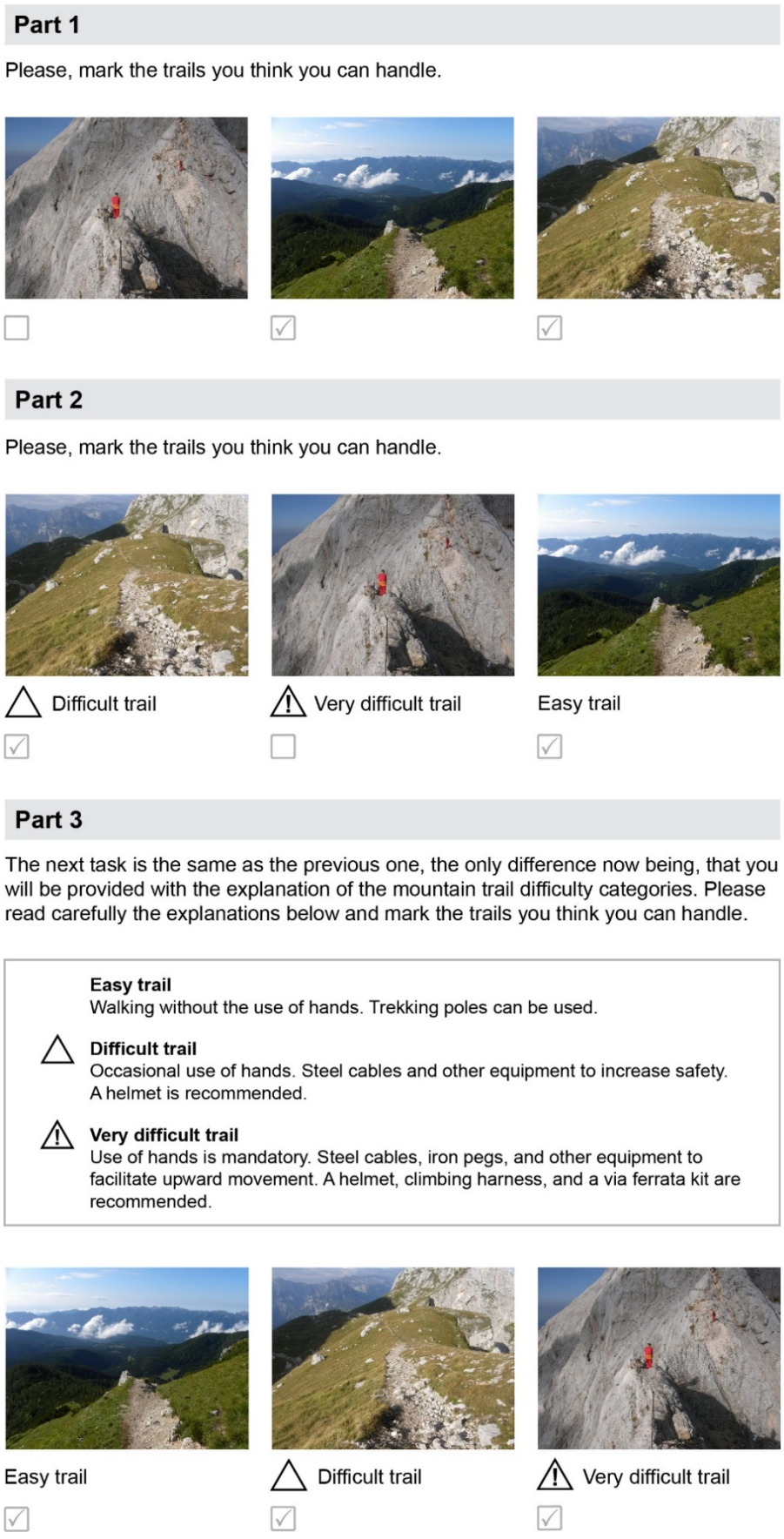
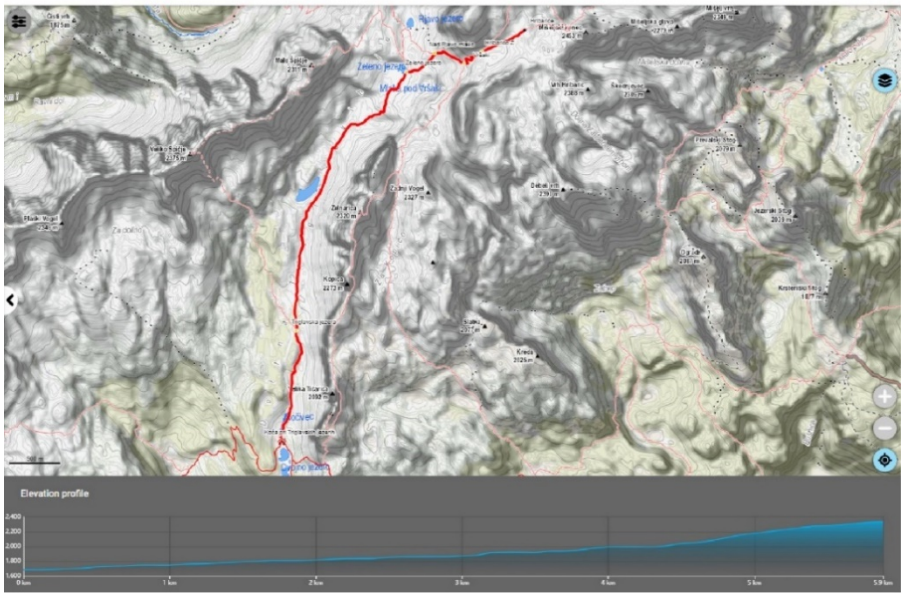


Figure 6: Elevation profile presented in part 4 of the test (Photo retrieved from https://mapzs.pzs.si/search/all)

Part 4



5 Results

Reaching the target groups

The phenomenon of not reaching the target groups during mountain tour planning was studied as described in Phase 1 of the Methodology section.

Tourists usually start planning a mountain tour when they are already at the vacation destination. Due to the limited time available, the necessary information is sought after as conveniently as possible. The first channel for seeking inspiration is through mountaineering websites, where the information is often derived from secondary sources, which are typically in a different language or translated. This is where the ambiguity of terminology occurs because plain language is not used. Terms such as hiking, mountaineering, and mountain climbing are often utilized as synonyms, without noting that their meaning in English correlates with the difficulty of the activity. Furthermore, this inconsistency is also evident in other promotional materials and in spoken language, which might mislead tourists into unreal anticipation of the challenges encountered on the tour.

In addition to the Internet, further advice is sought from the personnel at the accommodation facilities, who often lack the relevant knowledge to provide accurate information. Thus, tourists are referred to the tourist information centre, where the responsibility of choosing a tour that suits one's abilities is often forfeit by the staff. As personnel have neither training in mountain activities nor tools to evaluate one's abilities, they rely solely on personal experience. The information about the local sign system is not provided to the tourist, as usually nobody inquiries about it.

Current preventive measures also fail to reach the target groups also due to distinct ways of tour planning. Nowadays, there is a vast scope of mobile applications and platforms that can be used as tour planning tools. However, each digital tool uses its own criteria for defining the difficulty categories, which are not compatible with the Slovenian three-point difficulty scale. Furthermore, there are currently no mobile applications specifically adapted for Slovenian mountains. This also emanates in the names of the mountain peaks and huts being translated to the foreigner's mother tongue, which is in a contrast to the signage that is exclusively written in Slovenian. Hence, foreigners are forced to translate the inscriptions on the signposts to learn, whether they correspond to the names provided by the mobile applications. Moreover, the explanation of the Slovenian mountain trail sign system is not included in the foreign mobile applications.

Despite the delivery of preventive information through multiple analogue and digital channels, the inconsistent use of terminology, absence of plain language, lack of translated materials and inadequate adaptability to the various types of tour planning hinder the current preventive efforts to reach the target users.

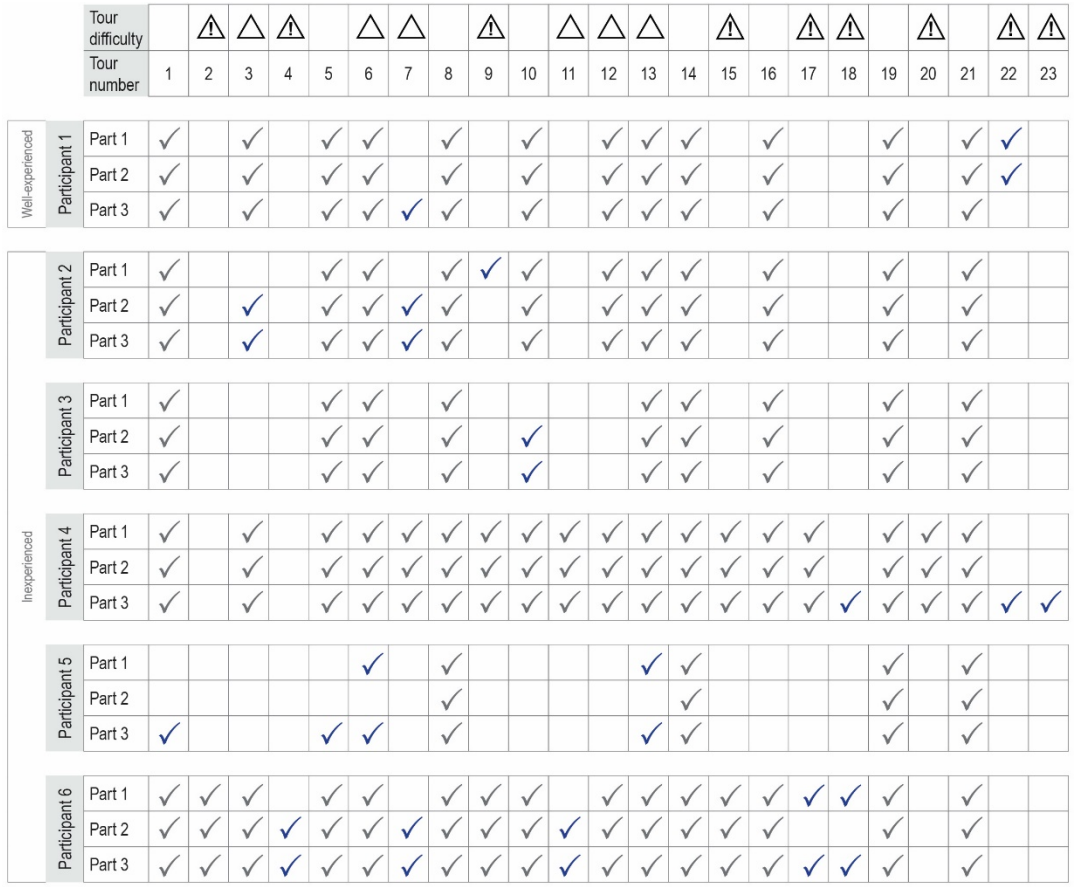
Understanding of the communication gap

After investigating the reasons for not reaching the target groups through preventive measures, the effectiveness of the marks for the difficulty of mountain trails was examined. This was executed as described in the Phase 2 of the Methodology section.

The results of part 1 of the test indicate that four out of five inexperienced mountaineers overestimated their abilities based only on the photographs of the tours. One well-experienced participant (Participant 1 in Figure 7) correctly assessed their abilities.

The results of part 2, in which the tour photographs were supplemented with textual information about the tour difficulty, show that participants corrected their decisions up to five times compared to the selected photos in part 1. In this part, they rated tours they had previously marked as unsuitable as suitable or vice versa. This suggests that textual information about tour difficulty, without truly understanding the meaning behind it, carries enough message to influence decisions (Figure 7).

Figure 7: Test results from research Phase 2. Crucial changes in selection are shown in blue.



In part 4, all participants assessed that the elevation profile with a corresponding topographic map is not informative enough to decide whether the tour is too demanding or not. Compared to the photos from the previous parts of the test, they found the map and elevation profile less informative. On the contrary, the Kepler track video was rated as the best support for self-assessment of skills and subsequent mountain tour selection.

Overall, all participants emphasised that tour photographs have a great impact on the speed of the decision-making process in the planning phase of the tour and make the decision more tangible. Their contribution to a more accurate perception of the tour difficulty was recognised as immense. Only then the interviewees declared to understand, what kind of message a text or a mark describing the tour difficulty conveyed.

Interviews with foreigners revealed that self-assessment of abilities is the most perplexing part of tour planning. Furthermore, the difficulty of the tour is mainly assessed by the duration and required equipment. Inexperienced mountaineers lack a perception of how much activity is suitable for them and what a given elevation gain means in relation to their endurance. If the tour is feasible in one day, most believe that average physical fitness is required.

6 Discussion

Notwithstanding the inevitable subjectivity in the assessment of participants' mountaineering experience, the results demonstrate that foreigners lack support in selecting a suitable mountain tour. Due to insufficient attention paid to building a holistic understanding of preventive measures and tour planning, the information either does not reach the target groups or is incompletely understood. The generalizability of the results is limited by a small test group of participants and a limited number of tours presented in the test. The visual testing could be further explored with a different set of photos. Furthermore, each tour could be presented with more than one photograph.

The results indicate that despite the supplementary textual explanation, the marks for the difficulty of the mountain trails are too abstract to be used as a basis for assessing one's abilities. Combined with tour photographs, they can influence decisions, but not to a vast extent. This could be remedied by the development of technology-based physical abilities assessment tools that would simplify the selection of a mountain tour. Such tools could exploit the biometric data collected by modern fitness trackers to suggest mountain tours, tailored to the user's abilities. The potential of virtual reality and 360□ photos incorporated into preventive measures is yet to be explored.

In addition, the Slovenian mountain trail sign system should be explained at various user touchpoints, especially at the tourist destinations in the alpine landscape. To overcome the language barrier and communication gap, plain language should be employed omnichannel. Additional educational programmes for the tourism sector personnel are needed, which should include a first-hand experience of the popular tours to eliminate the biases currently present in information conveyance.

7 Conclusion

In this paper, empirical research of the preventive measures for mountaineering accidents in Slovenia, not achieving their objectives, is presented. According to the findings, current admonitions in digital and analogue form inadequately convey the message about the Slovenian mountain trail sign system to foreign inexperienced tourists, as the abstract, textual information is not complemented by additional visual materials. The marks for the difficulty of the mountain trail are not well understood and do not offer a basis for an accurate self-assessment of physical and psychological abilities. Although preventive information is provided through various channels, the inconsistent use of terminology, lack of professionally translated materials and inadequate adaptability to the diverse types of tour planning hinder the current preventive admonitions from reaching the target users. With better information design, tourists could better assess their abilities and consequently select more suitable tours.

For an effective and efficient understanding of the preventive measures for mountaineering accidents in Slovenia, it is necessary to simultaneously examine the perspectives of information as well as service design. Only then will innovative propositions for reducing mountaineering accidents be effective.

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