Cooperative Landscape Assessment Using Web-GIS-Technology

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Abstract

The paper presents results from a recent doctoral research (STEMMER in preparation) dealing with methods of cooperative landscape assessment using web-GIS technology. The aim of this research was to develop a method that helps gaining local landscape knowledge and support planning and decision-making processes. The focus was on so called soft-data (KAHILA & KYTTÄ 2009) on landscape perception as well as valuation of landscapes.

Due to their specific education (KÜHNE 2011, 174; KÜHNE 2006b, 149) experts tend to perceive landscapes mainly in cognitive ways, whereas members of the general public are mainly bounded to landscapes in aesthetic and emotional ways (IPSEN 2006, 67). These two perspectives could also be described as positivistic and constructivist approaches to landscape and, at first sight, they seem highly incompatible. Most constructivist phenomena do not fit established positivistic planning methodologies and tools, such as geographic information systems.

However, public landscape perception is increasingly important for decision making. A general consensus on what landscape is and what it should look like is difficult to establish; this is mainly because, in postmodern societies, values differ greatly and due to pluralisation of lifestyles and cultures (INGLEHART 1998, 52). To integrate public landscape perception into geodesign processes is a challenge that the work presented in this paper will try to meet. Constructivist theories of landscape perception (IPSEN 2006, KÜHNE 2008, KÜHNE 2006a) are applied to create a framework for the analysis of statements on landscape that are formulated by members of the general public. The aim is to deconstruct statements that are based on emotional and aesthetic evaluation into a format that meets the needs of geodesign processes. In an online survey members of the general public were asked to draw areas that they perceive as landscapes on a web-GIS map and to describe the landscape using their own words. Based on this information, and applying the approach described, above the output of the survey is analyzed. Two case studies have been conducted that demonstrate results of the approach.

1 Introduction and Problem Statement

'Landscape' is generally considered to be a concept that many people are familiar with. When people participate in landscape debates it becomes apparent that landscape perception and assessment by members of the public differ dramatically from results that experts generate employing traditional landscape assessment methods (BRUNS and STEMMER in

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preparation). Traditional landscape assessment methods, at least in Germany, are developed based on positivistic landscape theory, assuming that landscape is an objective entity. In consequence, the relation between a landscape and a landscape perceiving subject is thought of as a linear process linking object with (perceiving) subject. Thus, by analysing spatial objects it should be possible, it is thought, to predict people's perception and assessment of a landscape.

Eventually, the one prerequisite this theory is based on no longer holds and that is the assumption that a general and collective consensus of landscape perception and valuation exists within a society at large. With the transformation of modern into postmodern society we are also experiencing a transformation from one common landscape ideal to more differentiated and even individualistic landscape perceptions. In addition, as part of a growing apprehension of authorities, the general trust in expert opinion is eroding. Not only is official landscape assessment affected by such trends, but every part of planning must make increasing efforts to gain acceptance by the general. What can be recognised in recent examples of non-acceptance is the difference in the perception, of any seemingly objective issue, by experts and protesters (GÖSCHEL 2013). This leads to the second misunderstanding included in positivistic types of landscape assessment: Perception cannot be understood as a one-way path with information travelling from object to subject, but must be modelled as a series of interactions between object and subject. Relevant models are found in most modern theories of perception and socio-constructivist theories.

It should be noted that positivistic approaches used in most types of landscape planning are very common, and they work perfectly in the context of a great variety of environmental planning and assessment; nearly the whole system of planning is based upon such approaches. The importance of pertinent methods and their long tradition is also apparent when looking at modern GI-Systems. The task of landscape planning is to integrate different environmental aspects including those best addressed by positivistic and those best addressed by constructivist approaches to support decision making. Consequently, planners have to adjust to the upcoming challenges of postmodern society, for example by integrating public perception into landscape assessment. New media in particular provide great opportunities to do so. The usage of internet technology and interactive Web-GIS is the key for including large numbers of people even at regional level.

2 Theory of Landscape Perception – The Socio-Constructivist Perspective

2.1 General Theory of Perception

Perception psychology has dealt with the human perception since the 19th century. Different theories have been generated, all of which belong to one of the three main groups: Classic perception theory, 'Reiz'-theory and 'Gestalt'-theory. From today's point of view none of the three seem fully sufficient; it rather seems many of the aspects of all three have to be taken in to account to understand perception. Moreover, the stringent separation of input and output took an aspect for granted that should have been the subject of research itself (MAUSFELD 2011, 76). NEISSER (amongst others NEISSER 1967) established, during the second half of the 19th century, the field of cognitive psychology. Perception was no longer

believed to be a linear process, either from object to subject, or the other way. Schema where thought of to be used for perception and as new impulses analysed using the schema, and the schema itself would be modified. Learning can be explained by this theory. Moreover, today it is assumed, and considered to be quite certain, that environmental impulses merely can be seen as starting point for complex consciousness-intern construction processes. Environment is no longer thought of as something surrounding people but something that is constructed in and by their consciousness (MAUSFELD 2011, 87). That said, perception theory and constructivist theories today show major communalities.

2.2 Constructivist Theory

In difference to realism (and positivism) constructivism assumes that no reality exists that is independent from human consciousness. Thus, reality is the result from any social interaction occurring in everyday life. Constructivists can be rather radical, stating for example, that all which we perceive does not really exist and is solely a construction (radical constructivism). A moderate constructivist might be stating that reality is constructed, but constructions are based on an existing outside environment (BURR 2005: 20). In the following such moderate form of constructivism is assumed.

2.3 Special Constructivist Landscape Theories

IPSEN (2002, 2006) and, in recent years, KÜHNE (amongst others KÜHNE 2006a) have developed theories on landscape perception that help to understand landscape perception and valuation.

IPSEN found that landscape is perceived in three dimensions; cognitive, aesthetic and emotional (Fig. 1). The former is related to landscape knowledge, the second is related to the aesthetic perception of landscape using all senses; the third is related to the feeling of homeland and identity. The three of them are highly independent from each other, e.g. people might be bound to a certain landscape as their homeland (emotional dimension) but know little about its material and cultural genesis (cognitive dimension). Explained the other way around, someone might perfectly understand the landscape geology and the evolution of vegetation, but this will not help this person to understand any aesthetic or emotional values.

KÜHNE developed this idea further to more practically explain how landscape perception works. Accordingly there are four layers of landscape construction (Fig. 1). The basis is 'physical space', containing all elements and features of 'reality'. Out of the variety of elements and features only some are chosen, by any perceiver, as the basis for landscape construction; the so called 'adopted physical landscape' is the result. In layer three, social meaning and values are attached to the selected elements and features, and a landscape is formed that is shared among certain groups, or communities, that exist inside of society (so called 'social landscape'). In the fourth and last step, this 'social landscape' is overlaid by individual experiences including emotional valuation. The 'individually modified social landscape' is thus a highly individual construct. Nevertheless both 'social' and 'individually modified landscape' are important because they are the basis and the source of conflicts that exist between members of the general public and different experts. The major cause of such differences between experts and laypeople is any secondary education that leads to the dominance of cognitive approaches to landscape. As expert landscape approaches are cog-

nitive they mostly deal with ‘physical space’ and ‘adopted physical landscape’. Members of the general public perceive landscapes based on aesthetics and emotion. Compared with experts laypeople do not tend to split landscape up into different compartments (e.g. soil, water, vegetation etc.) but refer to their overall landscape impression. Members of the general public normally deal with a ‘social landscape’ and its individual adoptions.

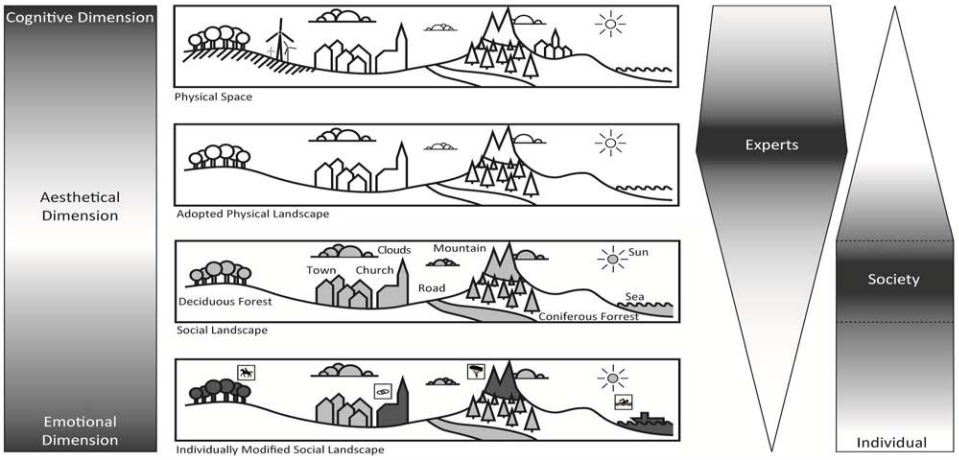

Fig. 1: Construction of landscapes according to IPSEN and KÜHNE

Both, IPSEN and KÜHNE, have shown that there are fundamental difference between the perceptions of landscapes by experts and general public. However there is also a difference between the perceptions of everyday landscapes on the one hand and ideal landscapes on the other hand, such as touristic destinations, symbolic cultural landscapes, and others. Ideal landscapes are evaluated by members of the public comparing images they have in mind (from school, postcards, films etc.) to what they see. Also, for landscapes they do not personally know these ideals help in landscape valuation. Everyday landscapes are perceived differently. Especially personal experience with a singular landscape is important. This, according to KÜHNE, is ‘social landscape’ and ‘individually modified social landscape’. Perception of those is highly individual or at least is shared only within small groups or communities.

3 Approach and Methods

Predicting the results of people’s perception and valuation of ideal landscapes might be possible by using expert methods. However, when the objective it to assess everyday landscapes, ways are needed to get access to the ‘social’ and ‘individually modified social landscape’. One option is to ask members of the public which areas in their surrounding people like, and why. Such an approach would lead to answers that take into account all the landscape knowledge that exist in public communities. Provides such information becomes available, landscape planners would then have to systematically and thoroughly analyse all

input that people give who take part in the inquiry. Within the case studies reported here, people have been asked:

- To draw in a Web-GIS-map which areas in their surrounding they like;
- To write a short text and include a description of the area, explaining what people like about it.

Such input was systematically analysed. The areas drawn by different people have been overlaid with one another and a hot spot map could be generated. Comparing the hotspots with expert assessment of scenic value lead to a comparison of people's perceptions with information that is prevalent in official plans (such as statutory land use plans and landscape plans).

The written texts were analysed using qualitative content analysis. According to constructivist landscape theory three different aspects where analysed:

- What elements of 'physical space' do people refer to? These elements are important for the construction of landscapes ('adopted physical landscape') and thus should be handled with care. Moreover it was analysed whether people referred to natural, semi natural or cultural elements. It was possible to map this information.
- What activities do people describe for certain areas? Activities are considered any act of using parts of a landscape. It is important that every-day activities are recognized by planners. If activities are no longer possible, for whatever reason, the areas presumably no longer will be cherished the same as before. To systematically analyse the activities the categories of three different phases of recreation were used as suggested by NOHL (2001, 52): (1) Phase of relatively low level of activity: sleeping, dozing, relaxing, etc.; (2) Phase of relaxation: stress release, meeting people, reading, talking, etc.; (3) Phase of high level physical activity and mental creativity: sports, painting, writing, handcrafting, etc. Pertinent information was mapped using GIS. The activities are closely related to the 'social landscape' and 'individually modified social landscape' because they show in what way people are bound to a landscape.
- Are there any hints to homeland or the feeling of identity in the texts? This is the most difficult question. No framework for relevant analysis exist, It was decided to first conduct case studies and then to use the material gathered here in order to find a way of analysing information given by different people.

4 Test and Case Studies

Two case studies have been conducted; one in Cologne and one in Kassel. Both studies showed, in many ways, comparable results. In both cases, the number of participants was not sufficiently high to gain empirical data that is sufficient for statistical analysis. Individual results indicate that the methods described above works well to gain a kind of public knowledge that has not yet been available, or that was very expensive to collect using traditional methods. In both studies it was found that areas exist that are extensively cherished by local people. From these areas it is possible to create a 'hot-spot-map' of public interest. At the same time the interest of people may also differ. Within the cologne study area, for example, it was found that some people used the survey to express their opposition to a

planned shopping centre. People's interest appears continuously to be related to proposed or feared landscape change. It must be assumed, however, that change is a basic characteristic of landscape itself.

Fig. 2: Results of the survey conducted in Cologne-Chorweiler: 1. Perceived elements of physical space; 2. Phases of Relaxation; 3. Emotional and aesthetic valuation of landscapes

During qualitative content analysis, first a relation to 'physical space' and 'adopted physical landscape' can be observed in most of the written texts. Moreover landscapes that are perceived as rather natural or cultural could be identified. But there was no hint that the one or the other would be considered being of higher value. There was also nothing said to suggest that the existence of specific features or elements in any of the areas that would people lead to construct, in their mind, a valuable landscape. The share of all elements mentioned was comparable to other studies (e.g. KÜHNE 2006a, 151). When comparison results from public input with the content of official plans, for example in Cologne, it was found that the elements that experts considered to be important where mainly those that have also been identified by members of the general public. However, some features were missing; especially when it comes to the individuality of landscapes those seem to be the most important ones.

People's activities could easily be sorted according to phases of recreation. With the mapped data it became apparent that some areas exist that are used for only one or two of the phases, while others were somehow used in more multifunctional ways. Looking at the activities in detail it seems that a lot of described activities are traditionally not on the agenda of official planning; in fact, some of these activities are assumed to be damaging to the landscape rather than making good use of it. When compared to official plans it turned out that every-day activities that do not need special infrastructure are seldom on the agenda of planning.

'Social' and 'individually modified social landscapes' are addressed, in this paper, as emotional an aesthetic dimension. Not surprising, nearly every participant wrote text that relates to these dimensions. What becomes obvious is how people feel bound to the landscapes they describe. Even in the case of the planned shopping centre in Cologne it is not just a typical NIMBY-strategy that makes people react. Indeed the way of describing aesthetical and emotional dimensions appears to be very divers. Most obvious are differences between aesthetic and emotional valuations. Aesthetical values seem to be prevalent in 'social landscape' meaning that there is consensus about values within groups of people; emotional evaluation appears to be even more individual.

5 Conclusion and Outlook

The test of the approach presented in this paper utilizes constructivist landscape theory. Results of landscape assessment show great potential. Large amounts of empirical data are still missing. One question is if 'big data' is needed for a qualitative approach like the one presented here, and how much publically generated data might be considered sufficient. Nevertheless, it was shown that, by employing the approach developed in this study, public landscape knowledge can be obtained for purposes of planning. One unsolved challenge remains, and that is how to address conflicts that pertain to different valuations and perceptions of landscape. However, it is a first step to find out how different landscapes are constructed in peoples mind. This is the starting point for discussing and developing different perspectives. Apart from any discussion about representativeness a main focus, in future studies, should be raising the numbers of participants and including all parts of society. This would help to find out more about the feeling of identity and homeland.

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