Developing Shared Urban Visions Through Participation Supported by Digital Tools

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Abstract. The authors base their efforts on the assumption that future cities will only be called ‘advanced’ and ‘sustainable’ if they evolve as a shared vision between the city users / dwellers (general public) and urban designers, planners, architects, engineers (experts). For visions to be shared and planning processes to be inclusive the involvement of all (urban) actors is paramount. With the increasing urban complexity and the interrelation of phenomena there is also an increasing demand for updated, advanced and re-thought digital tools that could help in forming and enabling such common urban visions. The paper outlines the agenda and connects our on-going research efforts with the fields deemed most crucial for inclusive-for-all, successful participation that can lead to shared visions of future cities. Standing out in interchangeable order and never-ending cyclic process are: (1) education, (2) communication and (3) collaboration.

Keywords. Urban design; education; visual communication; collaboration; digital tools.

Introduction

Identifying and resolving urban issues be it of physical (tangible) or the relatively objective perceptible reality (genius loci) can be considered a fundamental virtue of urban design, which is necessary for deliberate decisions and activities in urban environment. According to architecture as a generalist profession, built environment is treated in its widest sense – with accomplishments to assure the quality of living. And since the latter is an equity of every society, social group or individual, then mutual search for reaching the common consensus is inevitable. And when talking about a broad consensus, there is certainly a tendency standing at the heart of all, to meet and find common public interest - this elusive entity of a modern democratic, impartial and sustainable aspect of culture, which in addition provides a promise to enforce rights of individual groups as well as a precaution against manipulative tendencies of individuals or disputable environmental decisions.

Within the frame of shared urban vision promise our on-going research efforts proceed through several levels; according to different public groups targeted (professional, general, governmental, user etc.), and according to the level of mutuality in the process of participation assigned. We recognize that different levels of participation, involvement of
different public groups in diversified circumstances demand heterogeneity of approaches to these issues – from more analytical, inquiring to more experiential and project-based; both by developing new systemic and methodological approaches as well as accommodating digital tools in a manner that they support and enable common urban visions. In this paper we understand the elusive but widely used ‘digital tools’ as the tools bound to digital domain that facilitate complex inputs and outputs, rapid testing of multiple solutions and their adaptation, simulation, mass production and unlimited reproductions.

Throughout this paper we present our recent international research efforts through the prism of different stages in the process of collaborative work and participatory approach when reaching the consensus in future visions. By highlighting the three fundamental levels of our research work – educating, communicating and collaborating – we present several recent projects in terms of their relevance. The paper is therefore divided into three sections of which each first provides a brief insight into basic theoretical grounds and is further underpinned by selected projects (or their parts which correspond with particular abovementioned section). The paper is following the research efforts of the team of authors at the Faculty of Architecture in Ljubljana and their colleagues abroad, placing them into the context of the last decade of research work, highlighting the thread and thought that connects them all into a logical entity explaining aims and efforts.

Education as a foundation for shared urban visions

For different (expert and non-expert) groups of actors to collaborate in decision and design process, it is not sufficient to understand the design, material characteristics and elements of that environment, but to also understand the coherences of influences and consequences that individual interventions might cause. The complexity of spatial contents and aspiration for rational/creative/sustainable final decisions therefore demand a set of various different yet interrelated skills and interdisciplinary knowledge (explicit and tacit) when approaching architecture in its widest sense.

We have delved into research and promotion of architectural education with several focused projects dealing with: spatio-environmental value system of the lay public, digital teaching aids for general (non-expert) education system, digital teaching aids and support systems for teaching future architects (experts).

Knowing the understanding level of different publics and common beliefs/values or working towards them through formal and informal education is an essential part of the process where new media and digital tools can broaden the range of potential participants and enrich our efforts.

Education needs not always be supported by advanced digital tools as the recently concluded project “Education for sustainable development in the built environment in Slovenia” (development research national level) exemplifies (Zupancic et al, 2009). The project surveyed the awareness level about architectural-environmental issues among primary and secondary school pupils and looked into the existing syllabi from the same perspective, consequently suggesting improvements both from contents and teaching/communicating aspect. Not counting with the state of the art school equipment the researchers approached youths with illustrated, printed questionnaires. Such an approach proved to bridge some of the communication gap between non-expert and expert public as well as brought some positive energy and motivation because the questionnaires were not as usual: ‘dull and text based’. For the preparation of illustrations the 3D drawing and design tools (i.e. Google SketchUp, Adobe Photoshop) were used, others such as SPSS were crucial for evaluation of the results.

While getting to know how well the lay public is aware of architectural problematics and the state of their spatial values/beliefs are important input
data for the envisioned result - shared urban visions and participatory planning – the digital tools can also be of use in the educational process itself: either as teaching aids or, in some cases, as substitution for teachers (i.e. lack of specialistic knowledge, lack of proper teachers), or both. One of such endeavours was the architectural educational interface (described more thoroughly in: Juvancic & Zupancic, 2008). The developed and tested interface was designed as a collection of interactive tasks intended for 9th grade primary school pupils (non-experts and future builders), who were faced with some perennial spatially-architectural problems and equipped with additional info and through interactive testing.
of their ideas needed to find suitable solutions. Different variables such as the level of interactivity, navigation, narration, satisfaction etc were also tested at the same time. Similar digital tools could span all levels of education helping introduce architectural and spatial topics early on in the process and maintaining their presence throughout lifelong education regardless of teachers’ architectural competences (Figure 1).

E-learning project VIPA (Mullins et al, 2006), on the other hand, has been (and still is) focused on expert education. Envisioned virtual campus for virtual space design is an example of multifunctional, modular, educational, digital tool that is mainly used for educational purposes but can also act as a forum/network for interdisciplinary discussions and curricula development in the field of virtual space design. The project itself also sought overall pedagogical methods and curricular structure suitable to the specifics of the topic. As a set of tools to support and enhance the teaching/learning VIPA posses a LMS, CMS and repository (upgraded Moodle system) as well as the prototype of the virtual lab (VIPA constructor as the part incorporated in Blender and modified Open Croquet). The virtual labs were rarely used beyond the project (as other platforms became more accessible and less hermetic, i.e. SL) but LMS has still been very much in use up to this day for several daily course activities and workshops.

Although our research has been focused on specific target groups and testing limited, we have isolated the crucial points of expert and non-expert spatially-architectural education which gravitate towards the following questions: what to include – the contents, how to communicate it – suitable level for different publics, how to engage the learners – interactivity, pedagogical methods and which digital tools, if any, to use.

**Communication as a linchpin of urban dialogue**

Within the frame of the participatory approach in achieving shared urban vision one quickly encounters the problem of insufficient understanding among different actors in the process involved, especially in terms of significant discrepancy between the expert and lay pole of knowledge/skills concerning the gap which emerges at interactive communication.

And why is this gap an issue or to what end should we be patching this gap? Exchanging messages is the linchpin of the developing city and its visions. Contribution of spatial sciences is relevant in clarifying the questions that arise in relation to altering the system of space elements and their intertwinements, which in turn inevitably raise consideration of the development of techniques for the presentation and distribution of this knowledge. The latter is of even greater importance or even more evident when expert knowledge is crucial and closely linked with the living quality of this very society and especially when public consensus is essential for the implementation of ideas. We consider architecture and urban design knowledge contribution an important factor of a quality living environment and thus estimate that communicating architectural contents in a suitable form (for lay or/expert public) through suitable presentation techniques and with apposite tools plays a crucial role in the urban design process. It therefore captures part of our research effort, above all, the communication axis in the direction from the expert (architectural) towards lay public. Herewith by no means do we neglect the reverse flow of communication; however we isolate the specific entity of the issue to reach better terms for the analysis of separate parts and additionally more refined results of the research. Nevertheless, we recognize the incontestable necessity to integrate the outcomes of the research back to wider context.

The current development of presentation techniques justifies the assertion that presentation techniques in spatial sciences are based on visualization. King (King et al, 1989), yet in the incipient stage of computer aided visual design and CAAD, ascertains that visualization is the key to effective public
participation because it is the only common language which all participants can relate to. Visualization, as he states, provides a focus for a community discussion on spatial issues and guides all members of the process and facilitates better communication.

However, visualization techniques vary from a very conceptual to more concrete – easier to “grasp at” forms. Bosselman (1998) distinguishes between two main principles depending on “the perception of the world”, which may be (applied to the image or message itself) abstract or concrete. The concrete approach is directly derived from experience, whereas the abstract approach indirectly.

Thus far, within the frames of a diverse palette of visualization techniques (regardless of the scientific field) often a more integrated approach is searched for. This is through promoting a more informed design practice by means of the provision of environmental knowledge, especially when based on sets of predefined indicators, which tend to be visualized in a less abstract and more experiential manner.

Although the specific spatial issue is bounded in terms of Euclidian coordinates and presented as a spatial entity (being subjected to design proposals, regulations etc. for improvements), it is still necessary to equally highlight all three columns of sustainable development (natural, social and economic) and coherences among the factors which build the environment. By doing this, it is important to alert about those processes and phenomena, which are more difficult to measure and the consequences of which are realized with time delay or being less present in people’s consciousness or are due to their special local features more difficult to be generalized.

Therefore, beyond the mere transfer of facts by different visualization manners, we strive to further transfer insights, experiences, attitudes, values, expectations, perspectives, opinions, and predictions by using different complementary visualizations, and thus reveal new approaches also by well-chosen combinations of visualization modes. Further questions occur about navigation, associative information access, programming and communication with in very large data sets. And last but not the least, there is the crucial question of what the actual options to launch our theoretical, pilot or prototypical findings ashore are, namely into the practical/applied (formal and informal) procedures of participation.

In order to establish an optimal final survey within the framework of a postgraduate study, based on different presentation interfaces (the effect of different presentation interfaces will be tested on a sample of lay general public population in the following months), we recently designed a shorter preliminary research, namely a questionnaire-based inquiry (N=227) to establish basic patterns in lay public comprehension of various presentation techniques. The survey, which presents a preliminary component of our empirical research about presentation techniques, was applied to actual spatial issues in Slovenia and targeted at the lay public in order to identify methodological constraints and opportunities for further investigation. The main purpose of our preceding efforts is to become better acquainted with the possible difficulties in implementing the presentation interfaces or in executing the main statistical survey in the following months.

The preliminary research was carried out in March 2010 with an online image-based questionnaire; the sample population was non-random and was represented by 227 internet-users who hold an e-mail address and were selected in regard to their readiness for cooperation. The sample population had not previously been limited to the specific characteristics of the participants; however, additional classification was made in accordance with age, educational field and degree, place of residence and activity status. The sample population was invited to participate in the survey through an e-mail appeal; part of the population was invited and acquired through an appeal for participation, dispatched on the social networking websites.

The survey questionnaire contained 20 questions of which 13 are supported by or related to visual material (Figure 2). Images used in this study were acquired and assembled from various sources. The
Figure 2
Testing the communication and understanding abilities of different participants in the design process: A sample task in the questionnaire - Urban design proposal for Slovenska Street in the heart of Ljubljana (source: [3])
selection criteria are related to previously defined measures of abstractness/concreteness of presented contents, “detailness”/generalization of contents, perspective technique of the visual material, graphical mode of the image, etc. The questionnaire, on the one hand, consisted of a combination of open and closed type questions and aimed at establishing the participants’ attitude towards spatial contents (chosen known and unknown locations; forms, material used in the presented built-up environment, etc.), and their capabilities (skills) for decoding different visual messages on the other hand. While a major part of the questionnaire focuses on the mere visual modalities of conveyed architectural messages, a few tasks are related to the contents of the messages. In relation with sustainable built-up environments and pleasant/quality living localities we inquired about participants’ awareness of the sustainable principles in natural and cultural surroundings; namely, their attitude towards surrounding spatial qualities (cultural heritage, aesthetics, greenery etc).

The results of preliminary study demonstrated some conceptual and methodological shortcomings which need to be eliminated. As we strive to methodologically examine the basic patterns of space perception through visual presentations, further inquiry is necessary before the proper final presentation interface will come to life.

Collaboration as a path to shared solutions

Collaboration, as Achten and Beetz (2009) state, is working together in a manner to enhance each participant’s contribution to the design. According to Kvan (2000), the collaboration means working with others with shared goals for which the team attempt to find solutions that are satisfying to all concerned. Establishing the shared urban vision through education and communication represents only a part and the foundation of the process, the other equally important part is acting/planning together - collaborating on the specific tasks towards ‘materialization’ - be it physical or virtual.

And if collaborative design as a process brings forward the questions of improving the design tools and modifying the existing design environments in a way that collaboration can occur (Halatsch, Kunze, Schmitt, 2009; and [1]), then collaboration coupled with participation of experts and non-experts in an urban design process brings a whole new set of questions: technically, procedurally and contents related. Pluralism of interests and different levels of expertise present challenges for successful collaboration, especially when non-experts are taking part, however the group work can achieve something that could not be achieved by an individual and also produce benefits for wider community cross section, bring an insight and better understanding of different professions and arrive at more legitimate and widely accepted results.

Collaboration is especially challenging in environments where there is no previous ‘culture’ of public participation (or such a culture has been lost) in large scale planning processes where the number of potential participants grows to such extents that they cannot be placed ‘under one roof;’ and where the existing legislation is unsupportive and too rigid for such actions.

Assuming that procedurally, collaboration usually surpasses the grasp of the researchers (issues of legislation and politics), who can suggest the best opportunities and tools for it but do not have the leverage to implement them, our efforts have been focused on technical and contents related topics of collaboration.

VIPO e-learning project (Mullins et al, 2006) has been tackling both contents and technical issues of collaboration. On the one hand, it tried to introduce different professions and expertise to the field of virtual space design, collaborating on the same tasks, while also looked for viable technical solutions for collaboration through digital tools supporting online real-time distanced-cooperation, communication and off-line exchange of data (repository). The proposed virtual lab was used to expand collaboration
between different participants, such as international architectural students and/or graduates, 3D experts, computer scientists, etc. Although the envisioned 3D virtual lab has not been implemented to the extent which would enable less field-specific and more user friendly collaboration for the purposes of wider urban planning, the concept has been laid out and the solutions tested for future broader and more inclusive implementations. Other digital tools were used mostly for repository of information or communication between different participants (VIPA platform: upgraded Moodle). Many other collaborative projects can be seen using the internet upgraded with adapted digital tools to facilitate collaboration (Kvan, 2000).

One of the VIPA follow-up projects Erasmus LLP DIVE 2010 ‘Bridging the gap between virtual and real’ [2] continued the initiative and contents/technical collaborative principles by putting an emphasis on the face to face intra-expert and expert to expert collaboration with the support of digital tools. It represents the active collaboration of students and teachers of different professions: architects, digital designers, social scientists, geographers, even performers (Zupancic & Juvancic, 2009). Instead of dealing with long distance communication we focused on tools that would enhance the collaboration from the technical and task related perspective. On the one hand, experts worked together in groups on the project site using digital tools from the initial stage of the designing process (professional collaboration), using the tools to transmit their complex ideas (that could not be transmitted otherwise) i.e. animations, algorithms, interactivity, etc (Rhinoceros, Grasshopper, 3DS, VRML enhanced internet browser). On the other hand the non-expert collaboration has been suggested or included into the student design (i.e. experiments on the streets, where people were asked to try urban elements or the suggested ‘voting’ system for the layout change of the mobile urban solutions).

The group work of the recently concluded DIVE 2010 that best illustrates several levels of collaboration has proposed the redesign of the street that would include a grid of blocks, raising and lowering (Figure 3), thus providing changeable settings for different activities and day or seasonal cycles (flee market vending stands, open air theatre, sitting, walking, cycling, etc). Not only did the work itself lead to collaboration of different professional and international profiles and teachers/students with special expertise by the support of digital tools, it also envisioned user participation for reshaping of the street based on the voting system. In this case the digital tools (computer controlled system, publicly accessible virtual simulator with voting system, preset variants and possibilities for user modification suggestions) would not be used to support non-expert collaboration in the planning phase but rather collaboration during its lifecycle. The proposed solution is flexible enough to offer the opportunity for shared urban vision of the street layout after the implementation, which is an interesting and perhaps also an easier alternative to inclusive-for-all collaborative planning process.

**Conclusion**

Through our on-going research work dealing with urban planning and including different groups of public, we established that digital tools used in our projects so far are lacking the flexibility and user friendliness. They also proved to be too experimental, too rigid and sometimes too specific for inclusive-for-all collaboration. Although the digital tools used so far have not surpassed the prototypical level and cannot be directly and easily implemented to support all ‘ingredients’ of envisioned shared urban visions - education, communication and collaboration – the constant testing and solution searching has indicated where and how they can be brought into the participatory planning process to be of help to all participants.

Although the collaboration among professionals cannot be considered entirely integrated it indicates relatively high level of flexibility of different experts
Figure 3
Concepts for collaboration of experts and non-experts resulting in adaptable and responsive urban environment during its use; (DIVE 2010 - mentor: V. Bourdakis; students: G. Belevešlis, E. Gonçalves, N. Juric, V. Silva, L. Terseglav; source: [2])
when working together on urban scale issues (the visual communication still remains an issue when dealing with ‘non-visual’ experts). The digital tools used by experts are compatible enough that advantages still overshadow the hindrances and facilitate cooperation, however in praxis, not integrated enough to be called collaborative. Such tool use results in sequenced rather than simultaneous approach to the planning. All the technical issues (conversion of formats, adaptations, modifications) also demand valuable time and energy.

Participation of non-experts in the city planning sees wider gap between familiarity of collaboration and tool use among experts, and the more general digital applications the non-experts are used to and familiar with. The future of research and implementation lies not only in the lifelong education about architecture and urban planning (contents) but also in the development of digital tools tuned to the least able users in terms of their skills, communicative and technical knowledge. As the professionals need to get familiar with the tools they use, so do non-experts, and for that purpose the tools should be simple, intuitive and user-friendly. As we would like the future cities to evolve as shared vision of dwellers and planners we will need both: the users and experts in sync with complex urban and environmental image of the city and digital tools – ‘a shared urban design lab’ that will facilitate collaboration – effortless in technical terms, yet advanced enough to satisfy the needs of the majority involved.

References


[1] www.veps3d.org