

Developing a Typology of Public Participation 2.0 Users: an Example of Nexthamburg.de

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1 ABSTRACT

This paper outlines the development of public participation 2.0 user types based on the existing Web 2.0 user types. The theoretical concepts were tested on nexthamburg.de, a public participatory platform enabling the users to exchange the ideas about the future of the city Hamburg. Existing Web 2.0 user typologies classify users according to their activity and according to their communication with Web 2.0. We adapt these user types for the needs of public participation and test them on our study case with nexthamburg.de. We classified users according to their interaction into passive, active and reactive users. The underlying functions of the website, on which the study is based, are the posting of ideas, commenting on ideas and voting for ideas. This article presents the results of the first study phase, based on the quantitative data gathered with the help of eTracker and the website's database. eTracker is a software that tracks the behaviour of the users and their interaction with the platform. We aim at getting an overview of how people interact with a public participation platform and to classify the interaction forms and the user types in order to better understand the possible uses of public participatory platforms.

2 INTRODUCTION

The use of multimedia technologies facilitates new forms of integrating citizens into urban planning. The implementation of multimedia and interactive functions has the potential to introduce innovative forms of participation based on Web 2.0 technologies. With the integration of this concept, public participation becomes public participation 2.0 (PP 2.0) "using the new media to reach out to wherever citizens are active, including cyberspace" (Sommer and Cullen 2009: 2). Public participation 2.0 describes the usage of Web 2.0 technology for the purpose of public participation. Both concepts, Web 2.0 and PP 2.0, encourage and enable citizens /users to produce content, an idea, or even a network on the internet.

Providing content and instruments for public participation 2.0 necessitates the need to know who the users are, and how they interact with web-content and with each other. These two questions are of interest to us. On the basis of our research on interaction with a public participation platform we aim at developing innovative methods of presenting web-content for the purpose of public participation to foster an "active participation" and a high level of interaction. "Active participation" has a high position on the ladder of participation, introduced by many researchers such as Arnstein (1971) and Kingston (2007), and includes two-way participation and involvement in the decision-making process.

Our work introduces the development of a user typology for the case study nexthamburg.de. Nexthamburg is a public online think tank for the Hamburg of Tomorrow. On the basis of online postings, nexthamburg.de develops visions, strategies and concrete ideas about contemporary issues of concern by citizens in Hamburg, Germany. Everybody is welcome to post an idea; and every idea or vision that appeals to the other users, who have the option to vote for a contribution, has a chance to be applied in a study and possibly implemented.

For our study of the user typology of public participation 2.0 users, three variables for classification are of interest: interaction (passive, reactive and interactive), level of communication (peer-to-peer, intra-community, public) and spatial reference, which indicates if the idea applies to a specific geographical location or if it concerns the area of Hamburg in general. In the first phase of the study we concentrated on the interaction of the users with the selected public participatory platform. The level of communication and spatial reference are the focus of the second phase of our study, not presented in this article. Having data about their interaction would be of enormous advantage to understand user behaviour and thus to tailor applications to the users' needs. To know about users' needs and to react to them aligns with the objective to integrate more citizens into planning processes.

The main contribution of this article is in the analysis of the public participation 2.0 user types. We describe the process of developing a user typology of public participation 2.0. The underlying hypothesis is that by

knowing how the users interact with the platform, we can tailor the web content and interaction to their needs and their interaction with the PP 2.0 platform. Sharp et al. (2007: 11) states “Designers need to know many different things about users, technologies, and interactions between them in order to create effective user experiences. At the very least, they need to understand how people act and react to events and how they communicate and interact with each other.”

The article is organised as follows. We present the previous work on web users in general, on different forms of interaction, and on developing Web 2.0 users’ typologies. Section 3 gives a brief overview of the public participatory platform nexthamburg.de selected for our case study. Section 4 presents our research methodology and first results. We conclude the article with a discussion about the results and our future work.

3 PREVIOUS WORK ON WEB USERS AND USER TYPOLOGIES

3.1 Understanding the Web Users

There are many interpretations of the term ‘user’; some even include the stakeholders in the user group (Sharp et al. 2007). The most applicable definition for our study is “people who interact directly with the product to achieve a task” (Sharp et al 2007: 430). We are interested in the users of public participatory applications offered on the Web 2.0.

There is broad consensus that web applications have to be tailored to users. Plenty of literature and approaches elaborate on this and how a website should look like and function (Tidwell 2006, Nielsen and Loranger 2008, Raskin 2001, Shneiderman and Plaisant 2005). These books offer a good view into interface- and interaction design and describe general guidelines. They propagate user studies, especially for sites with specific content. Questions that can be raised to get a broader picture of the user are: Who are the users of the system: experts, lay-men, men, women, what age, which ethnicity, etc.? What language and words do they use to describe what they are doing on the website? What do they want to achieve? What are the general tasks of the users? User studies vary with every specific application because some questions may be answered using general guidelines, but other specific problems need additional research and studies.

Most often the user specifications that influence the development of applications concentrate on the physical abilities, physical workplaces, diverse cognitive and perceptual abilities, personality differences, cultural and international diversity, disabilities and age (Schneiderman and Plaisant 2005). Some applications are only developed for and used by a certain group of people who have similar user specifications. Similar user specifications can also describe an interest that is shared, or the same goal that users want to achieve. Examples for webpages that have users with similar specification are websites that present information to a specific topic e.g extreme mountainbiking in the Alps, landscape photography or online maps like google maps that are used by users that have the goal to find a place. These websites are designed to follow the users’ goal. For example, the application “google maps” is simple, it offers the user an easy search capability. The goal that a user, whatever age or personality, wants to accomplish, with the help of this application, is to find the selected place.

To find a common denominator on a low level of interaction and a simple design is on the one hand an option, but on the other hand it bears the risk of offering content that is insufficiently challenging and uninteresting for some users. This is especially a concern as applications for PP 2.0 have the potential to deliver a lot more than the information about a route or a place. To design attractive applications we suggest analysing web users according to their interaction with an application instead of describing them with pre-defined age classes or the level of education, as some user typologies do. This article is our first study of users topologies based on the users’ behaviour and their interaction with the participatory application based on the Web 2.0 technology.

3.2 Interaction and Interaction Design

In the most general terms, interactivity simply describes an active relationship between two things (Salen and Zimmerman 2007: 58). It comes in many forms. For the purpose of designing interactivity it is important to understand what forms of interactivity the designers create. Interactive design is, according to Shedroff (2000: 269), “at once an ancient art and a new technology” because media “have always affected the telling of stories and the creation of experiences”. Even passive experiences such as reading or watching a video can

be understood as interactive, because they “involve an interaction between the mind and the device or the imagination and the story” (Shedroff 2000: 283). Salen and Zimmermann (2007: 59) describe “cognitive interactivity” and “beyond-the-object interactivity” as two of four modes of interactivity. While the first describes the psychological, emotional interaction with a system, the second describes the participation within the culture of the system, e.g. the fan culture of a game. According to Salen and Zimmermann (2007: 59), the explicit interactivity refers to the interactivity mode which enables reciprocal interactivity; the user manipulates the application and the application responds. This mode of interactivity is especially of interest to us and our study presented in this article. The fourth mode of interaction according to Salen and Zimmermann is “functional interactivity” (2007: 59). This mode describes the “functional, structural interaction with the material components of the system” and thus refers rather to the interface than the manipulation of an application (Salen and Zimmermann 2007: 59).

Different approaches of interactivity vary according to the specific activity of the user. Interaction with an application starts with looking at the interface and operating the system, e.g. typing the address of a website or choosing it from the bookmarks. Sharp et al. (2007: 64) substantiates different interaction types by distinguishing four types: Instructing, users issue instruction to a system; Conversing, users have a dialog with a system; Manipulating, users interact with objects like holding, opening or placing; and Exploring, users move through a virtual environment or physical space.

Basic interaction design starts with analysing the needs and requirements of the users (Sharp et al. 2007). However, the users are not always capable of describing their desires related to an application. This is because they are often not aware of what is technically possible. Suzanne Robertson terms these the “undreamed-of requirements” (Sharp et al. 2007: 432). These requirements can be approached “by understanding the characteristics and capabilities of the users, what they are trying to achieve, how they achieve it currently, and whether they would achieve their goals more effectively and have a more enjoyable experience if they were supported differently” (Sharp et al. 2007: 432). Identifying requirements should be partly done by the stakeholders, but they are not always aware of the users’ requirements and needs. This is one of the reasons why it is the definition of the requirements, to a large part, as the task of the interaction designers. Requirements can consist of a variety of different specifications such as look and feel requirements, usability requirements, operational requirement, etc. (Sharp et al. 2007: 526). In our study we concentrate on the explicit interactivity and observe in which way the users manipulate and use the existing online public participatory platform.

3.3 Online User Groups

In Germany, several studies of online users (Markt- und Medienforschungsinstitut Result 2007, ARD/ZDF Online Studie 1997-2009) try to describe the typologies of the Web 2.0 users. Their analyses focus basically on the users of the web-based platforms for market research. They suggest the distinction between the following two basic types of users: the users that participate actively by creating content and the users that participate passively by watching and reading content. Both groups contribute to the Web 2.0 in a mutual dependence. Passive users form an audience for the active users’ inputs and contributions. According to the study “Typologie Web 2.0” (Markt- und Medienforschungsinstitut Result 2007) around 30 percent of the Web 2.0 users are respectively information- and entertainment seekers. The first group uses the internet to obtain information; they participate optionally by asking questions in e.g. forums to get more information. The second passive group consists of users that seek entertainment in form of e.g. games, music or videos.

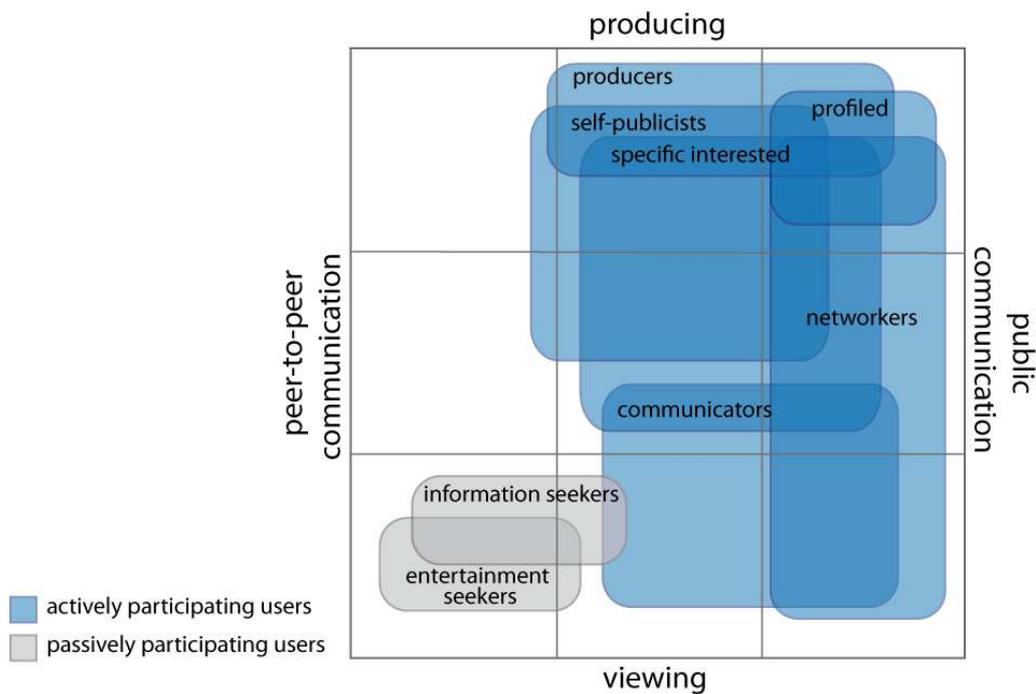


Fig. 1: Typology of Web 2.0 users (Markt- und Medienforschungsinstitut Result 2007: 37)

The group of the active users is more fragmented. Figure 1 shows the categorisations of the different users. The subgroups of the active users are developed on the basis of two axes: One axis for the level of creation; producing to viewing; and the other for the level of communication; from individual communication to public communication. The users are classified into groups according to the mode of their communication and the art of their interaction, beginning with just viewing on to producing content. The sub-groups are defined as: communicators, profiled, specific interested, networkers, producers and self-publicists. Communicators do not have a basic interest in creating content, they use Web 2.0 to communicate. The classical Web 2.0 user, in the study called “profiled”, uses all options to communicate and to create to the same extent. “Specific interested” use the Web 2.0 potential to communicate and to produce in the service of their interest. They are not as extroverted as the producers and self-publicists and can overlap with networkers. Networkers take advantage of the communicative aspects of Web 2.0, but they also create. Typical Networkers are the users of social-networking-sites. Producers are interested in publishing their photos, videos, music etc. Their focus is on showing their work, and the community and communication with other people are secondary. Self-publicists have the aim to present themselves by e.g. writing diaries on a weblog. They can overlap with the producers.

In this study, the basic goals of the users are added in order to be able to classify the users characteristic traits. The goals are, for example, to produce, socialize, or to present oneself. Without adding those traits self-publicists would show almost the same characteristics of action and thus the same position in the table as producers or networkers. However, because they follow different goals, their range of possible activities varies.

4 CASE STUDY NEXTHAMBURG

Our study case nexthamburg.de is a public think tank available on the Internet. Its main focus is the city of Hamburg and its future development. The citizens can post their comments and ideas directly through the online platform nexthamburg.de. Visions, strategies and concrete ideas are developed in a dialogue between citizens and the nexthamburg team, on the basis of online postings by citizens. The posted ideas are about contemporary issues citizens in Hamburg are concerned with. Everybody is welcome to post an idea. Citizens can contribute by commenting on posted ideas or by voting for the ideas posted by other citizens. Every month three ideas that get the highest number of votes are appointed top ideas. These top ideas are featured in an extra area on the website. Every half year a session is organized where the voted top ideas are discussed and one final winner is selected. The sessions are organised as events where people interested in

future developments of the city can physically meet and discuss the issues. The winning top idea is further developed and analysed in a feasibility study.

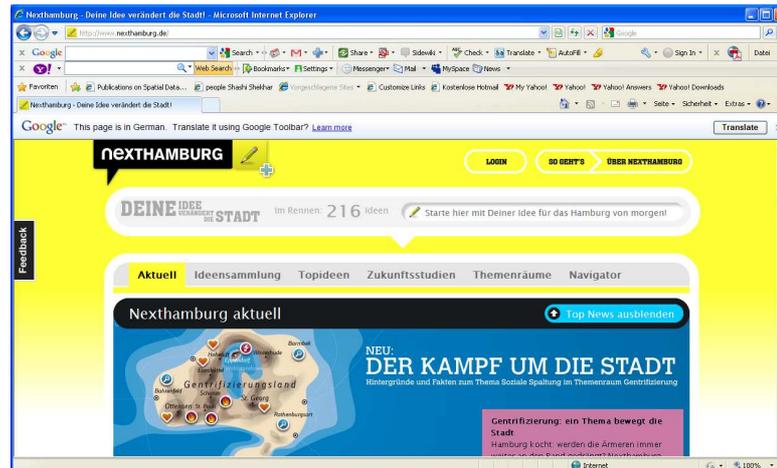


Fig. 2: Nexthamburg user interface (www.nexthamburg.de)

The philosophy of nexthamburg.de describes a bottom up process in public participation. Citizens can post every idea they have, even if it is not plannable at first sight. Nexthamburg does not promise that ideas will be put into practice, but offers a platform for discussions and exchanges among the citizens and planning experts.

During our study period from July 2009 until the end of January 2010, the first version of the platform was online. Citizens had the possibility to post their ideas about the planning issues in the city of Hamburg, comment on the posted ideas and vote for the best idea. The public participatory platform was available online to every potential user without login. This was changed with the second version of the application as of February 2010. During our study period, 78 ideas were posted that resulted in 213 comments for these ideas and 7265 votes. These three interaction forms are the focus of our study. The methodology and our first results are presented in the following section.

5 STUDY OF PP 2.0 WEB USER TYPES: AN EXAMPLE OF NEXTHAMBURG.DE

In our research we are interested in users typologies and their possible classifications. This study is focused on the analyses executed on the example of a Web 2.0 public participatory platform. The data available were gathered with the help of the software package eTracker, which tracks the users and their interaction with the system. The data is gathered in the form of simple statistics. For our study we combined it with data from the nexthamburg.de database, that gives information about postings, comments and votes. In this section we present our initial analysis of the user types on the example of nexthamburg.de.

5.1 User Types and their Levels of Communication

According to the data analysis, we identified the following three interaction types of users (table 1): active, reactive and passiv. Active users produce content, which means that they post ideas, vote and comment. Reactive users react on the existing content by voting or commenting, but do not produce any content themselves. Passive users visit the website and gather information presented on the nexthamburg.de platform.

For our further classification of the users and their interaction with the nexthamburg.de platform we used the characteristics of the user typologies based on the web user types 2.0 (Medienforschungsinstitut Result 2007). We distinguish among several levels of communication. Peer-to-peer communication refers to the communication among peers. Intra-community communication describes the communication within a community. For both kinds of communication a log-in is needed. Public communication, without log-in, is the communication which is visible for every visitor of nexthamburg.de. Based on these interaction types public participation user types such as the information seeker, the producer, the special interested or the networker can be identified on the nexthamburg.de platform.

Interaction types		Level of Communication
passive	Visiting the website without commenting, voting or posting	Peer-to-peer
active	Posting ideas	Intra-community
reactive	Commenting on ideas or voting	public

Table 1: Interaction types

Further parameters interesting for this study include the spatial and thematic reference of the users' postings; Specifically, postings that apply to a specific location or if it concerns the area of Hamburg in general and which theme it applies to. Some initial research in these two categories was done by Matern and Petrin (2010, forthcoming). We aim at extending our study with these parameters in the next stages of our research.

5.2 Data for the Analysis

The data concerning the interaction of the users with nexthamburg.de Web 2.0 public participatory application was gathered with eTracker. eTracker is a software which enables real-time webanalytics based on pixel technology. By loading an invisible 'counter pixel' with every web-page, the number of page impressions can be retrieved. Additional information is gathered through interaction of the user with the website and stored in a database on the server. We used the data collected in the period from July 2009 to the end of January 2010 and combined statistics compiled from the software eTracker with data from the nexthamburg data base where the postings, comments and appendant information is saved. The data gathered in this way gave an overview about how many users visited the webpage nexthamburg.de in the test period, where they entered the website, how long did they stay, which browser they used, etc. The eTracker data was, due to the website technology that was used during the study period, not able to display information about the number of postings, comments and votes.

One of the interesting categories measured by eTracker was the "value unique visitors". This parameter counts the number of users in a specific time frame, usually 30 minutes. During this time the user is counted as one visitor no matter how often she leaves or visits the website. The value of unique visitors is only an approximation; more accurate data about users can be retrieved if they have to log in. The available data also includes the number of postings and comments per user and the number of votes per posting. These data gives ample information about the distribution of interaction. At this phase of our study no data about intra-community and peer-to-peer communication was available, as the website did not have a login area during the study period.

5.3 Results of the Analysis

With the help of the nexthamburg.de database we were able to reconstruct some basic types of interaction. In table 2 we show an overview about the overall number of interactions during the study period from July 2009 to the end of January 2010. Votings are, with 96,1%, the most attractive form of interaction. 2,8% of the users commented on the posted ideas, and only 1% of interactions are postings of ideas. A possible reason for this is the simplicity of voting. If you like an idea, you click on the "support" button and give your vote anonymously. It does not take much time. Posting an idea needs more involvement. First one needs a good idea and then she has to describe and post it publically on the platform. Although not many users post, the number of the average posting per user is quite high. The users that post, post in average 4,5 ideas. Users that comment, write in average 7,6 comments (table 3). These numbers indicate high involvement by the users that actively contribute. It indicates that once they are attracted by the platform, they tend to stay active a rather longer period of time.

Overall number of interactions (postings, votings, comments) during the study period	7556
Number of postings	78 1%
Number of comments	213 2,8%
Number of votes	7265 96,1%

Table 2: Overall number of interactions (postings, votings, comments)

Postings/ comments per active user that has posted/ commented	
Average number of postings (per user that has posted)	4,5
Average number of comments (per user that has commented)	7,6

Table. 3: Postings/ comments per active user that has posted/ commented

During the study period we identified 100 users that interacted either by posting an idea, by commenting or by doing both (table 4). 60% of the users contributed only by commenting, 21% posted an idea and only 20% did both. This means that almost all users that posted an idea also commented on other ideas. 100 users interacted in an active, respectively, reactive way with the website. The remaining visitors tend to interact rather passively. The number of the remaining visitors can only be approximated (table 5). If we use the parameter “unique visitor” to get an overview about how many people have visited the website, only 1% of the users interact actively by posting and commenting. Data about votings were not available for single time users. Votes are only recoded per posting. Every 125 th user decided to post something on the platform, every 50th user commented, and every 1.25th user voted for the posted idea.

Number of users that interacted	100
Users that have posted an idea	21
User that commented an idea	59
Users that posted and commented	20

Table. 4: How users interact actively and reactively

Unique website visitors in the study period 02.07.2009-26.0.2009	9.028	
Average number of postings per unique visitor	0,009	Every 125th user
Average number of comments per unique visitor	0,02	Every 50th user
Average number of votes per unique visitor	0,80	Every 1.25th user

Table. 5: Unique website visitors

On the basis of these results it is almost impossible to build a reliable user typology for PP 2.0. Classes that could be built according to this data are the producer, which belongs to the group of active and reactive users, and the information seeker, which is the largest group and rather passiv. Producers are all users that create content in the form of posting or commenting, and information seekers are the remaining users that visit the website but do not contribute.

6 CONCLUSIONS

Knowing the users and their requirements is crucial for the developers of public participatory 2.0 applications. It is especially important to understand the functionalities the users use and the ways they interact with the system. The better an application serves the user’s interests and behaviour while they are online, the more motivated the citizens will be to participate. Knowing the requirements of the nexthamburg.de users, the designers of the platform would be able to tailor the platform to the users’ needs and thus to serve the community by giving them the interaction styles they want and need to best communicate their ideas about the future of Hamburg. In doing so, the designers could be reactive to their needs.

In our study we analysed how the users interacted with the Web 2.0 participatory application in the period from July 2009 to the end of January 2010. We observed the following three parameters; postings, comments and votes. The aim was to define a user typology for public participation 2.0 users. In this phase of the research, we were only able to classify the users into active and reactive producers and passive information seekers. The majority of the users, 96%, voted. Voting followed by commenting with 2,8%, and postings with only 1% of all interactions. Obviously most users prefer to contribute in the less time consuming way, in this case by voting. Our study shows that the more involvement which is needed for an interaction, the less people would actually do it. Only 1% of the unique website visitors were active by posting or reactive by commenting and voting, the remaining users only read the content published on the website.

The results of our study give an overview about the usage of the three core-functions of the website. If we want to know more about “undreamed-of interaction styles and functions”, we have to carry out additional interviews and gather some more data. Interviews are also needed in case we want to specify the public participation 2.0 user types. As long as we do not know what goals people have when they contribute on the public participatory platform, we cannot classify them into specific types of users. The only groups we were able to define at the moment are the producers and the information seekers. A possible classification into more detailed groups, such as specific interested, networker or communicator, requires additional research.

The new, second version of nexthamburg.de application has been online since the beginning of February 2010. It enables improved webanalytics due to its new concept. Every page is tracked separately, thus it is possible to know which page has been loaded and how often by the users. A login now is required for users that want to comment and vote for the presented ideas. These additional functionalities, which enable the gathering of additional data about the user’s behaviour, will enable the designers and researchers to gain better statistics about the users` behavior. With additional information about the way the users interact with the application, we will be able to classify the users into further groups, such as the networker, who communicates within the nexthamburg community, or the special interested, who cares for thematically related topics or for a specific geographical area. While data about the spatial and thematic reference is available and has not been examined for this study, data about the form of communication is only available since the launch of the second version of the website in February 2010. This data will enable us to continue our research on the Web 2.0 public participatory users and their typologies. In the next phase of our research we plan to analyse the new data related to the more specific information about the ways the users interact with the selected public participatory platform.

The analysis results concerning user interaction will be, among other things, the basis for our further research on interactive map-based applications for public participation. This research builds on our previous research in public participation in urban planning (Krek 2008; Wagner, Kulus and Krek 2008; Steinmann, Krek, and Blaschke 2004a and 2004b). Our vision is to overcome classical GIS functions like zoom, pan or layering. We aim at introducing an intelligent adaptable map that facilitates a high level of participation and communication, considering the way users interact with web-content. Studies about the users’s interaction will be very helpful for the design of future interactive applications.

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7 REFERENCES

- ARD/ZDF Online Studie 1997-2009. <http://www.ard-zdf-onlinestudie.de/index.php?id=188>, access 14.12.2009
- ARNSTEIN, S.R.: A ladder of citizen participation. In: *Journal of the Royal Town Planning Institute*. 1971.
- KINGSTON, R.: Public Participation in Local Policy Decision-making: The Role of Web-based Mapping. In: *The Cartographic Journal*, Vol. 44/2, pp. 138–144. 2007.
- KREK, A. 2008. Games in Urban Planning: The Power of a Playful Public Participation, in: *Mobility Nodes as Innovation Hubs. Proceedings of 13th International Conference on Urban Planning, Regional Development and Information Society / Manfred Schenk, u.a. (Hrsg.) - Schwechat-Rannersdorf, 2008, S. 683-69, ISBN: 978-39502139-5-9.*
- MATERN, A. and PETRIN, J.: Nexthamburg – ein Zukunftslabor als Beschleuniger für emergente Strategien in der Stadt? Conference "Planung als Kulturtechnik" TU Darmstadt. 2010, forthcoming.
- MARKT- UND MEDIENFORSCHUNGSINSTITUT RESULT: „Web 2.0“ Begriffsdefinition und eine Analyse der Auswirkungen auf das allgemeine Mediennutzungsverhalten. 2007.
- NIELSEN, J. and LORANGER, H.: *Web Usability*. München: Addison-Wesley. 2008.
- RASKIN, J.: *Das intelligente Interface. Neue Ansätze für die Entwicklung interaktiver Benutzerschnittstellen*. München: Addison-Wesley. 2001.
- SALEN, K. and ZIMMERMAN, E.: *Rules of Play. Game Design Fundamentals*. Cambridge, Mass.: Massachusetts Institute of Technology; The MIT Press. 2007.
- SHARP, H.; Rogers, Y. and Preece, J.: *Interaction design. Beyond human-computer interaction*. Chichester: Wiley. 2007.
- SHEDROFF, N.: Information Interaction Design: A Unified Field Theory and Design. In: *Jacobson: Information design*. pp. 267-292. 2000.
- SHNEIDERMAN, B. and PLAISANT, C.: *Designing the user interface. Strategies for effective human-computer interaction*. Boston: Pearson/Addison-Wesley. 2005.
- SOMMER, L. and CULLEN, R.: Participation 2.0: a Case Study of e-Participation within the New Zealand Government. In: *Proceedings of the 42nd Hawaii International Conference on System Sciences*. 2009.
- STEINMANN, R., KREK, A. and T. BLASCHKE. 2004a. Can online map-based applications improve citizen participation?. In: *Lecture Notes in Computer Science, Springer Verlag, TED conference on e-government, Bozen, Italy*.

- STEINMANN, R., KREK, A. and T. BLASCHKE. 2004b. Analysis of online public participatory GIS applications with respect to the differences between the US and Europe. In: Proceedings of the Urban Data Management Society Conference, UDMS'04, Chioggia, Italy.
- TIDWELL, J.: Designing interfaces. Beijing: O'Reilly. 2006.
- WAGNER, A., KULUS, D. and A. KREK. 2008. Online gestützte Beteiligungsangebote in formellen Planungsprozessen am Beispiel des deutschen Bauleitplanverfahrens, in: Proceedings of 13th International Conference on Urban Planning, Regional Development and Information Society / Manfred Schenk, u.a. (Hrsg). - Schwechat-Rannersdorf, 2008, S. 349-358, ISBN: 978-39502139-5-9.
- WEIDEMANN, I. and FEMERS, S.: Public participation in waste management decision-making: analysis and management of conflicts. Journal of Hazardous Materials, 33, pp. 355–368. 1993.