

Visual Simulation as a Tool for Planning Education

Computer Aided Participation Support

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Contemporary computer techniques offer many new opportunities to engage citizens into the planning process. There are new possibilities of interaction, introducing an observer into the “game”. The research project presented in the paper assumes the use of a visual 3D language which consists of a series of schematic types of buildings. They form a language which is easy to understand both by professionals and by laymen. Understanding is the very first step towards getting convinced by the ideas presented. The next step is interaction - the user’s action induces the response of the system. The solution proposed by the user meets an evaluation from the part of the system which evokes the user’s interest - in the case presented here the evaluation introduces the simulation of future state of the site. The problem posed is to find out the best way to convince people that some places are less or more suitable for settlement, depending on the media present there, distance from the urban areas and the environment protection. The attempt to create a tool which could be helpful in an educational process is described in the paper. The idea is to prepare a form of a master plan record which uses the visual 3D language and may be accessed via World Wide Web pages. The paper formulates the assessments for the software described above and examines the possibility to create an application. The trial to prepare a web based service using the flash and shockwave technology is presented.

“There is a need to increase public sensitivity to environment and development problems and involvement in their solutions and foster a sense of personal environmental responsibility and greater motivation and commitment towards sustainable development.” (Agenda 21, 1997)

Building in the open landscape is a problem which is especially noticeable in poor countries with unstable legal regulations, devoid of long planning traditions. Examples of such countries in Europe are post-communist countries, where people still see no

distinction between the ownership of the land and the right to use the land. The lack of clear-cut difference between open, natural landscape and urban environment is a phenomenon which is thoroughly described in literature. The most difficult problem which still remains unsolved is the need to educate people, to change human awareness so as to teach the society that an urban area should have a border and further on there should be a natural - that is non-built - landscape. The basic landscape protection instrument should be a well-respected and

coherent system of legal regulations which prevents open landscape from introducing buildings and facilities or new parcels divisions and enables creation and implementation of law at the local level. The legal system results from coherent system of values established and respected by all the parts involved, including “everyday users” – that is ordinary people. This requires the common belief that all sites are worth to be protected (Wisniewska W. 2002).

The important way to increase public sensitivity to environment should be an educational action towards citizens. Everybody should know what the spatial order is, why we need it and what kind of policy should be used to protect the environment. Opening up the environmental arena to popular involvement is a major thrust behind the Local Agenda 21 movement, announced at Rio Conference in 1992. Local Agenda 21 asks local communities to identify their key environmental problems and to set targets for addressing them (Healey 1997).

There are numerous reasons for the lack of understanding of the need of protecting the natural landscape in Poland. The issue is complex and well described, thus only the main reasons are quoted in short.

The Second World War and the post-war migrations resulted in the significant change of the ethnic composition of the society and the destruction of the former community structures. The whole communities lost their places of living and at the same time they lost the care for their environment. Pawłowska K. (2001) writes: “Between man and the place of his living there may be a special emotional relationship which gives man the feeling of ‘being at home’. If there is such a relationship, the place can become an object of care of the whole community and as such has a better chance of welfare than nobody’s land. The feelings of belonging can be beneficial for both man and place.”

The failure of the system of collective housing construction in the 1980s led to irregularity in spatial development of cities. This is visible in the landscape of suburban areas. People deprived of chances to

get a flat began to build houses on their own, often illegally. The result which we may observe now are the housing areas which had appeared in the most convenient locations, without any spatial coordination. It was the only chance to solve the problem of the lack of flats, so there were no considerable attempts of authorities to stop the process. The housing areas built in a chaotic manner without urban order or economic, ecologic and social reasoning are not the only thing that has remained after that period. Another relic is common indulgence in building without licence. This habit has stood through the political coup of the 1980s. The citizens’ attitude towards the public undertakings which result from public interest is bad or even hostile. The Polish remember the forms of compulsion and profit from private property right which they have finally gained. In these conditions the local government meets the resistance of individuals in all actions connected with restricting the rights to administer private property (Pawłowska K. 2001).

There are yet social phenomena such as a habit to disregard collective interest in physical planning. People in Poland usually share common belief that an individual has nothing to say about the appearance of his neighbourhood. They do not believe in sincerity of actions taken by local authorities. The main reasons for the lack of local communities’ engagement is the lack of tradition and knowledge that such actions are possible. Local authorities, not existing for 45 years, still learn to manage their communities, and also their space. A considerable part of conflicts going on in the field of landscape protection results from bad management which disregards human rights to take part in making decisions concerning the shape of space where one lives. The phenomenon results in a wider perspective of non interest in spatial matters in general. The main group which is interested in the planning process are stakeholders, who have the possibility to get some profits out of their engagement. There is, however, a significant difference between the interests of stakeholders and inhabitants.

There are many discussions going on in Poland in which planners complain about the society being not democratic enough to be able to take part in the planning process (Pawłowska K. 2001). At the same time citizens are usually convinced that they learn about the changes which are to take place in their neighbourhoods at the very end. The research identifies the existence of a large group of the Polish who are ready to get involved in the matters of shaping space. (conclusions from examination of the landscape perception prepared for V Program M.K.i S., K. Pawłowska et al, *Percepcja krajobrazu kulturowego obszarów urbanizowanych jako podstawa dla jego ochrony i rewitalizacji*, Kraków 1995) If the citizens' opinion was better articulated and taken into consideration more seriously, public landscape protection services could find stronger support than it has now.

The regulations of the Polish Physical Planning Law guarantee some elements of public participation. Yet the legal procedures are complicated and require some professional skills.

The master plan drawing is usually difficult to read for a layman. The quantity of symbols is big, there are many issues showed in the same picture. Each symbol is referred to in the text part of the document which should be checked along. The authenticity of the drawing as it is part of the local law should be confirmed by the electronic signature. The published illustration must be identical with the one which was supported by the local community authorities.

Along with publishing the master plan in the original form there is the need to explain the code of the regulation to people who do not have any professional skills in the domain of planning. Contemporary people understand the language of pictures. Due to dissemination of television and digital communication humans have got accustomed to visual broadcast. Planners should take this into consideration when trying to get to laymen. Planning education needs to use multimedia and the Internet as the way of communication.

What should the communication be like to become

a successful environmental awareness technique? There are many approaches to sensitizing people to particular environmental issues. Many of them were worked out in the 1960s during the development of the participation movement in the United States of America. Sanoff H. (1978) writes "Sensitivity to the visual environment requires the development of a level of perceptual awareness that is relatively uncommon. (...) Research into techniques used to produce change have been identified as coercion, reason, emotion and education. Change behavioural involving environmental sensitivity must include a rational educational approach as well as directly engaging the personality."

Our aim is to convince the presentation addressee that building in the open landscape in conflict with the master plan regulations does not suit his needs well. The disadvantages of such actions from the point of view of a planner are contamination of natural landscape and at the same time lack of media furthered by the pollution of environment. The opinion of an average potential presentation user would be slightly different.

The visual planning language

Let's imagine an investor who wants to buy a plot of land and build a one family house... He is looking for a cheap parcel in a beautiful, natural landscape. He browses through the web sites of local authorities, looking for legal regulations concerning his future settlement. Traditionally he would at least find the 2D drawing of a master plan accompanied with a description concerning rules for constructing. Instead he can see an easy to understand 3D simulation. First there is a present state of the site presented. In the next step he is able to see the simulation of the future state, with all the buildings arising in the neighbourhood which are authorized for the area concerned according to the plan regulation. Their detailed choice is random so there remains some uncertainty, as in real life. In the next step the buildings which appear do not comply with the rules.

Their choice also appears unpredictable. In such a simulation the non-built area may not be natural and encouraging any more. The user may be also able to learn how long it will take the municipality to provide the site with water supply and sewage systems, etc. and what costs he will be obliged to pay.

Basic assumptions

The successful urban presentation should comply with a few rules. First it must be legible to laymen. The simulation of a projected state which looks like real world is the easiest way to convince non-professionals. Similar techniques have been utilised before with the use of hand drawings, sketches or maquettes.

Master plan is the document containing rules which buildings should comply with to get the impression of spatial order. Buildings are erected in different time and according to different designs. The architect's creation is restricted in order to obtain the harmonious whole. Fortune also plays an important role in the described process. Real world processes may be shown by the subsequent variants of the same site with different types of buildings introduced at random but in compliance with the rules of master plan. In this way the user is given a chance to understand the regulation. At the same time the presentation may become a method to verify the correctness of the code.

There are two selection steps when choosing the buildings types which are to be displayed. First the ensemble of buildings matching the master plan regulation for the site is chosen from the bigger collection of building types. Then a few buildings are chosen by chance. The kind of presentation described may be created in case the master plan document specifies clear rules concerning buildings. Diverse codifications used to record the plan regulation make efforts very difficult or impossible. The interaction is an element that improves functionality of the presentation and makes it more attractive. There are many kinds of interaction. The simplest one may be assured by the possibility of

moving inside or around the model. Other easy ones are verbal commentary concerning results of user activity or standard Windows functions like opening of new windows after clicking on an element.

The possibilities to introduce the game into an educational process

Let's imagine a person who has been reading planning code and wants to have some fun. At the end of the page there is a banner calling: "Why don't you try a little game?!" He or she enters, let's say that it is a woman so she, and is asked to choose a house of her dreams. The collection of 3D models of one family houses is available. She is looking at the house from the outside, for some of the houses she may even make a little tour inside. Than she is asked to find the best location for her imaginary house. The site and accompanying planning rules are the same she has read just before a moment. They are still accessible. The chosen location must comply with the planning rules. She finds a location and puts the image of the house onto the site – it may be a photograph or a drawing, it doesn't matter. If the result complies with the rules she wins. If it does not she loses. If she wins, she looks at the photo of the family with children in her imaginary house. She may also get a chosen screensaver, a melody or a bonus of this kind. If she loses, a beep is heard and the user is informed that "15 years of her life is lost". The code of planning regulation is still accessible so she may reread it. She has still 30 years of "living" so she can make another two attempts. If she loses again twice, her "life" finishes and she has to log on again to continue. People learn most efficiently when making mistakes and having a limited chance to try again they are forced to think. That is why such a "game" should be an effective way of planning education. The text commentary is indispensable in every method to let the user understand clearly what happens and why.

The possibilities to invent the game scenario are unlimited. Another important idea is usage of the vision of the designed state as the environment for

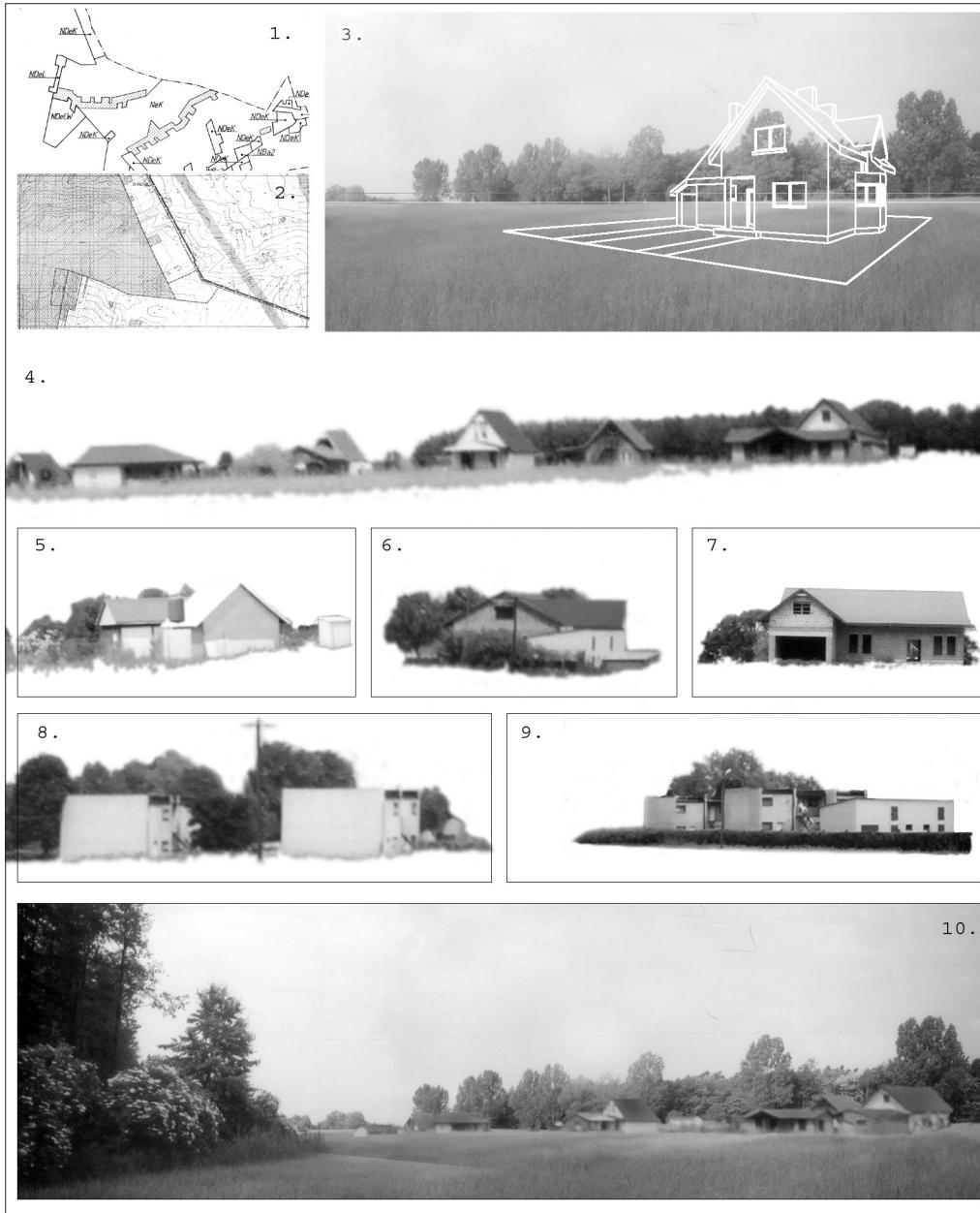


Figure 1
 1. Master plan regulations.
 2. The trial to insert the new building into the landscape - fixing important factors like the horizon position, scale of the model, etc.
 3 - 7. Proposed types of one family buildings.
 8 and 9. Modernist houses which are not envisaged in the planning regulation for this site.
 10. New buildings located at their sites accordingly to the planning regulation.

meetings of virtual characters – avatars, representing real people sitting in front of their computers. The avatars may visit the virtual world together, look around, speak to each other, and change the elements which are interactive. Their appearance is chosen by users. The dialogs and the motion taking place in the virtual world may also be achieved using traditional methods – text window and possibility to switch from one place to another. Many people may exchange opinions when using the discussion forum.

Currently the most popular are net games, where action consists in a fight with an adversary – often a monster or a superman, or in a fight against other users. Games where there are more players participating are more interesting for users than these where the communication is reduced to the dialog with a computer only (source: author's opinion poll). According to the definition of American Society of Marketing, the basic functions of advertising are Attention, Interest, Desire, and Action (AIDA). There are two ways to popularise a product which are called “pushing” – mailing, www presentation, banners, and “pulling” – the methods forcing user to act – links at www sites, files containing advertisement which user should open himself, screensavers, desktop wallpapers, and advert games. The notion of space order should be popularised taking advantage of all the presented ideas.

Further possibilities

There are a few types of elements which every presentation consists of. They may be divided into constant ones and variables. The background – in this case landscape – remains unchanged. The housing is a variable. The analogical exercises were practised, as it is mentioned above, in the sixties in the USA. Then it was the appearance of variables which had been changed by the representatives of local community in order to get visual satisfaction. The responses would differ due to background or value orientation of the addressee. Learning about the different perceptions of the problem is impor-

tant. It may be enabled by collecting responses from the range of users of the site.

Another important thing is a possibility to discuss the problem with other users. Discussion allows to look at project from different points of view. It relies upon coercion and a will for consensus. Usually it engages emotions. Formulating opinions during the debate results in heightened awareness to the initial variable under study.

The example showed

The presented example shows a place near the Łagiewniki Forest in Łódź. The site used to be an open landscape fifty years ago and now it has been built up. The presentation was prepared with the popular software. The part assumes the use of Macromedia Flash and pre-scanned or rendered photographs of single family buildings as sprites in the scene where the photograph of the landscape constitutes a background. The interaction and element of gambling is introduced using Flash scripting. Some elements have been prepared with Macromedia Director. The shockwave 3D technology enables presentation of pre-modeled housing types in the landscape. Lingo 3D procedures have been used to add the interaction. They are responsible for moving in 3D, displaying comments and choosing the types of buildings. 3DstudioMAX has been used for creation of houses and site models.

It uses the possibility of shockwave technology to manipulate the volumes with textures. The user clicks to get the image of the site built up according to master plan record. The houses displayed are taken from the library of possible building types. The user may look at the site from different points of view, some movements are also possible.

There are many possible ways of scripting this kind of game, ranging from a popular VRML standard, through XML programming language (its variety GML – Graphic Modelling Language), to interaction enhanced modelling methods used in computer games. It follows that technology is no longer a

problem. Generated on the basis of plan rules from pre-prepared elements 3D simulation plan model can serve as a base for interactive presentation available via the Internet.

Conclusions

Support for the master plan from the part of inhabitants may become very important in the situation of periodic changes of local authorities and politics. The urban plan is a document whose realisation takes years and it should not change in the meantime to get the appropriate effect. Public support may become the best guarantee for the plan success. The desire to get public support for the physical plan imposes more requirements on a planner. A design must respect some standards. The content of the document should be clear to laymen. The project should respect interests of all stakeholders and promote the solutions which balance the priorities of the common good with private interests.

The problem is to find out the best way to convince people that some places are less or more suitable for settlement, depending on the media present there, distance from the urban areas and the environment protection. The methods of display described in the paper represent the great potential. The addressee is attracted by its visual form and gets involved into the game. The entertainment becomes an occasion to learn the rules of urban composition and to understand the reasons for landscape protection.

Environmental sensitivity should be shaped from the early childhood. Computer communication and the use of multimedia may allow for introducing landscape protection issues at the early stage of education. The Internet as the education tool may be addressed particularly to young people – they make up the major group of net audience. The children and teenagers like playing games. Thus entertainment distributed by means of the Internet communication remains a good way to teach them.

The education using multimedia cannot be the only remedy to serious problems of environment

protection. However, the tool is constantly getting more importance along with the increasing access to the Internet in Poland. The accelerating convergence between telecommunications, broadcasting multimedia and information and communication technologies (ICTs) is driving new products and services, as well as ways of conducting business and commerce.

The methods of participation in urban planning which were worked out in USA in the 1960s may be adopted to contemporary conditions of computer communication and the use of multimedia. The important thing which has changed is the possibility for the user to participate at the convenient time without leaving his own home. Another difference which may occur more difficult to pass for many potential participants is the lack of direct contact with other people and anonymity of computer communication. Thus it may occur that the role of computer as a participation tool should be complimentary to traditional techniques. It will never replace direct meetings and debates.

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