MEDIATED SITUATIONISM

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Abstract – This paper introduces a new approach for the digital design education in architecture. In several courses called *Digitale Methoden 2* over the past two years students have been asked to deal simultaneously with two major topics: understanding information visualization and processing social interaction. This helps to enhance their design capabilities as well as learning to deal with complex data and space-sociological phenomena. The underlying questions for our research were: Could the development of individual, digital visualization methods extend or replace analogue pre-design processes for investigating and understanding urban spaces? Is it possible to create artistic applications as a result of the previous ‘measurements’ to solve space sociological problems?

PREVIOUS TEACHING METHODS

Visualizations

Visualization is an important aspect in academic architectural education. It:

- enhances communication skills and
- facilitates improvements of architectural projects.

The latter is brought about by closing the feedback loop during the development of a project. We have focused on the second aspect and have tried to invent methods for the sensual enhancement of the architectural planning process.

A great amount of teaching has been dedicated to the creation of photo realistic visualizations. Although they help to convey the physical appearance, they have difficulty in representing the non visual boundary conditions of a project.

Another large amount of work has gone into the creation of visualizations for purely aesthetic reasons (see e.g. [1]). Due to the abstract level of these visualizations, they might be very useful to foster the evolution of architectural ideas. However, for the same reason, it is sometimes difficult to create an understandable link between the visualization and an architectural project. This aspect will be discussed further in Creative Coding.

Web development

Web 2.0 technology for architecture? A lot of architects, information designers and computer scientists concern about ways to merge web and virtual technologies with real estate architecture. *Being digital* [2] like Asymptote Architects and Marcos Novak or handling data driven forms like Greg Lynn and many others are examples at the architectural side of this topic. While ending up with something, one could finally 'see' in the virtual or real world, the processes of creation often stay hidden and un-discussed. The concept of *Digitale Methoden 2* is the answer to this lack, trying to teach on one hand a more precise way of handling web based data resulting in a architectural intervention. On the other hand we teach a deeper understanding for handling complex data in architectural tasks.

Building a physical Internet radio, thinking about one button devices, mapping web databases onto landscapes, programming pdf files or doing some hyper prototyping were tasks of the previous years of this course.

Fighting through new technologies and some programming practices, fewer students finalized the courses. One result of these previous courses was a table, where online parametric modeling results in a piece of furniture. A similar work, done in the same time by the Swiss architects gramazio&kohler called *mTable* [3] was a proof of concept and a concurrent evidence for this contemporary design strategy.

Another project, called 'urban ants' [4] was situated in two different cities, visualizing their connection through interactive flooring in an urban space at each city. Connected through the web, a simulation shows the opposed movement through interactive ant-streets as a change of colour in the flooring. A reference to this project but a leap in scale was the New York telephone exchange [5] done by the MIT media lab, but based beside others on a previous project called 'mobile landscape' done in the Kunsthau Graz by the SENSEable city laboratory [6].

A primary question for us, when we started re-designing the course was: Could we do architecture with input like that? Outbound from that, additional questions occurred: What does architecture concern about information visualization? This is in fact a philosophical question and nothing we would like to answer in a students course.

But starting with the term 'Information architecture' we recognised a big mistake what information architecture is about. Introduced by Richard Saul Wurman [7] at a conference of the American Institute of Architects in 1976 the term 'information architect' is widely used for the design of information structures. More in detail information architects handle complex digital data and information and convert them to readable graphics or demonstrations. As in many other areas the word 'architect' describes a constructive handling of information input to a understandable visual re-arrangement or output. 'Real life' architects are designing peoples life with physical buildings, embody the needs of individuals and the society by interpreting the information given by them. Information architects do the same except that physical results not necessarily evoke. Especially the so called 'digital turn' that affects architecture as well as all other disciplines, dissolves the border between the computer scientific use and the practical (building) use of the term 'architect' if, however, it

existed anyway. As Wurman introduced the term also as a teacher in an architectural school, the course we are discussing in this paper continues this tradition.

The whole world knows about what information architects do – except us architects! So there was also a need to redefine and discuss information architecture in an more architectural way. It is necessary to point out that information architecture is nothing limited to computer science or the world wide web. It is something ideational that becomes physical. In this context we would like to use the terms ‘informed’ or ‘intelligent’ architecture as well.

Is it really the design of something, that we are interested in information architecture? We don't think so because we are interested in designing processes and in case both aspects are important. Therefore we suggested to have less interest in results and more focus on what they are working on and what processes they use.

Finally we ended with two needs: Having a closer look at what information we are interested in, and searching for the right scale for our projects, somewhere in between a ‘parametric informed’ table and the world wide communication network built with mobile phone data. The major task was not to design something instead designing processes concluding an intervention

INFORMATION VISUALIZATION

Creative coding

The algorithmic creation of images has a number of interesting aspects:

- the level of detail can be easily pushed far above the limits of human drawing
- visualizations can be animated
- the laws of physics (or modifications thereof) can be utilized to drive graphic representations
- trendy scientific fields like cellular automata become approachable.

Thereby it has sparked off different forms of art. Most notably among them is algorithmic-, generative- and emergent art. Of course, these visualizations have led to direct translations into architectural forms (see e.g. [8, 9 and 10]).

The declared goal of the discipline was the discovery of 'interesting' visualizations. As a useful side effect, the graphical output has made the programming discipline more attractive to students who may have avoided programming and the real merits of algorithmic design before. Only recently, algorithmic project development also have led to ecological design [11].

Physical computing

In general there are many fields in architecture where we find physical computing attached. BUS systems, intelligent buildings, digital improvements (e.g. Digitalstrom [12]) or mediated façades are only some examples.

In our case, the question was: How could we collect invisible data? We started measuring the invisible with:

- Statistical methods (counting, questionnaires, interviews)

- Visual methods (images and videos)
- Sensory methods (humidity, infrared light, pressure)
- Collecting things (or garbage)
- Combination of these methods
- Recursive improvement through visualizing the data.

Following Humboldt's traces described by Daniel Kehlmann [13] we motivated the students to see urban areas with the eyes of a researcher, dropped right into the 'nowhere'. Equipped with the tools mentioned above, they started exploring urban areas in a new, different way.

What did they measure? Students always want to measure 'objective' urban parameters but as architects they always make subjective decisions. Understanding that there is no 'objective way' or 'super position' where one could find the ultimate answer to architectural problems was one of the key experiences in the course. Instead they found often new answers through a deeper understanding of the problem by measuring it in different ways. Therefore translation, re-creation and abstraction of instrumentation were typical steps in this process.

Concluding this section we have to say that there is a 'technical' haptophobia while collecting the data but not in working with equal techniques for production (laser-cutter, 3d printer or CNC milling). Also no fear about visualizing data in bars and diagrams but great respect from programming and coding. Establishing a new relationship between instruments and results and also between collecting and mapping the data was finally gained by most of the students in these courses.

APPLICATION TO ARCHITECTURE

We are aiming to employ algorithmic tools for the sensual parts of the architectural planning process. Therefore, we have visualized heterotopic, space sociological as well as situationist aspects for further courses.

Heterotopias

The heterotopia represents a concept elaborated by the philosopher Michel Foucault [14]. From an architectural point of view, a heterotopic space is composed of architectural elements that help to support the creation of utopias in human minds. Thereby, utopias refer to dreams, wishes and other elements that interfere with reality (or that create a 'parallel universe' to our established reality).

From an academic point of view, heterotopias represent an intellectual domain that is rarely touched in architectural debate during project development. Hence, the value for inclusion in educational programs is twofold:

- Heterotopias represent an essential part in the human perception of architecture
- Heterotopias are difficult to communicate and therefore they are usually avoided in planning processes.

Hence, the development of tools that ease the communication of heterotopias may provide additional value to the architectural design process. These types of tools were developed in our courses and are discussed later.

Space Sociology

Space sociology [15] refers to the study of the interplay between architecture and human behaviour. Thereby it refers to the subconscious aspects of architectural reception. A formalized theory amenable to algorithmic formulation was developed by 'space syntax' [16]. The theory is useful to predict the most likely sociological impacts of architecture. These include, for example:

- the identification of regions with a high crime rate
- the assessment of pedestrian fluctuation
- the local distribution of visual control vs. visual controllability.

Based on these measures it becomes possible to further derive useful information, which can be utilized for the logical distribution of various commercial urban facilities (shops and other amenities).

Situationism and Dérives

The 'dérive' is a psycho-geographic space perception practise. While other situationistic practises only 'wave' or 'wander' through urban spaces, dérives follow a ludic rule-set where a group of people is driven to a different perception of urban environments. A dérive is a 'planned' operation not based on hazard but taking it in account. The Situationists replace the unconscious dream-city of surrealism by a playful tangible, spontaneous city [17]. For urban planning the meaning is a new kind of 'open source urbanism' described for example by the projects from urban catalyst. [18] What Cedric Price described theoretically as 'enabling' in the early sixties of the last century is now taking place in urban design strategies. The role of architects is shifting to curators. Instead of the visible form of buildings, the program of intervention is in focus. The users of urban areas become responsible for the production of space, architects and urban designer are only consultants and/or process engineers.

NEW AREAS OF APPLICATION

Combining information visualization and architecture

Starting with traditional ways of visualization we used tools like many eyes by IBM [19] to simply get quick results. Following up, we used the software Processing and Flash with focus on data translation and import. Finally we applied artistic, visual or aesthetic criteria onto this data-sets and visualizations. From another point of view, we switched from data visualization (to get information out of them) to some sort of visualization or information design. We tried to design processes through designing the right visualization tool.

Combining ‘outdoor measurements’ and the theory of the *dérive* we extended theory by the values of digital practice and vice versa.

Using Flash and Processing Software for space sociology and heterotopias

By designing the art of visualization we dig out certain hidden aspects of the heterotopic place. Thinking of ‘how the final visualization’ will look like carried out new aspects of the phenomena investigated by the students in the first term.

Adding audio on heterotopias

Two new needs appeared in the second term of InfoViz: (a) Bringing the Information back to the place and (b) what could we do with audio? One idea to handle the students’ ‘technophobia’ was combining physical computing with visualization instruments. Digital video combines both input and output. So we equipped the students with digital video cameras on the input side and constrained the output to projections.

The reproduction of the results through video installations followed also the heterotopic concept of ‘getaway’ into a illusory, co-existing parallel world. A cooperation with students from the department of electronic music appeared useful as they worked on algorithmic compositions based on data-sets. We grouped similar projects where students used same algorithms, data-sets or locations.

At the end of the course a concert took place in the ‘Medienkunstlabor’ right in the ‘urban’ heart of the city of Graz where visuals and audio pieces together accomplished a heterotopic experience [20]. Remarkable in this method was the development of a trial and error method from a theoretical issue.

Artistic intervention in urban areas adding situationism and *dérives*

In this course we mapped the idea of the *dérive* onto the collected data. Coincidence and subjectivity are valid for the data or information as they are a basic component of the situationistic theory. From the course description:

First, get rules or even algorithms out of the visualization. Second, search for patterns and reconfigure them by rules. Do this in at least one or more steps; not only visualizing (passive presentation) but trying to get the people involved to end in an active way of ‘visualization’. The visualization is part of the improvement as it forces people to react which produces a change in the interactive visualization and further forces another reaction.

The design is at least a process of interaction and reaction as architecture always is. The key points were:

- Carrying out new aspects of the (heterotopic) architectural problem by visualizing it (great amount of data, making invisible things and connections visible)
- Bringing the information back to the investigated place
- Get the people involved, change the place or even get information about how the installations re-invent or change the place.

TECHNICAL ASPECTS

Flash, Onyx, Air

The reasons for using the proprietary software Flash were:

- Ready-made visualization instruments like the relation browser by Moritz Stefaner [21] are available on the web
- XML based tools for handling the data and database connections
- A big community exists
- Many of our students had some experience with Flash before
- One or more 3D engines (papervision3D, Sandy, Away3D, Alternativa3D, Five3D and Roxik) are available
- The graphical quality and ability to design with the use of a timeline (think of processes!)
- Easy scriptable (Actionscript versions 1 and 2)
- Onyx as an open source, standalone VJ environment working as browser based Flash file or AIR application.

Using AIR (Adobe integrated runtime) for the need of more complex, data driven visualization as a logical extension of the toolset. Especially the possibility to build standalone applications that do not depend on servers or browsers, to PHP/MySQL data handling or on profound Actionscript 3 knowledge was worth working with AIR.

Processing

Processing was developed by Ben Fry and Casey Reas [22]. The Processing application consists of a Java library and an IDE (Integrated Development Environment). The library encapsulates a few standard Java drawing routines. It hides the complexity of the Java graphics functions and thereby makes programming accessible to a wider audience.

Students can approach programming in a simple imperative style using the Processing techniques because it does not use an application ecosystem. It becomes much easier to immediately dive into simple programming experiments. The IDE is represented by a simple text editor. On the other hand it does not include a debugger, which is a serious disadvantage.

EXAMPLE APPLICATIONS BY STUDENTS

fruit mileage. The supermarket full of its generated needs was the topic one group of students was interested in. What do we really need and how far would we go for that? By investigating the goods of the market, the special interest was focused on fruits and vegetables. They found a different supply in various markets, depending on the quarter they were situated in. One could read the social group of its inhabitants from that, but we asked the students for a simple application to bring some more information to the people. In supermarkets they built up a 'mileage bank' where everyone who chose a fruit or vegetable got the information about the distance the goods had been travelled.

The students found out that in richer areas people buy more biological food. But on the other hand they spend much more money on environmentally unfriendly products than customers in poorer areas.

garbage hills. A project also connected with a supermarket was the garbage hill. Students investigated the place in front of a market like the team of CSI Miami. The students categorized the sort of garbage and the moment the garbage was dropped by customers. Beside the fact that a nearby school produced a lot of cigarette butts, the students were interested in the different places where garbage was dropped. First thinking of a landscape they ended up with a linear visualization of garbage hills. They found the rest-breaks between the lessons of the school but also the different social groups, their (environmental) behaviours and how they are connected to each other. The way they made it visible for the public the students actually built a sitting accommodation made of – one could imagine – garbage.

radioballet. This represents a technical variation of a flash mob. Several groups of students organised radioballet events via a local radio station. Participants with small radio receivers carried out several broadcast instructions like e.g. 'waving' or 'dancing'. Due to the synchronized activity of a group of people, these activities started to irritate passers-by. In our studies we aimed to focus public irritation on traditional normative sociocultural behaviour.

nekrotopia. The basic idea in this project was a map of death. Starting at a graveyard students collected data which every gravestone offers its spectators. The students generated a database and started with some typical questions about lifetime, life cycle and how this lifespan is connected to forename or historical dates e.g. World War II. While thinking that every graveyard has a fixed lifespan with a certain amount of 'new' inhabitants every year, this was not true. Moreover, the investigated graveyard got its 'inhabitants' over around 30 years. With this discovery, they interpreted their graveyard as a 'ghost'-city, visualizing and opposing lifetime and death time connected with the place of the graves and the choose able time stamp. Through a process of data investigation and sorting procedures, the students began with a three dimensional idea of a landscape but ended up with a new kind of mosaic display visualization of hidden information about a heterotopic place.

cellular automata. Hospitals are typical heterotopic places and a difficult architectonic task. It is also very hard to get data-sets we are interested in. Students liked to visualize the nightlife as a sort of 'breathing'. They video-captured the façade (with permission of the hospital) and translated it into black and white images. More in detail, the façade was black and the lightened windows where white. There is a reference to the work of Manfred Kienle [23] who investigated the information-aesthetic value of façades in general. After defining some typical states we asked the students if it was possible to find a 'rule-set' which these states are based on. They played with CA (cellular automata) and found some rules they could fit in their states. The claim to bring the visualization back to its 'scene of investigation' produced a CA output and use like the 'Blinkenlights Project' in Berlin [24]. Moreover and as a result of our cooperation with the Institute for Electronic Music, one of their composers took the rule-sets and wrote a piece of algorithmic music for the installation.

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