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USING GPS TO ANALYSIS TIME-SPACE TOURISTS' BEHAVIOUR. A PRE-TEST STUDY IN BOÍ VALLEY

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The study of the time-space behavior of tourists has been based on various data collection methods such as observation, travel diaries, maps behavior, studying photographs of tourists, surveys or panels or analyzing travel blogs also.

Today the use of Global Positioning Systems (hereinafter GPS) for studying the time-space visitor activity in tourist areas is spreading. GPS can track the location of a tourist every second with very high accuracy. A wealth of information is provides, with a very high level of detail on the behavior of pedestrians (Shoval and Isaacson, 2007). Moreover, the collected data can be easily analyzed using Geographic Information Systems (GIS), which provide very accurate information about the patterns of tourist behavior, the total elapsed time, time at each node, length of stay, average speed, for instance (Shoval and Isaacson, 2007). In short, the main advantage of this type of spatial analysis is that it provides a wider and better understanding of some of the behaviors of visitors (Bauder, 2014) and allows influencing the management of tourist space and consequently improving the quality of the tourist experience.

In fact, the use of GPS is becoming a standard practice as a research technique. A large number of studies examining movement patterns of tourists using GPS in order to collect data on the spatial and temporal behavior are emerging in the literature, with quite successful results. Thus, one of the most common areas are the natural spaces (Arnberg and Hinterberg, 2003; Chhetri and Arrowsmith, 2008, Svensson et al, 2011; Orellana et al, 2012; Wolf et al, 2012; Smallwood et al, 2012; Hallo et al, 2012). Studies also begin to appear in theme parks and recreational areas (Shoval, 2010; Zillinger, 2010, Russo et al, 2010; Zillinger and Pettersson, 2011; Birenboim et al, 2013.) in big cities like Hong Kong (Shoval et al, 2011;. McKercher et al, 2012; Grinberger et al, 2014; Edward et al, 2010), Freiburg (Bauder, 2014) or Sydney and Canberra; and finally, in historic districts and heritage cities (Isaacsson Shoval and Isaacsson, 2006, 2007; Van der Spek, 2010;

Tchetchick et al, 2009). In parallel, the geographic area under research has been expanded and also data on the movements of visitors in tourist areas such as islands in the North Sea has been monitored (Nielsen et al., 2010), Estonia (Ahas et al., 2007) or Italian alpine valleys (Bruno et al., 2010).

All these precedents have been characterized by selecting a geographic area that corresponds to a particular type of tourism: cultural, natural, metropolitan, thematic tourism. There are tourist areas which are characterized by the coexistence of cultural resources, natural or recreational nature, so visitors should not only choose among the various resources of the destination, but also between different typological categories. This paper explores the behavior of visitors in the Boí Valley, an area in the Catalan Pyrenees which is characterized by the presence of high value cultural, natural and leisure resources. The goal is to understand how visitors respond to a very wide range of stimuli and to what extent they tend to focus on a single category or try to cover the whole offer in the destination.

The Boí Valley is an excellent outdoor laboratory, with all elements of the tourist experience: an extraordinary cultural heritage, exceptional natural features, facilities and exclusive tourist services and a rich ethnographic heritage. Therefore, tourists find in the valley many different heritage, nature and recreational stimuli, which means they must select some items and reject others

The information for this pilot study was collected during the months of July to October 2012. The final sample was composed by 79 GPS trackings. The GPS were distributed from the Barruera Tourism Office Information, the first village in the valley. Each group of visitors who could be an individual, a couple or a family group received only a GPS device, which would be returned in the same Tourism Information Office in a box provided for this purpose, when returning from his/her stay in the valley. Every visitor who was part of the sample was asked to carry a GPS device as well as to answer a brief questionnaire with socio-demographic variables.

The GPS, a Data Logger QStarz model (BT-Q1000XT/TR-Q1000XT), recorded every 10 seconds by measuring the position of the visitor in latitude and altitude to within a few meters, in real time. The data is automatically kept in the device and downloaded to a PC (software QTravel) upon the tourists returned the GPS. Each GPS had a range of 72 hours. The GPS was recharged in the Tourist Office itself during the time they were not in use.

The main result of the analysis of the social use of space by tourists in the Boi Valley is that visitors tend to visit a very large number of resources. The visitor optimizes her/his visit and makes an efficient itinerary that allows him/hers to access a wide sum of nodes and resources. An average tourist visits several villages, the national park and some Romanic churches. Logically, all tourists analyzed have accessed the village of Barruera because it is the collection point for the GPS. But two-thirds also have accessed Taüll or the National Park and three quarters have visited the village of Boi. The churches of San Juan of Boí, San Felix of Barruera and San Clemente of Taull, the icon of the valley, are visited by 50% of total visitors. Likewise, the percentage of other churches and villages is not trivial.

The pilot test also reveals that Boí Valley visitors remain in the valley an average of 20 hours, with a standard deviation of 7 hours; these descriptive statistics show that the Valley visitor responds both rural-cultural destinations typologies, excursionist and tourist (Royo, 2009). In both cases a short stay and a high number of visited nodes draw a very

high internal mobility and at the same time, an ephemeral consumption of each item. Thus, even with a high deviation of 57km, a visitor travels an average of 98km, which means an average speed of 5 km / h. If we consider that an important part of the stay is static due to overnight stays, contemplations or restorations, we see that the valley touristic consumption is characterized by an extreme mobility.

A large number of visited items in such a short time demands that the average visiting time is very short. In other words, it seems that nodes rather than visited are just observed. In short, the visitor behavior pattern is to recognize a certain nodes socially settled in the tourist imaginary. That is, tourists behave in the valley following a pre-established pattern of consumption.

Therefore, in general we can speak of an identifying behavior which we have named *fast look*, in other words, a quick and superficial visit to the maximum number of nodes in the shortest possible time. Tourists do not have a deep relationship with the visited elements, but merely to collect pieces of the touristic mosaic where photography helps to set and complement the memories of a superficial experience.

Thus, another Boí Valley touristic behavior characteristic is based essentially on the consumption of nodes external side or space attributes that are easily visible. That is, in most churches visitors have spent more time visiting the external side than the inner one. The visit, as already discussed above, responds more to the behavioral pattern of a rapid ritual with a brief overview and some photograph than to a real effort to understand and feel the heritage value.

However, the organization of the parts that make up the touristic offer in the valley is very hierarchical. The tourism system tends to organize the whole catalog of visiting opportunities in a very hierarchical way. A few elements are universal and are part of the set of paths; and as the visiting time is extended, the visitors access other lower levels of the touristic hierarchy. Therefore, the behavior of visitors is relatively ritual and tends to reproduce very predictable patterns of consumption. Results show that 18.8% of visitors enter a unique church in the valley, 41.3% visit two or three churches, 28.9% four or more churches, and only 11.3% of visitors, mainly those interested in nature, has not visited any church. The mean is 2.73 visited churches and devoted an average of 12 minutes. These results show the importance of Romanic churches and the villages of Taüll and Boí as the main attraction of the valley. These are nodes with a great capacity of attraction to capture the visitor's interest. Therefore, the tourism behavior of the Boí Valley responds to the nodal territory or sights model.

As the main limitation of the study is true that despite the advantages of using these technologies, there are still aspects of visitor behavior such as the tourist gaze, interest in certain elements, destination perception, image of touristic destination or level of satisfaction that cannot be analyzed with the use of GPS. These aspects require techniques such as direct observation (Hartmann, 1988; Keul and Küheberger, 1997, Galí and Donaire, 2006, 2010), space-time diaries (Thorthon et al, 1997;), analysis of pictures taken by tourists (and Couldway Mackay, 2004; Garrod, 2008; Donaire and Galí, 2011; Stylianou-Lambert, 2012), or the usual post-visit questionnaires or qualitative interviews. Future research should aim to complement the results obtained with the GPS with those obtained through these other methodologies.