

Games in Urban Planning: The Power of a Playful Public Participation

Alenka KREK

(Alenka KREK, HafenCity University Hamburg, Schwarzenbergstraße 95/D 21073 Hamburg, alenka.krek@hcu-hamburg.de)

1 INTRODUCTION

Online based public participation in spatial planning became a very popular research field. Innovative emerging technological possibilities in the field of web-based applications support new forms of communication among citizens, planners and public authorities. They include online discussions, web surveys, online forums, virtual workshops and conferences, exchange of e-mails, and online map-based discussions. Additionally to that they can be extended by the geographical information systems (GIS) and integrated in a public participatory GIS (PP GIS). These new developments and theoretical discussions related to the concepts of PP GIS promise new quality in public participatory processes. In spite of this we observe a very slow development of the real-world practical applications and its implementation within the spatial public participatory process. Public authorities and planners are afraid of the new possibilities, their technical capabilities and possible transparency of the planning processes that can be achieved with the use of new technologies. Many rational citizens still prefer to ignore public participatory processes.

The citizens are rationally ignorant because the cost of learning about the new plans and planned alternatives cost them a high investment (Krek 2005). The high cost is the result of their investment in gaining information about the plan, planned alternatives, studying the plans, attending the meetings, talking to the neighbours and the experts. It includes phases of learning, processing the learned information and deciding about the own opinion in this particular planning situation. For most citizens the personal benefit of getting involved in planning activities and learning how to use new technological tool is usually little and the cost of participation is high. Besides, citizens feel that they cannot really influence the final planning decisions. In such cases, they decide to ignore the possibility of involvement and participation. We say that these poorly informed citizens are rationally ignorant.

This article concentrates on the concept of a playful public participation (PPP), games and play and their potential use within the public participatory processes in planning. It addresses a non-rational level of the human being. It is about possible use of games as a stimulating computer-based tool that can potentially involve the citizens in serious public participatory processes. The main potential of applying this method lies in the pleasure of use and learning about the environment and the planned activities. We stress the emotional effect of the concentration that keeps the attention of the citizens and involve them in the public participatory process on a non-rational level. Games have the power of involving the citizens in the serious processes without thinking and rationalizing about them. They touch them on a subconscious level and attract in a playful, pleasant way. We call it “the power of participation without participation” being inspired by Blink (Gladwell 2005), the book with a sub-title “the power of thinking without thinking”.

The issues involved are how can we design serious games in which the citizens play and enjoy, learn and participate. How to create a playful public participatory (PPP) environment which induces a pleasure of coming to the planning participatory web space, publishing web blogs about the neighbourhood, chatting with planners and voting for the best location of a swimming pool? This paper is an initial exploration of the idea of a playful public participation and its possible implementations.

2 CURRENT ISSUES

The general problem of public participation in spatial planning is a lack of the citizen’s interest for such processes which we call rational ignorance. It is independent from the design of the participatory process itself. In case the process takes too much time and investment into learning, the citizens will decide to ignore it. The second issue deals with technical implementations of new, online participatory solutions and questions why we still have very low number of practical, working applications in this area. We conclude the chapter with a set of research questions.

2.1 Rational Ignorance

The experts involved in public participatory activities in urban planning processes often report about the citizen’s lack of interest in participation. In one of my articles (Krek 2005) I discussed the rational ignorance

as one of the causes for the minor involvement of the citizens in urban planning participatory processes. Here I consider the ignorance as theoretically laid down in the public choice theory. Ignorance is, according to the foundations provided by Buchanan and Gordon (Buchanan and Gordon 1962) and later Gunning (Gunning 2002), said to be rational when the cost of educating oneself about the issue sufficiently to make an informed decision can outweigh any potential benefit one could reasonably expect to gain from that decision. In this case it is irrational to waste time of educating oneself and learning about the issue. Economically the best choice is to be rationally ignorant about it.

Rational ignorance as a term can be found in political science and economics. The book entitled “The Calculus of Consent” (Buchanan and Gordon 1962) pioneered this new application in economics and provided foundations for public choice theory. Public choice theory is concerned with the decisions a rational individual should make in an individual or collective environment and is the basis for social or collective and public choice theories. Social or collective choice is dedicated to the particular problem of choice in a collective environment. It is a branch of economic analysis that studies the behaviour of politicians and individuals.

Their theoretical approach can be well applied to the participatory planning and can contribute to a better understanding of the processes involved in these activities. The personal benefit of getting involved in planning activities, gathering information about the discussed issues, forming a personal opinion about them and learning how to use a computer-based application is rather low. The investments measured by time spend for information search and understanding of the planning situation is rather high. In such cases, the citizens decide to ignore the possibility of involvement and participation. These poorly informed citizens are rationally ignorant.

2.2 Focus on Technical Characteristics

Computer-based applications and tools aim to improve public participation and the citizen’s involvement in participatory activities. They offer the whole range of new functionalities which support different participatory activities such as for example voting, commenting on the proposed planning alternatives, expressing opinions on the existing solutions, etc. Their main advantages are in the possibilities of viewing the planned alternatives and comment on them anytime and from any computer. This makes public participation activities independent from the in advance planned meetings and public gatherings organised at a specific place and hour and offers flexibility to the users. An integration of geographic information systems (GIS) and public participatory tools represents one of the latest innovations in this area. Public participatory GIS (PP GIS) research area basically discusses how to integrate the new applications in participatory processes and which new functionalities and technical characteristics could bring the most benefit to the users. Numerous authors contributed to this new field (Pickles, J. 1995; Schroeder 1996; Al-Kodmany 1999; Kingston et al. 1999; Carver 2001a; Carver 2001b; Craig et al. 2002; Haklay, M. and C. Tobón 2003; Sieber 2003; Jankowski and Nyerges 2001), to mention only some of them.

In spite of all interesting technical developments, integration of a GIS and multimedia, argumentation maps (Rinner 2001) and other PP GIS implementations and concepts we do not observe increased citizen’s participation in spatial planning. Research and implementation efforts are still very strongly focused on the technical architectures, technical functionalities and capabilities. Technical improvements are important, but not the only factor influencing the use of such applications and their successful implementation in the participatory processes. Simply making GIS available on the Internet does not constitute an effective participatory decision support solution. The GIS-based tools itself cannot encourage higher public participation in spatial planning since GIS and spatial data are expensive and require substantial investment in learning how to use them. Their major role is still limited to enabling time and place independent access to information and one-way participation (Krek 2005). The research on possible integrations of public participatory functionalities and concepts and online map-based representation of space reached has not progressed beyond the discussions about the technical concepts.

2.3 Research questions

The goal of our article is to discuss other, less obvious parameters which influence online public participation processes in spatial planning. Our general research questions are: “Why are some computer-based applications successful? Why people like using them? Why do they spend hours and hours in front of

such applications being completely dedicated and involved with the application?" These questions can be applied to the public participation processes discussing alternative possibilities for the citizen's involvement in the processes and trying to improve our understanding of their motivations and activities. The rest of the article deals with the concept we call "playful public participation (PPP)". It is our first investigation of the unconscious and emotional processes involved in these activities and presents some possible ideas related to the play and pleasure of using public participatory applications.

3 PLAYFUL PUBLIC PARTICIPATION (PPP)

A playful public participation (PPP) is public participation which central part is play. Its main concept is designed around pleasure and joy for the citizens involved in public participatory processes. English language makes a clear distinction between a game and play. This is not the case for all languages, for example in German language there is only one word "spielen" which describes both concepts. „Playing a game“ is then translated into "man spielt ein Spiel". The same is in Slovene language translating it into "igrati igro". The distinction made by the English language brings an advantage in understanding the differences and concepts of this rather complex relationship. This distinction makes sense for our approach as presented within this article where we consider play as a broader concept than a game. According to this approach a game is only a subset of play, and play is at the same time a subset of every game (figure 1). The „playing component“ in the context of public participation makes games an interesting research field and a promising implementation area.

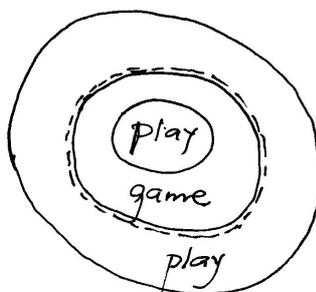


Fig. 1: Integration of the components play and game

Examples of a playful public participation range from a collaborative work on a planning concept, a group of people affected by a plan invited to show their daily environment, or just playing with a computer-based application. A playful public participation can include the following elements:

3.1 Play and joy

Play is a free activity standing quite consciously outside "ordinary" life as being "not serious". It is an activity connected with no material interest, and no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to the rules and in an orderly manner. The rules can be formal or informal. It promotes the formation of social groupings and interaction among players. We take the view on play within this section as introduced by the Dutch anthropologist Huizinga in his book entitled "Homo Ludens" (Huizinga 1955). Caillois (Caillois 2001) adds to this description the qualities such as free, uncertain, unproductive. Playing is not obligatory and therefore brings the joyous qualities with it. The outcome and the way in which this play will develop are uncertain. The uncertainty brings a potential for innovation and creativity with it. The unproductivity, sometimes called also inefficiency (Suits 1990), reflects the lack of a wish for winning, earning money, or gaining goods. Except for the exchanging the property among the players it tend to end in a situation identical to that prevailing at the beginning of the game.

3.2 Story telling

Story telling has a long tradition. It is know from the ancient art which used images, symbols, words and improvisation techniques for sharing the stories. They became part of entertainment, theatre and movies. Stories are frequently used to teach, explain, or entertain. They can be shared with gestures, or with words that can be spoken or written. Telling the citizen's a story, involving them in a playful participation based on

a story can be a challenging approach in public participation. Games usually include stories which entertain, educate and attract citizens. Traditionally, oral stories were passed from generation to generation, and survived solely by memory. A variety of myths, legends, fables and different interpretations of symbols are still known and often used by our generation. For example, stories about a wise men such as the biblical king Solomon, who is still known for his wisdom, wealth and his writings. The appearance of technology has changed the tools available to storytellers. Computer games, virtual reality centres build upon a foundation of sophisticated multimedia storytelling including 3D visualizations, voice, music and virtual reality.

3.3 Walking and dancing

A group of people affected by a plan can be invited to show their daily environment, walking together and visiting the main “objects” of the plan, and discussing the alternatives with an expert planner. This concept has been introduced by Rottenbacher (Rottenbacher 2004; Rottenbacher 2004). It involves meeting at a certain place, either part of the village or city, and walking together through the planning environment. The joint activity of all participants is a common walk in which they can exchange their opinions about the plan, their possible anger and feelings of appreciation, and communicate with the planning expert and other attendees. This approach includes people getting to know each other, their interaction, and learning about the current and possibly planned situation. The process as such brings challenges related to the heterogeneous group involved in the process and their heterogeneous mental maps and visions for changes in the future. Tensions between the individual vs. group interest can appear, but while walking, which is a playful pleasant activity; these tensions can possibly turn into a collaborative contribution to the plan and bring valuable inputs to the planer in charge.

3.4 Drawing and painting

Drawing and painting can be a playful and joyful activity. Public participation activities can use free style drawings in the initial phase of motivating the citizens. Drawing is often used as a method for expressing new ideas and visions. An implementation of the idea can be found in a drawing game called Urbis' Create Your own Supercity. Beside drawings, they include other activities such as exhibitions of unique insights into the culture of the modern city in this case focused on Manchester, and explorations of design, architecture, graffiti, music and the urban environment. New, modern technologies use the possibilities of drawing online. If designed in a pleasant, attractive way, drawing and painting can be a very valuable expression tools constituting one of the possible elements of a playful public participation. Georeferenced drawings can be attached to the digital map presented in a web-based public participatory application. Rinner (Rinner 2001) introduced the concept of argue maps which link public participatory comments with a map and model them as objects in a database. The background is given by argumentation models as a way of structuring the dialogue in the planning process.

4 TAXONOMY OF GAMES

In this chapter we concentrate on games as a subsystem of play including play as the subset of a game. Many definitions of a game exist. We limit this discussion and provide a rather technical definition of a game in which we consider it as a system. The games can be very different in their nature. A variety of different concepts is listed in the subchapter within this chapter.

4.1 Game as a system

Many authors among them also (Huizinga 1955; Parlett 1999; Caillois 2001), to mention only some of them, offered their definition of a game. In this article we consider it as a system and define it in a rather technical sense. A system is a set of things that affect one another within an environment to form a larger pattern that is different from any of the individual parts (von Bertalanffy 1968; Littlejohn 1989). Many ideas about systems and their formal theory and methodology as known today emerged from Ludwig von Bertalanffy's 1928 description of organisms as living systems. He formalized his approach in his book *General Systems Theory: Foundations, Development, Applications* (von Bertalanffy 1968). Littlejohn (Littlejohn 1989) defines the following parts of the system:

- Objects which are the parts, elements, or variables within the system;
- Attributes constitute the properties of the objects;

- Relationships among the objects;
- Environment in which the objects with their properties exist and interact.

We can explain it well on an example of Chess. The objects in Chess are the figures on the board and the board itself. The attributes are the characteristics we associate with the figures; for example the figure of a horse has a form of a horse and can move on the board in a very fast way. The relationships are the actual positions of the figures on the board and their relationships which change while playing the game. A horse at a certain position on the board might threaten one or several neighbouring figures owned by the competing team. The environment in this case could be either the board (if not included among the objects) or the play of the game itself. This structure of a game as a system can be applied to different games.

4.2 Varieties of games

A variety of different games exist. It is almost impossible to include definitions of all of them. We describe some of them within this subchapter in order to improve understanding of the differences among them and their basic characteristics. The description is not complete and can be extended with other forms of games.

Non-digital and Digital games. Non-digital or traditional games do not use computers or other electronic devices for the creation of a game environment. Some authors suggest further distinction between “classic” non-digital games like Chess and “contemporary” such as for example *Dungeon&Dragons*. Digital games involve computers and other electronic devices for the creation of the game environment.

Serious games are games developed for non-entertaining purposes. In 2002 founded incentive entitled Serious Games Initiative dealt with the definition of the expression and the main concept. Examples of such games are the games that address policy and management issues, public participatory games, or games for health and change management.

Open-end games are games that can be played without an end. They have no rules about the winning situation and they do not include this concept in the game. An example can be a game in which the player moves the objects in order to arrive to the most preferred solution; rearranging different houses, parks, trees would result in a planned version of the neighbourhood which represents only one of the possible solutions of this game. Another player will possibly arrive to another solution of this game. In this sense there is no winner of the game.

Formal and informal games. Parlett (Parlett 1999) provides an explanation for the distinction between formal and informal games. “An informal game is merely undirected play, or ‘playing around’, as when children or puppies play at rough and tumble.” He contrasts this activity with what he calls a “formal game”. A formal game is based on ends and means. Ends describe the end of the game where a player or a group of players achieves the goals of the game and wins it. Means are a set of equipment or/and the rules of the game which can produce the winning situation.

Autonomous games are games that do not require active human participation in order to function. This concept is similar to the concept of an “autonomous” agent, which is defined as to be able to autonomously pursue its own agenda.

Emergent games. In games emergence arises through the interaction of the formal game system and decisions made by the players. A good example of this kind of emergence is bluffing in Poker. The strategy of bluffing, pretending to have a better hand than you actually do, is a key component of the game. Bluffing is a possible strategy for the player, which is not explicitly described in the rules of the game.

Ubiquitous games. The expression emerges from ubiquitous computing which is a relatively new metaphor. It describes the computers which are spread invisibly throughout the environment, embedded and hiding as it were, within the objects of our everyday life. Ubiquitous games, loosely defined, are games that take place in a mixture of the real world and the virtual world of the game. Mark Weiser’s (Weiser 1993) suggested the following three characteristics for ubiquitous computing: ‘invisible’, ‘calm’ and ‘connected’. Applying these principles to the games resulted in development of so called ubiquitous games.

Meaningful game is premised on the idea of a meaningful play which emerges from the relationship between the player’s action and the outcome of the system. Salen and Zimmerman (Salen and Zimmerman 2004) distinguish between two kinds of meaningful play (not game!). The first sense of meaningful play refers to the way game actions result in game outcomes to create meaning. It refers to the way the game

generates meaning through play and generates meaningful experience for the player. The second sense of meaningful play refers to the goal of successful game design. It is based on the evaluation of the game as the whole system and to decide whether it is meaningful enough or not. The meaning in this context reflects the emotional and psychological experience of the player.

Non-competitive games. The idea of these games is not necessarily to eliminate competition, but to somehow shift the focus away from winning and more towards the fun of playing. The non-competitive games are games that encourage playfulness. Another expression sometimes used for this kind of games is “**funny games**”. They are called funny because the score does not matter and the only reason to play is for the fun of it.

5 EXAMPLES OF SPATIAL PLANING GAMES

This chapter lists some examples of the games which include a spatial planning aspect. They were designed as games and never used to support serious processes within the planning and participation. Some of them could be classified as serious games due to the environment which is modelled according to the real world situation in the modelled city.

SimCity is one of the well-known video games in the area related to the city planning. The player is given the task of founding a city, taking care of and maintaining the happiness of the citizens in this city and keeping a stable budget. Several versions of this game are available marked by the numbers such as *SimCity 2000*, *3000* and *4*. In the first stage of playing the game the player can change and alter the terrain of the city before building on it. He or she can mark certain parts of the city changing them into different zones. The player can further on define them as commercial, industrial, or residential zones. It can add buildings, change the level of taxes, build transportation system and enhance the city in many other ways. During this process the player might face disasters such as flood, fire, volcanoes, meteors, earthquakes, tornados, and damages caused by monsters or extra-terrestrial crafts. The utopian goal behind the game was built on the desire to create “ideal cities”. The player is in a position to control the environment and its parameters; the healthcare needs, taxes, funding and investments. It can invest in new buildings, infrastructure, schools or airports. Depending on variety of factors such as land value, demand and different level of taxes, the player achieves certain wealth levels and occupation capacities in the city. This is an open-end game as there is no way to win it. The player can use his/her imagination and gets unlimited possibilities for his creation.

PlastiCity: A Multiplayer Urban Planning Game allows the individual or multiple players to reshape Bradford city centre according to their own, or a shared, vision. The players can use “weapons” in order to build, demolish, repaint, rescale and rotate buildings in the city. The representations are done in 3D environment and support a complex interaction of the player and game environment. The project started in the summer of 2004 as an investigation of the selected urban planning aspects. The research included investigations of the current, past and possible future of urban structures and the history of visions of “cities of the future” related to the visions provided by some well know architects such as for example Charles Fourier and Le Corbusier. The game is based on careful research of the city planning institutions such as the City Council for Planning, the city centre Masterplan, and the wishes and demands of the local population. It consists of a prototype of the final game, with realistic architectonic models, basic gameplay and a set of functions developed for the purposes of creating and changing the buildings. In the second phase of its development the creators included also different possible urban planning strategies that can be used by the players, and implement some ethnic and gender specific game elements. Because of the close relation to the reality and the real city situation it could be considered as a serious game. It is an experiment the employment of gaming technologies for social and cultural ends and takes an innovative approach to engaging the citizen with the decisions and process of urban planning.

Urban Plans is a video game similar to SimCity. In the contrary to SimCity it does not include any obvious rewards or goals for interacting with the simulation. It can be classified as a non-competitive game and is like a toy that can be played with. The buildings available to the player are classified according to their functionality and can be included in the city or deleted from the environment. The player can get a relatively high amount of money which can be used to create buildings, factories, universities and other elements of the environment. The player can also earn money which is not a difficult task. The representation of the environment is done in 2D and 3D model.

City Creator is very similar to Urban Plans and also represents a non-competitive kind of a game. The player can drag and drop the elements of the city in a blank field. The elements of the city are not labelled as in Urban Plans; instead their function is to be determined by the user's perception of the icon. There is no score and the end state occurs when the user feels satisfied and desires to send a copy of their town to someone over email.

6 CONCLUSIONS AND FURTHER WORK

Playful Public Participation (PPP) means bringing joy and pleasure in the process of interaction between the citizens and planning experts. Possible implementations of the concept range from including the activities of drawing and painting, walking or playing games. The pleasure and joy can be so strong that the participants might feel like being "in flow" during the participative process. This expression was defined and used by Csikszentmihalyi (Csikszentmihalyi 1990) in his work. He describes the state of "being in flow" as the state of effortless concentration and enjoyment. It describes the sense of effortless action, the moments in life in which everything seems to be just perfect and great. Religious mystics would refer to the state as the state of "ecstasy," artists and musicians as "aesthetic rapture, and athletes as "being in the zone". It can happen during skiing, if you are an enthusiastic skier, reading a good book, playing with your child, the moments in which you forget the time, the environment around you. Some psychologists (Belitz and Lundstrom 1998) describe it as the natural, effortless unfolding of our life in a way that moves us toward wholeness and harmony.

In our continuing work on playful public participation (PPP) we will deal with its concepts and possible implementations. The intriguing questions are: How can we design playful public participatory processes? How can we achieve such a state, such a level of concentration in which participating citizens focus strongly on the participating activities that bring pleasure, joy and effortlessness with it? Can this be done in a virtual environment? What are the characteristics of a playful virtual participatory environment?

In our experimental work we dealt with the representation of the Domplatz, an area within the city of Hamburg, Germany. Figure 3 shows a picture of the current situation of this part of the city which will be arranged in a new way. This part of the city is one of the most important historical sites located in the centre of Hamburg. The planners and also the city government were very interested in the opinion of the citizen's related to the new possible uses of this part of the city. Technically, the real public participatory process of this part of the city was supported by the application DEMOS. The platform is designed as an internet forum with a limited possibility of using maps for the visualisation. According to the last news the platform got an award from the International Centre for Local eDemocracy in London. The discussions resulted in a decision to design the Domplatz as a historical garden.



Fig. 3: Domplatz in Hamburg

In our experimental work we went further from that and created some elements of the Domplatz in a computer game environment. The modelling itself was done with Blender, which is an open source programme developed for the creation of games and game environments. Figure 4 shows our first experiences in 3D modelling in this environment.

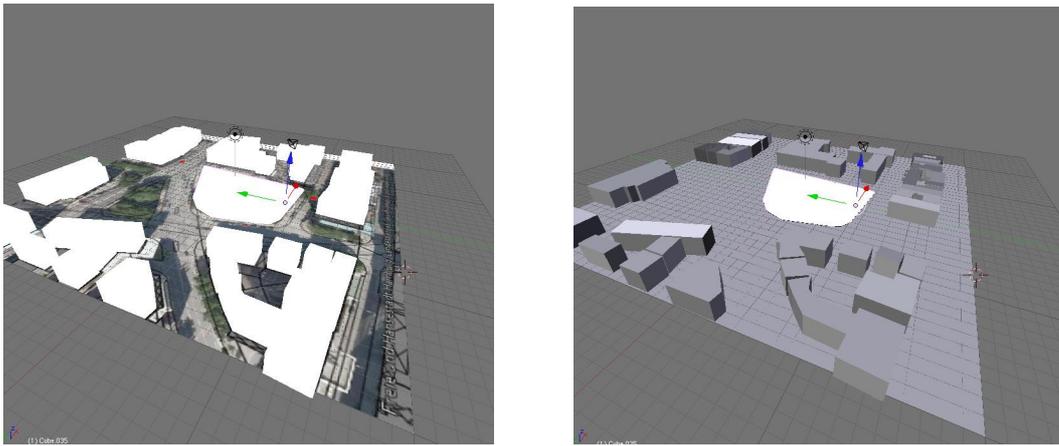


Fig. 4: Domplatz in Hamburg modelled in a game environment

The design of a serious, non-competitive and public participatory game turned to be a challenging task. What are the possible rewards for the participants, how can we create a pleasant virtual environment in which the citizens learn about the current situation of the Domplatz, how can gaining information and learning about the planning possibilities and the current situation be stimulated and created in such a way as to result in a pleasure and joy? Our further work on these issues will provide some more insights on these very relevant issues.

7 ACKNOWLEDGEMENTS

Thank you to our visiting researcher Michael Arteaga, Emergent Game Group, Georgia Tech Laboratory for his creative ideas, introduction into Blender, and first implementations. I appreciate the enthusiasm of my students attending the seminar on Public Participation Online in summer semester 2007.

8 REFERENCES

- AL-KODMANY, K. (1999). Combining Artistry and Technology in Participatory Community Planning, *Berkely Planning Journal* 13, p. 28-36.
- BELITZ, C. and M. Lundstrom (1998). *The Power of Flow: Practical Ways to Transform Your Life With Meaningful Coincidence*. New York, Three Rivers Press.
- BUCHANAN, J. and T. Gordon (1962). "The Calculus of Consent: Logical Foundations of a Constitutional Democracy."
- CAILLOIS, R. (2001). *Man, Play, and Games*. Champaign, University of Illinois Press.
- CARVER, S. (2001a): Participation and Geographical Information, position paper, ESF-NSF Workshop, Spoleto, Italy.
- CARVER, S. (2001b): The future of Participatory Approaches Using Geographic Information: developing a research agenda for the 21st Century *URISA Journal of the Urban and regional Information systems association*, Vol. 15: 61-71.
- CRAIG, W. J., Harris, M. T. and D. Weiner (eds., 2002). *Community Participation and Geographic Information Systems*, Taylor & Francis, London.
- CSIKSZENTMIHALYI, M. (1990). *Flow: the psychology of optimal experience*. New York, Harper and Row.
- GLADWELL, M. (2005). *Blink, The Power of Thinking without Thinking*. London, England, Penguin Books Ltd.
- GUNNING, P. (2002). "Understanding Democracy: An Introduction to Public Choice." online <http://www.fortunecity.com/meltingpot/barclay/212/votehtm/cont.htm>, retrieved: 20.08.2006.
- HAKLAY, M. and C. Tobón, (2003): Usability Engineering and PP GIS: towards a Learning-improving Cycle, online: <http://www.casa.ucl.ac.uk/muki/pdf/Haklay-Tobon-URISA-PPGIS.pdf>, retrieved: 05.04.2004.
- HUIZINGA, J. (1955). *Homo Ludens: A Study of the Play Element in Culture*. Boston, Beacon Press.
- JANKOWSKI, P. and T. Nyerges (2001). *Geographic Information Systems for Group Decision Making*, Taylor & Francis.
- KINGSTON ET AL. (1999). Virtual Decision Making in Spatial Planning: Web-based Geographical Information Systems for Public Participation in Environmental Decision Making, online: <http://www.geog.leeds.ac.uk/papers/99-9/index.html>, retrieved: 02.04.2004.
- KREK, A. (2005). Rational Ignorance of the Citizens in Public Participatory Planning. 10th symposium on Information- and communication technologies (ICT) in urban planning and spatial development and impacts of ICT on physical space, CORP 05, Vienna, Vienna University of Technology.
- LITTLEJOHN, S. W. (1989). *Theories of Human Communication*. Belmont, CA, Wadsworth Publishing Company.
- PICKLES, J. (1995): Representations in an electronic age: geography, GIS, and democracy. In: J. Pickles (Ed.), *Ground truth: the social implications of geographic information systems*. New York, Guilford Press, pp. 1-30.
- PARLETT, D. (1999). *The Oxford History of Board Games*. New York, Oxford University Press.
- RINNER, C. (2001). "Argumentation Maps – GIS-based Discussion Support for Online Planning." *Environment and Planning B: Planning and Design* 28(6): 847-863.
- RINNER, C. (2001). "Argumentation Maps – GIS-based Discussion Support for Online Planning." *Environment and Planning B: Planning and Design* 28(6): 847-863.
- ROTTENBACHER, C. (2004). Motion increases emotional correspondence. *GIScience* 2004.
- ROTTENBACHER, C. (2004). Presence in the Planning Process. *GEOINFO*.

- SALEN, K. and E. Zimmerman (2004). *Rules of Play, Game Design Fundamentals*. Cambridge, Massachusetts, The MIT Press.
- SCHROEDER, P. (1996). Report on Public Participation GIS Workshop, NCGIA Technical Report 96-97, Scientific Report for Initiative 19 Specialist Meeting.
- SIEBER, R. E. (2003): Public Participation Geographic Information Systems across borders. *The Canadian Geographer* 47, no 1, S. 50-61.
- SUITS, B. (1990). *Grasshopper: Games, Life and Utopia*. Boston, David R. Godine.
- VON BERTALANFFY, L. (1968). *General System Theory*. New York, George Braziller.
- WEISER, M. (1993). Hot Topics: Ubiquitous Computing. *IEEE Computer*.
- CITY CREATOR <http://www.citycreator.com>, retrieved: 25.7.2007.
- DEMOS <http://www.demos-monitor.de/index.php/das-demos-konzept>, retrieved: 06.04.2008.
- DOMPLATZ DISKUSSIONS FORUM <http://www.hamburg-domplatz.de/>, retrieved: 04.04.2008.
- DUMPTOWN OR RECYCLE CITY <http://www.epa.gov/recyclecity/dumptown.htm>, retrieved: 25.7.2007.
- FACE YOUR WORLD <http://www.faceyourworld.nl>, retrieved: 20.7.2007.
- URBAN PLANS <http://www.owensworld.com/flashgames/play.php?id=33>, retrieved: 21.7.2007.
- URBIS' CREATE YOUR OWN SUPERCITY <http://www.urbis.org.uk/general.asp?page=197>, retrieved: 27.7.2007.
- SIMCITY 4. online available: <http://www.simcitycentral.net/simcity4/>, retrieved: 20.7.2007.