Real Virtuality –
Immersion and Perception of Virtual Architecture in Multi-User Virtual Environments

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The virtual as has been subject to architects since the Domus Aurea, colorful gothic windows or the Hall of Mirrors in Versailles. Today, the computer creates space and it is space. Space has not lost its relevance, and is now re-loaded as a hybrid real virtual environment, bodily perceptible within a virtual alter-ego. The computer becomes ‘home’ for millions of people spending their time in 3D virtual worlds. Those worlds grow, created by game designers, programmers, or - most important - by the people themselves. Yet these virtual worlds are created without architects, like the real world. It is now time for architects to discuss this increasing field: to address the issue of embodiment, immersion, interface, and perception of virtual worlds and start architectural processes.

Architects in Virtual Reality.
“Nothing resembles itself, and holographic reproduction, like all fantasies of the exact synthesis or resurrection of the real (this also goes for scientific experimentation), is already no longer real, is already hyperreal” (Baudrillard 1994, p.108).

Architects always tend to use new technology to change or recreate common ways of producing or designing architecture. At least they are affected by the artefacts which technology produces, like Corbusier and his fascination of race cars and ocean liners, Buckminster Fuller and his idea of mass production, and of course Negroponte’s ‘Soft Architecture Machines’, who founded the Architecture Machine Group at the MIT in 1967. Together with Seymour Papert they argue against the still dominating paradigm of the computer as a big calculating machine. Papert believes in the possibility to use the computer as a constructionist educational learning environment. Forty years later, the computer has pervaded our lives. We use it in a plurality of devices, but programming is still up to a few specialists. All the rest are users.

The booming game industry has made 3D virtual reality a mass media, and 3D virtual spaces have become a major economical factor. Today Millions of mostly young people play and live in shared 3D multi-user virtual environments (MUVE), despite the simple interface. The daily-live of people, using computers, has nothing at all to do with using big calculating machines, but on the contrary, with simulation, navigation, perception and interaction within hybrid virtual real environments. Looking at existing virtual architecture in MUVEs, or computer games reveals that the architecture is only a simple copy of traditional ‘real-world’ ideas. In our research we focus on questions about the characteristics, immersion and perception of virtual architecture within MUVEs. Existing possibilities of current 3D platforms are used in new ways, by re-thinking the process and matter of the architectural design. Thereby Second Life is used in multiple ways: as a place, software, tool, media, presentation technique, and e-learning environment. We try to leave our real world ideas behind and use the computer as an information editor. The approach to design leads to a multi-user interactive engagement with the machine. The computer becomes an object to think with.

The real world - just another window!
Sitting in front of a computer screen, the definition of real or virtual space is not relevant. All that matters is framed in a window, a word document, a chat on Skype, or the virtual island on Second Life. It is just another window, and me sitting in front of it. The classical dichotomy of our experiential reality is beginning to disappear: truth and lie, real and virtual, near and far, place and non-place, body and avatar. Virtual reality becomes part of the spectators’ perceived experience, superposed to real-life experience. The pictorial space of MUVEs, enriched with sound, noise, and movement, generates immersion. Studies in the field of psychology and neuroscience show that virtual 3D environments cause real physical and mental human reactions. Virtual reality has the potential to
assist current rehabilitation techniques; e.g. to cure acrophobia, arachnophobia or brain damage. (Vogeley 2004; Rizzo, et al. 1998; Kuntze, et al.2003). Virtual worlds are capable of generating knowledge. The virtual is real to the people, despite knowing it is ‘only’ virtual. The human body is immersed into the virtual. The notion of Baudrillard’s ‘Hyperrealism’ constitutes that there is no fiction anymore; “the simulacrum is true” (Ecclesiastes n.d. cited in Baudrillard 1994, p.1).

God or Ego?
In MUVE’s the human perspective is multiplied. Like on the desktop the user can easily tab between different programs and tasks, in a 3D virtual world he can choose between different perspectives. The virtual connects body and perspective in new ways, by neutralizing the single point of view of our perception (Queau 1995); the reference point, mathematically defined since the Renaissance, gets multiplied: “the end of panoptic and perspectival space” (Baudrillard 1994, p.82). This is a widely known problem for architects using 3D virtual project simulations for clients: the user can see and experience all parts of the project, including the ‘not so perfect’ areas. Despite architects are trained to create perfectly, nicely rendered perspectives from the best point of view, to win a competition or to convince the client, but VR offers the possibility for all its users to explore and perceive the project freely.

“Cyberspace is created by transforming a data matrix into a landscape in which narratives can happen (...) Reduced to a point, the pov (point of view, pyramid of vision - a 3D computer graphics term describing what the viewer sees) is abstracted into a purely temporal entity with no spatial extension; metaphorized into an interactive space, the datascape is narrativized by the pov’s movement through it” (Hayles 1993).

Interface - how old are you? - PLAY
It is very simple. If you are younger than twenty years, you are used to handle computer games, you have experience in moving a mouse, and you know what WoW means. Playing computer games is nothing to talk about, it is a bodily experience. One observation which everyone can make in a New Media exhibition is that only young people play and experiment with the interfaces provided. Older visitors just stand in front of it, reading the signboard and watch the screen. This shows that it will become even more normal to interact within VR in the future. Interesting for architects in this context will be to see, what spatial conceptions the next generation develops, and what form of architecture they create. Will they look different from the traditional architectural designs ‘we’ still need? And what are the consequences for architecture reprogrammed by the experiences learned out of virtual environments?

Going virtual
Virtual space is a hybrid medium, in which text, picture, and computational rules constantly interfere with each other. Yet, their relationship seems to follow a specific setting – “the visual culture of a computer age is cinematographic in its appearance, digital on the level of its material, and computational (i.e., software driven) in its logic” (Manovich 2001 cited in Hansen 2004, p.34). Everything within a virtual world is digitally created. Text, code, rendered light, voice, sound, music, avatars, - everything is a kind of an entity, visualised frame by frame. MUVEs like Second Life are big social, computational systems following computational and social rules. Contrary to popular belief virtual worlds are not endless. Not everything is possible – 0 or 1. “Cyberspace is not a space without laws. If anything, it is a less tolerant space than the world we exist in” (Novak 2001).
Virtual space is a manifestation of real world ideas, not only concerning architecture. The space in most computer games is a simple Cartesian 3D grid - the idea which is still in mind of people, thinking of space. Despite we know that space and time are constructed concepts. Both are notions of knowledge, which we did not deduce from the world, but read the ideas into the world (Renn 2005). Virtual architecture will have to merge the discussions about body, space, interface, surfaces, net and information. Existing notions of body and space have to be re-programmed to stay meaningful. Like Gins & Gins argue, the body is always a body in space, “it is by necessity an architectural body” (Gins & Gins 1997 cited in Hansen 2008, p. 183).
Instruction 1: ontological – Architecture_Engine_1.0
Everything within virtual worlds could be called a virtual entity: the avatar, the light, the geometrical objects (prims), the panels on the screen, the texture, the camera, which gives the perspective to the viewer. Every entity has a behaviour, which is a piece of code, or script. This script defines the property or the function of the entity. For example: a light has to create brightness, it is per se invisible, it is not physical (which means, it has no gravity, according to the physic engine), and it has some prims shaping for example a streetlamp. And, like in the “real” world, a light does not walk around like an avatar, or does not “close” like a door, because it would not make sense to us. But this kind of assignment is man-made. The connection between object and function is always man-made. Both categories, the object/entity and the code/behaviour are completely independent and could be assigned arbitrarily. The only boundary is the human acceptance, or willingness of acceptance.
In my diploma project “Architecture_Engine_1.0” a game engine is used to explore the possibilities of using a game engine for an architectural design process. The application is a game like environment to create virtual architecture. The script for the movements of the avatar is transferred to the architectural object. The architect becomes the architecture. The architecture becomes the user. The terms and definitions begin to dissolve. The assignment between thing and behaviour, between object and function is abrogated. The user becomes the object, the object is the user, and the whole virtual environment becomes a reactive, sensible, multiplayer system.

Instruction 2: architectural consciousness – Archdiploma2007
The Archdiploma2007 is a biennial architectural exhibition of the best diplomas at the Vienna University of Technology, Faculty of Architecture (Curator Prof. Manfred Wolff-Plottegg, Prof. Harald Trapp). Last year Second Life was used to present the projects. The architecture, created for a diploma thesis, was virtually built within the MUVE of Second Life. The goal was to explore the reaction of architecture to New Media. Beside SL, several media like WAP (wireless application protocol), NFC (Near Field Communication), a book catalogue, and of course a ‘real’ exhibition space was used to present the diploma projects. The media becomes the editor for the exhibition of the absence, as Plottegg puts it. The architecture becomes the information editor (Plottegg & Trapp 2007).

On a flat white island in SL the user starts, always on the same point, to explore the exhibition. The architecture is programmed to appear randomly. It remains at a place on the island for a couple of seconds, and then disappears. The user finds a game like situation; the visitor has to find out what to do and where to go. He can walk or fly around. By entering a project it remains still. The architecture was programmed to overlap each other; the environment was constantly building new constellations. The ‘natural’ condition of virtual architecture is neither static nor in a flux – both are conditions to be created. Virtual architecture is an instruction, waiting to be executed.
The individual projects, thought to fulfil a single spatial function, built permanent unexpected new connections among each other. Material, texture, function is losing its meaning. For the user architecture becomes a rule – the first rule whose understanding constitutes the entry to a new world. In our example architecture is and defines the concept of the exhibition world. The virtual architecture becomes the show and the showroom simultaneously.

Instruction 3: open the virtual door
“Narrow road between lands. You are stood on a narrow road between The Land and whence you came. To the north and south are the small foothills of a pair of majestic mountains, with a large wall running round. To the west the road continues, where in the distance you can see a thatched cottage opposite an ancient cemetery” (Bartle 1999). Virtual worlds use the ideas, the concepts of our ‘real’ world. Bartle cites the beginning of a famous MUD, where the computer games were textual worlds. Not much has changed if you look at MUVE’s like Second Life or World of Warcraft. People know how to read those ‘signs’. “In architecture, a structural element such as a column is both a real column and the sign of a column” (Eisenman 1999 cited in Hansen 2006, p.192).
A normal door for example is closed or open. It splits two parts of a space, by building an opportunity
to overcome a barrier (wall). People know that, it seems to be unnecessary to mention it. But using architecture in a virtual environment, inhabited by avatars, needs new concepts of spatial, or temporal arrangements for recreating readable architecture. Architecture is full of spatial signs that people can read. Architecture is information; it is an information editor (Plottegg 2007), however the interface is constantly changing. If people are more and more used to interact with hybrid real virtual environments, the properties/behaviour/function/code of each media/entity/object begin to interfere. For example: to ‘click’ at an object to open a door, chat, box, email, window, or to make a phone call. The instruction remains, the object dissolves. Architecture becomes a process. As our research within Second Life shows, virtual architecture needs new ways of ‘instructional manuals’ beside the known signs, in order to avoid package leaflets. Those interactive architectural interfaces could act and react in multiple hybrid manifestations, using all kinds of media.

**Instruction 4: parameter value!**

Contrary to the common belief that translation is always accompanied by loss, the translation of virtual to real and vice versa can produce new design approaches. The future will show which virtual strategies, which spatial applications will be accepted by people. Architecture has to deal with interfaces between human and environment. Therefore virtual worlds are the best playgrounds to explore new concepts. Following the strategy of Facebook or other open source projects, virtual architecture could become a collaborative process, made and tested by millions of user. The human consciousness gets reframed within constantly changing virtual hybrid architectural interfaces. Thus people, used to interactive architecture, will have new demands, new behaviours: Architecture reloaded.

**Figures**

figure 1: architecture_engine_1.0 - Screenshot
figure 2: Project in Second Life – Lukas Antoni
figure 3: archdiploma2007 - Screenshot
figure 4: archdiploma2007 - Screenshot
figure 4: Island of the TU Vienna in Second Life - Screenshot

**References**

Bartle, R., 1999., MUD Glorious Mud. [internet]. Available at: [http://www.mud.co.uk/richard/gnome.htm](http://www.mud.co.uk/richard/gnome.htm) [accessed 25 June 2008]


Virtual Reality (VR) enables users to experience artificial environments without the need for leaving their current location. This technology allows people to travel to places that don’t exist. Special virtual reality software and hardware like head-mounted displays (HMD) and hand controllers make virtual reality possible. Virtual reality focuses on complete immersion. It means that users experiencing virtual reality can hardly distinguish what is real and what is not. Their senses feel so real that they subconsciously interact with an artificial environment like they usually do with the natural one. Furthermore, complete immersion may either replicate physical properties of the real-world environment or form its physics laws like inverted gravity or its total absence. Virtual Reality (VR) and Virtual Environments (VE) are used in computer community interchangeably.

Virtual reality refers to immersive, interactive, multi-sensory, viewer-centered, three-dimensional computer generated environments and the combination of technologies required to build these environments. Telepresence is a specific kind of virtual reality that simulates a real but remote (in terms of distance or scale) environment. offers the enhancement of human perception and was applied as a virtual user’s guide to help completing some tasks: from the easy ones like laser printer maintenance to really complex ones like a technician guide in building a wiring harness that forms part of an airplane’s electrical system. Virtual environments (VEs), focused on component cognitive and attention processes, were rather recently developed and validated for spatial abilities (Rizzo et al., 2006), learning and memory, and executive functions. They are well suited to applications where full immersion and completely synthetic digital environments are preferable, or necessary; perhaps in order to have total control on all objects and events in the world; or to focus user attention on only the content/data/simulations within that world; or to define a metaverse (to use Stephenson’s, 1992 construct) where real-world impediment of.