

# **User needs for Location Based Services in protected areas – case study Swiss National Park**

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## **Abstract**

The Swiss National Park (SNP, Switzerland, Central Alps), is the main test area for the EU project WebPark. One of the projects' aims is to specify and evaluate the information needs of visitors to recreational and protected areas and to provide this information in the field on mobile Internet platforms. As one approach, a mail survey was conducted. The results received through 1597 completed questionnaires concern users information needs for LBS, former and actual use of digital media and former information behavior of visitors. Results show, that safety information is of key importance. Wildlife information is highly demanded. The provision of information has to be done quietly and only on request. In general, the user wishes to maintain control over information content, delivery (pull/push, visible/audible) and personal privacy and security.

Keywords: Personal Digital Assistant, Location Based Services, users information needs, protected areas

## **1 Introduction**

The Swiss National Park (Switzerland, Central Alps), is the main test area for the EU project WebPark (IST-2000 31041). This research project aims to develop personalized value-added Location Based Services (LBS) for recreation in protected coastal, rural and mountainous areas. These services will enable users to request information from several databases by mobile phone and/or Personal Digital Assistant (PDA) and similar devices. In the project high importance is attached to information design in order to guarantee user focused information services. In addition to that, handling must be as easy as possible. This is achieved by extensive user needs assessments and analysis based on different techniques like visitor monitoring, surveys (questionnaire) and scenario testing to determine the cognitive tasks around which the interfaces should be built.

## 2 Theory and Issues

The recreational use of wilderness areas increased steadily during the last decades (Cole, 1996). Facing the increasing visitor numbers, managers of recreational and protected areas must deal with additional management issues like environmental and social impacts. Furthermore, monitoring and planning processes in such areas include *information services*: What kind of *experience* and *information* shall be provided to visitors (Eagles et al. 2002)? Recreation, tourism and safety administrations currently deal with a large number of enquiries such as „when is it possible to go, where can I see or what is the state of this trail?“ From a management point of view, such queries take time at the user side and require staff to respond. Hence, many administrations of protected/recreational areas and tourism have created web pages, digital media and different printed products to address these needs. However, information is not available precisely when many users need it, i.e. when they are outside on a hike. Information needs are affected by a variety of factors, such as background, professional orientation and other individual characteristics of the user, or social, economic and political systems around the user (Devadason & Pandala, 1997). One of the used techniques of user requirement analysis for WebPark services was a mail and online survey in form of a questionnaire sent out to potential national park visitors to provide following information

- previous contacts with the Swiss National Park (SNP) and general information seeking behaviour
- information about the actual use of Internet and mobile devices/PDAs
- users information needs for a location based information system, e.g. information topics
- background information like the social compound, age and professional structure of the respondents

## 3 Methods

### 3.1 Survey

The questionnaire design and structure followed principles of Bortz & Döring (2002), Wieken (1998) and Schnell et al. (1998). Different groups of questions were designed to evaluate the potential user needs, social backgrounds of interviewees, previous usage of digital media with regard to the SNP and usual information retrieval behaviour. From November to December 2001 the questionnaire was prepared and translated into German, French and Italian, the different required languages. The survey was sent out to individuals found in the address database of the National Park. This includes customers of the National Park House shop, subscribers to the National

Park newspaper „Cratschla“ and people having personal contacts or having being on an inter-institutional exchange with the SNP. After checking and clearing the data, 2420 questionnaires were sent out to potential park visitors in Switzerland, Austria, Germany and Italy. Most of these people visit the park regularly. In addition, to reach more people who had not had much contact to the National Park previously but who were probably interested in these kinds of protected areas, an online survey was provided using the same format as the mail survey. A link on the SNP homepage ([www.nationalpark.ch](http://www.nationalpark.ch)) led to the questionnaire.

### **3.2 Data analysis**

After the plausibility check the following steps were performed prior to the statistical analysis:

- Categorisation of open answers: Answers associated with existing categories or new categories were introduced. For example, the categories policy/jura, pension, house-wife/-husband, pupil/student and media were added to the question „field of work“.
- Introduction of new variables: Existing answers were transferred into new variables, e.g. the information canton (county) was translated into distance of settlement to SNP.

Statistical analysis was performed in two major steps:

- Description of the respondent group: Social and demographic background was described. Potentially auto-correlated parameters were checked.
- Analysis of central issues: The main questions such as on information behaviour, use of digital media and user needs, were analysed using different social and demographic parameters. To get an idea about the information needs as such, the questions concerning the essential user needs were checked against each other: Do people with high security requirements need maps for orientation purposes as well? Are people interested in animals interested in vegetation as well?

Statistical analysis was performed with SPSS v.11.0.

## **4 Results**

### **4.1 Description of the sample**

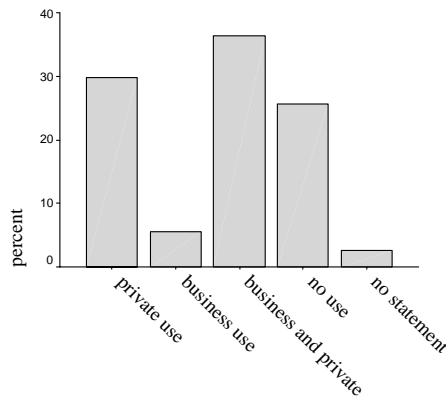
The return rate of the questionnaires was 44%. In total 1597 cases were included in the analysis after the data preparation. The ratio of male to female respondents was 2 to 1; most of the respondents were aged from 41 to 50 years old. 90% of the respondent group had visited the SNP at least once before. From this group, 30% had visited the SNP more than 10 times. Most of the returned questionnaires had been

filled out by „Cratschla” subscribers (52.5%), a smaller number of returns were from shop customers (12.9%), had been made aware of the questionnaire by email (12.1%) or had filled in the questionnaire on the internet (8.0%). With regard to profession, about 15% of the respondents were employed in sales/marketing or educational/university businesses respectively, followed by a group of retired people and a group working in civil service.

#### 4.2 Former and actual use of digital media

Most of the respondents (70%) used a mobile phone, 30% did not. One third of the mobile users (36.4%) used it for private as well as for business purposes, 29.8% only for private and 5.5% only for business purposes (Figure 1).

**Fig. 1.** Mobile use of the respondents (n=1597)



More than 80% of the respondents used their mobile on holiday, only 14% did not. In general, the use of a mobile phone depended on the age of the respondents. The older respondents tended to use a mobile less frequently than the younger respondents ( $\chi^2$ ,  $p < 0.05$ ). Most respondents asserted security reasons for using the mobile phone in activities and sports (67.2%). PDAs were only currently used by a small group of respondents (15%). 86% (1380) of all respondents had Internet access available. 52.3% of the respondents had Internet access at home as well as at work, 13.6% had no Internet access. Most of the respondents who had Internet access used the net daily (48.3%), 29.9% used it weekly and 18.6% used it only once a month. Younger respondents were more likely to have Internet access than older respondents ( $\chi^2$ -test,  $p < 0.05$ ).

### 4.3 Former and actual information behaviour

There is an official printed guide available in the SNP as well as guided tours through the park. 33.6% of the respondents used this official guide book, whereas 44.4% did not, and 11.6% obtained information from the park rangers in person, from other visitors, or from friends. More than half of the respondents had visited the SNP homepage. For these, information on nature in general and special animal and plant species seem to be of most interest, followed by news and history (Table 1).

**Table 1.** Information interests on the SNP homepage [www.nationalpark.ch](http://www.nationalpark.ch)

	rank	count	percent of responses
nature, animals, plants	1	641	25.1
news	2	523	20.5
history	3	368	14.4
lodging, accomodation	4	270	10.6
GIS	5	270	10.6
opening hours SNP information centre	6	250	9.8
guided tours	7	122	4.8
others	8	111	4.3
Total responses		1832	100.0

A high number of people liked the information boards or the information provided by books or other printed media. The information provided by nature trails and personal contact with the staff was also very popular (Table 2).

**Table 2.** Preferences of information provision while hiking through the SNP

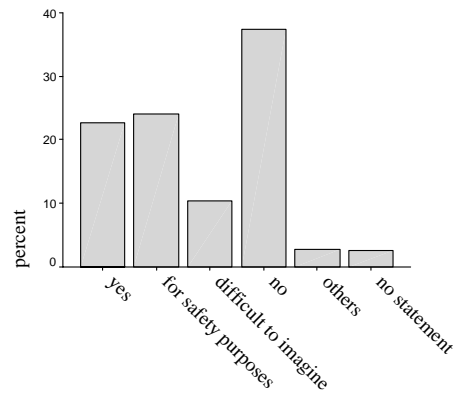
	rank	count	percent of responses
information boards	1	1039	26.0
literature	2	807	20.2
nature trails	3	641	16.0
personal contact to staff	4	629	17.3
no info needed	5	304	7.6
knowing SNP very well	6	295	7.4
guided tour	7	220	5.5
Total responses		3998	100.0

### 4.4 User needs

Before evaluating the users information needs for LBS the respondents had to answer the question, if they would generally use such an information service. 20% would use the service without restrictions, whereas 24% would only use it for security reasons,

10.5% supposed the service to be interesting but could not imagine it very well and 37.4% of all respondents would not use it (Figure 2).

**Fig. 2.** Potential use of the proposed information service (n=1597)



The group of the „Cratschla” subscribers tended to refuse the service more than the other groups. As mentioned above, 54% (n=1000) of the respondents said they would use the service for various reasons. Significant differences in the social and demographic backgrounds of this group to those who said they would not use the service could not be found. There were slight differences in the use of internet and mobile phones, but these differences depend on age significantly ( $\chi^2$ -test,  $p < 0.05$ ).

The information topics indicated to be most important and attractive were safety, fauna (animal locations), information for orientation purposes and flora (Table 3).

Table 3. User needs. Numbers in front of questions according to the question numbers in the questionnaire. Included are the cases where respondents would use the service (n=1000).

n=1000	% very important	% important	% less important	% not necessary	% no statement
3.9 Safety information such as severe weather warnings, unuseable paths etc.?	51.2	26.7	8.9	4	9.2
3.6 The locations of particular animal species and how to get there?	36.1	37.3	7.3	8.6	10.7
3.1 Maps and other information for orientation purposes based on your actual position (similar to the car GPS-system)?	20.5	37.4	12.8	17.2	12.1
3.5 Actual information about vegetation (e.g. important flowers in blossom)?	20.1	45.3	13.2	8.7	12.7
3.3 Thematic maps, for example geological maps, vegetation, slopes etc.?	15.4	45.4	16.3	10.4	12.5
3.7 Local information about current research projects?	8.7	40	26.5	11.9	12.9
3.2 Information on your route, such as quality, steepness, distances and nearest/next picnic areas?	15	37.3	18.6	18.2	10.9
3.4 The nearest possibility of personal information?	12	34.6	26.1	14.8	12.5
3.8 A virtual, interactive instruction trail guided by a mobile/PDA?	2.5	19.8	28	35.4	14.3



When comparing the information needs with cross tables, three groups of information needs can be designated ( $\chi^2$ -test,  $p < 0.05$ ):

- *Orientation*: The respondents who would like to have maps and other information for orientation purposes tend to require information on their route as well as virtual trails.
- *Security*: The respondents who would like to have security information tend to require route information and maps in general.

- *Fauna and flora:* The respondents who would like to have information about animal locations tend to require information about vegetation, research, and thematic maps as well.

Concerning the delivery of information, 30.9% of the respondents would want to get all information by request (pull), 25.9% would prefer the delivery to be dependent upon the type of information, 18.4% would limit the push-option (automatic delivery of information) to security information, 6.1% had no preferences and 6.4% would want to get all kinds of information automatically (push). 36.7% of the respondents preferred the idea of viewing the information, 32.2% would want this dependent upon the type of information, 10.5% had no preferences and 7.5% would like to hear the incoming information.

## 5 Discussion

By definition, random samples only allow conclusions to be made about the distribution of certain characteristics of the main unit from the distribution of the characteristics of the sample results (SCHNELL et al., 1998). The SNP user needs assessment did not use a random sample, and is therefore not representative with respect to this definition. Nevertheless, the sample was very useful for the aims it achieved. The questionnaire respondents were not only potentially but highly interested in the SNP and represent the target main unit for a location based information service (visitors or potential visitors of the SNP) very well. Most of the respondents are already familiar with technologies like the Internet and mobile devices. Also on holidays many people use a mobile phone, though less than they would normally. The SNP is equipped with a wide range of different information media. Written media like books, brochures and maps are still popular to answer questions before and after a visit to the park. In addition, the Internet site and the recently published CD-ROM have found many friends.. An outcome of the survey was that security issues are very important for many visitors. On the one hand they visit the SNP because of its natural landscape and wilderness, on the other hand they want a wilderness controlled and well prepared for visitors. The importance of information about flora and fauna was expected, because the SNP is famous for its richness of fauna and flora. Virtual, interactive instruction trails were not highly demanded by the respondents. Maybe many of them cannot imagine how these might look. Another explanation might be that people do not want to be crowded with any information available, rather they want to decide on their own what to get to know about. However, the results of the survey provide a useful basis to build upon. The preferred information topics and deliverable mechanisms determine the range of geographical location based or non location based data which have to be either



prepared or still to be produced for the development of the WebPark services architecture.

## **6 Conclusion**

„Identification of information needs is essential to the design of information systems in general and to the provision of effective information services in particular” (Devadason & Pandala 1996). At a time when protected and recreation areas are under pressure from the sheer weight of the visitor numbers, intelligent solutions for information services, developed with help of users information needs studies can ensure that the visitors make eco-friendly and safe use of the environment. Referred to the special aim of developing a mobile LBS, following conclusions can be drawn. They are specifically applicable to the visitors of the SNP and in addition are valid for most other alpine regions with a similar environments.

- Safety information is of key importance, hence, actual information on the state of the trails, changes in weather conditions etc. is demand. Consequently, the rangers in the field should be able to give real time information back to the system.
- The visitors are generally interested in navigation media. In the context of LBS not only do digital maps have to be provided but also tools for the profile-visualisation of the planned trip and actual, location based information on the topography of the route to follow.
- Wildlife information is highly demanded. Therefore, thematically maps for vegetation and animal occurrences are necessary. In addition, extensive specific, non location based information on these topics in a form of a digital library is needed.
- The information provision has to be quiet and (for most information topics) to be provided on request, as audio mobile alerts and spoken content are not favoured
- In general, the user wishes to maintain control over information content, delivery (pull/push, visible/audible) and personal privacy and security.

## **6 Acknowledgement**

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