

The Cognitive User of Architecture

Building a conceptual framework for the exploration between the relationship of architecture and its user based on the current neuroscientific debate.

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Abstract

This paper introduces the ongoing project *The Cognitive User of Architecture*, which investigates the relationship between architecture and user. The main thesis states that in order to receive knowledge of this relationship, the focus has to lie on the user rather than on the built environment. Accepting and validating the user as a subjectively perceiving and consciously processing 'actor' on the stage which architectural environments provide, the central claim is that architecture is a consciously experienced subjective product, emerging out of the user's perception. Focusing on cognitive science as a consequence, German philosopher Thomas Metzinger's work is examined and incorporated. In *Being No One*, Metzinger (2003) considers neuroscientific research to present a representational and functional analysis of what consciously experienced first-person perspective actually is. Metzinger's significance lies in the development of a conceptual toolkit, interlinking the humanities with the empirical sciences of the mind.

This research paper explores the capabilities, opportunities, and implications which Metzinger's studies have for the architecture / user relationship. Therefore not only theoretical concepts based on the neuroscientific debate are explained, but interactive spatial experiments – responsive architecture – are presented, verifying the theoretical concepts with supporting empirical data.

Keywords

user/architecture relationship, subjective experience, self model theory, apperception/perception, real-space experiment

Introduction

The following paper investigates the relationship between architecture and its user. The main hypothesis states that in order to acquire knowledge of this relationship, the focus has to lie on the user rather than on the built environment. Accepting and validating the user as a subjectively perceiving and consciously processing 'actor' on the stage which architectural environments provide, the central claim is that architecture is a subjectively experienced product, emerging out of the user's process of 'consciousness'. This process of subjective experience is what we have to understand in order to gain knowledge of the relationship between architecture and its user.

User

Taking a closer look at the meaning of the built environment it becomes apparent that this environment is not an 'entity' removed from the subject (and its life). Particularly when we refer to lived-in space, we must add man as the user to the concept of mere constructed space (considering of room definitions, materials etc.), as well as his way of using space. The meaning of space is thus determined by its use. 'The physical is only brought to life through its usage.' (Lerup, 1986) Architecture without life - architecture that is not needed – has no meaning, or at least not yet. It acquires its meaning through its user. (eds Deusser & Friedrich, 2006)

Reflecting on architecture, however, means reflecting on an object, which is a subjective reflection by a user on an object. Every subject/object consideration unequivocally leads to an epistemological observation, since an observation that only investigates the outer environment and neglects the observing system is out-dated. A current major epistemological goal that science is devoting energy to is the phenomenon of consciousness. The science of consciousness already utilizes models of human consciousness, which provide fascinating insights into the subject/object relationship. These models shed a different type of light on the user/architecture relationship, portraying architecture as a profoundly subjective product of the human mind based on perception. This leads me to extend the classical user-definition and originate *the conscious user* in my endeavour to describe the *user/architecture relationship*.

Self Model Theory of Subjectivity

The essence of the phenomenon of consciousness or subjective experience is that a single unified reality becomes present. If a world appears to you, you are conscious.

‘But what does it mean to say that for all beings enjoying conscious experience necessarily a world appears?’ According to Thomas Metzinger, ‘it means at least three different things: In conscious experience there is a world, there is a self, and there is a relation between both – because in an interesting sense this world appears to the experiencing self’ (*Metzinger, 2003, p 5*).

For that very reason Metzinger distinguishes three different aspects in his original question. First, he investigates what it means for a reality to appear. In the second aspect he deals with the question of how it can be possible that this reality can appear to a subject of experience. Finally, he sheds light upon how this subject becomes the centre of its own world, in other words how it transforms the appearance of a reality into a truly subjective phenomenon by turning it towards an individual first-person perspective.

Being no one

Metzinger treats these questions in detail and establishes the results in his *Self-Model Theory of Subjectivity*: ‘a phenomenally subjective experience consists in transparently modelling the intentionality relation within global, coherent model of the world embedded in a virtual window of presence’ (*Metzinger, 2003, p 15*). As far as Metzinger is concerned the *Self-Model Theory of Subjectivity* (subjective experience) consists of three elements: the globally available model of the world, the virtual window of presence, and transparency.

Metzinger states that every conscious system operates with globally available information, in other words all information that is associated with being in a world. Therefore, a system that is conscious has to have an internal and dynamic model of the world. Consequently this model is a consistent internal representation of the world as a whole. According to Bernard Baas and his hypothesis of the *Global Workspace Theory* (Baas, 2003), the content of conscious experience is the content of a global workspace, which offers fast and flexible control of its outer but also inner behaviour to the system.

Additionally, the system experiences this integrated model from a virtual centre point through a virtual window of presence. Whatever you experience, you always experience it *now*. The experience of presence which comes with our phenomenal model of reality is the central aspect. If the global model of a world or a part of it is embedded into the virtual window of presence of the system, then the produced representational content is the presence of a world. A conscious experience is the presence of a reality. Therefore, a conscious system could also have a great

unconscious model of reality, namely the part that is not globally available. It is obvious that this unconscious model of reality causally influences the behaviour of a system.

Finally, a conscious system such as man needs a functional implementation of naive realism, so-called transparency. Phenomenal transparency in general, however, means that something particular is not accessible to subjective experience, namely the representational character of the contents of conscious experience. (Metzinger 2003, p 169)

Ego Tunnel

Thomas Metzinger uses one particular metaphor to exemplify conscious experience: the *Ego Tunnel*. He writes: 'What we see and hear, or what we feel and smell and taste, is only a small fraction of what actually exists out there. Our conscious model of reality is a low dimensional projection of the inconceivably richer physical reality surrounding and sustaining us. Our sensory organs are limited: They evolved for reasons of survival, not for depicting the enormous wealth and richness of reality in all its unfathomable depth. Therefore, the ongoing process of conscious experience is not so much an image of reality as a *tunnel* through reality.' (Metzinger 2009)

Taking the concept of the *ego tunnel* into account, the debate touches upon the question if architecture, subjectively experienced by the user, directs the user's 'awareness' on its – architecture's – self? This question accounts for much, since most theoretical concepts about architecture draw on undivided attention by the user. In accordance with this neurobiological proposal we have to distinguish between two different types of subjective perception of architecture, assuming that one requires devoting attention and one does not. Consequently the question arises which kind of 'architectural' sensation is 'strong' enough to prompt an architectural user to focus on the architectural environment and how is it possible to 'track' this with empirical data.

Empirical Methodology

In the course of the last years my research colleagues and I tested different types of experimental settings. Our experiments shared a main focus, expressly different types of subjective perception of architecture. The following three experiments throw light upon the development of our different empirical approaches. One of the first experiments we conducted, the *displacement.14* investigation, posed the question: *What do people look at?* To evaluate this, test-subjects' eye movements were tracked as the individuals were shown predefined images on a monitor. The 'eyegaze analysis system' then mapped very precise x-y coordinates of the subject's 'gaze point' on a computer screen showing images of the Seattle Library designed by Rem Koolhaas (OMA). (Picture 1)

The aim of the investigation was to search for *areas of interest* - architectural elements, different types of colours, or special materials - which attracted the users' observation.

On the positive side, this type of investigation, which focuses on architectural environments, provides objective data, however the setting of sitting in front of a computer screen has nothing to do with real subjective experience of architecture.

For that reason our next step was to design a full scale spatial experiment, the *displacement.13* experiment. The concept of this investigation was to design a technically augmented object or box and place it in an existing architectural environment. We equipped the box with tracking systems and so transformed the whole architectural situation into a real space experiment. (*Picture 02*)

Alongside the tracking system, which was part of the inner installation of the box, the entire surface of the object was augmented with an interactive video-installation. The function of this interactive video-installation was to tempt users to enter the box, however since there was no common (in terms of appearance) door, the interactive system on the surface had to communicate the existence of an entrance. The research question we were interested in was what kind of sensation is 'stronger', the architectural - no door - sensation or the interactive - door - communication.

The positive aspect of *displacement.13* was of course its spatial properties and appearance, but in contrast to our first experiment we did not produce suitable data.

For the subsequent real-space experiment we did not add a physical object to an existing architectural environment. *Displacement.15* extended such an environment with a reactive light-system, which was able to change the visual appearance of the architectural landscape in relation to the movement of the user. For this experiment we resumed the notion of the *area of interest*, tracking the test subjects' positions, rather than their 'gaze point' (on a screen), as they walked (individually) through the real space experiment. By tracking each respective person, we combined the different spatial situations with the given position of the user. Walking through the room, each user constantly changed the spatial appearance (the light situation) of our real-space experiment. Test persons were asked to move through the installation for five minutes, in the hope that they would 'find' a preconceived 'ideal' light-configuration intuitively. (*Picture 3*)

Self Affine System

My research has led me to understand my investigations as 2nd order experiments, since I investigate investigations. I have to point out an observation I made in accordance with the *displacement* experiments. I have come to appreciate the discovery that the importance and meaning of my work lies in the

differentiation between purposeful attention (*apperception*) and its opposing process (*perception*), which does not emanate any attention from the origin of these sensations. My assumption, in conclusion of this series of experiments, is that the procedure of architectural perception is generally governed by the subtle process called *perception* and does not demand purposeful attention. Acknowledging some exceptions, my derivation is that when the user is not alone purposeful attention (*apperception*) is directed at another individual rather than the environment.

Revisiting *displacement.13*, my analysis is that the team 'overestimated' the user and his ability to interpret our interactive surface. Users were unable to identify the entrance into the object, the clues the augmented surface provided did not suffice. Thirty minutes into the test situation one inquisitive user cracked our code and immediately started a queue in front of the entrance. This illustrates beautifully how peer behaviour and influence overruled individual response to a given environmental situation; the lack of adequate architectural guidelines for usage was no longer prevalent. (*Picture 4*)

Displacement.14 made me discover a similar 'effect'. As you can see on picture 1, the *area of interest* shared by 40 test-persons was the prominent staircase in the middle of the image. Every picture shown depicted a pronounced specific architectural element, one of the images, however, was different. What we had not noted and considered when we selected the pictures, was that in one of them people are seen in the back of the room. As the analysed image shows, the *area of interest* immediately shifts from architectural elements to the people in the background. (*Picture 5*)

Displacement.15 was based on a reactive system and prompted several test-persons to play with it. Jumping back and forth, they soon discovered the logic concealed in the layout of the system and although this was not intended to attract attention, the reactive system did indeed engage users' interest. (*Picture 6*)

I must assume that the selective process we experience as reality is intrigued and captivated by systems, which provide the existence of *a self-model of subjectivity* or mimic this type of a self.

Conclusion

Thomas Metzinger states in his writings that phenomenon's like *the Ego Tunnel* are products of an evolutionary process to secure the survival of the individual. In the same way, within the process of perception a technique of selection had been evolved to manage the limited resource of focused attention. The focus on self-affine systems, however, could be interpreted as an important precondition for social and cultural developments. If we take that for granted, the question arises what would happen if the architectural environment is augmented with responsive or interactive systems. What will happen to our limited possibility of focused perception?

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