

A VIRTUAL REALIST PRIMER TO VIRTUAL WORLD DESIGN

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PLACES IN CYBERSPACE

Metaphors play an important role in our understanding of the world. They can both broaden our conception of a phenomenon by transferring understanding from familiar areas to new domains, as well as restrict our understanding of new phenomena by working as boundaries for our thoughts (Lakoff and Johnson, 1980). Cyberspace—a term coined by science fiction author William Gibson—is a widely used spatial metaphor for the Internet. We conceive of cyberspace as the place we peek into through our computer monitors when we for instance browse the web. It is irrelevant to us that all the data has to exist in the local computer’s memory before it can be viewed. We think of the webpage as residing somewhere »out there.« In the same manner we think of telephone usage as direct conversations. It doesn’t matter that the sound of our voices often is converted a number of times between different kinds of signals before it is rendered back to speech at the receiving end. When we talk on the phone, it is as if our minds occupy a shared space somewhere in-between here and there. Although it would imply a drift away from the original meaning of the term—also this can be thought of as cyberspace (Sterling, 1993).

Through the technological advances of graphical rendering and network communication it is now possible to dress this metaphor in colors, textures and sound. Where once there only existed an abstract idea of space, there are now concrete

(although virtual) places that we can enter and interact within via avatars. They can be general purpose meeting places like most worlds built using the Active Worlds or Onlive Traveler systems, or made for specific purposes like the Everquest gaming world. Unlike constructs in our physical world, these places have no pre-existing environment that they are placed within. They have to be thought out (or perhaps dreamed) and constructed from scratch. In the process of doing so, we encounter some rather interesting questions. How do we represent ourselves and our environment in the absence of all the benefits and limitations of an a priori physicality?

This is where the field of virtual world design emerges. There is no consensual definition of the concept »virtual world« and I have no wish to indulge in the issue of different possible or proposed definitions here. But for the sake of clarity, let me just mention that I will be talking about places in cyberspace which exist for extended periods of time and can be accessed by large numbers of participants simultaneously. They also provide some kind of spatiality including some kind of representation to indicate the positions of the present participants. There are text-based systems (e.g. MUDs) that fill these requirements and I do indeed consider them to be virtual worlds, but here I will be focusing on the graphical variety. Virtual reality (VR) will be used as a wider concept also including environments that are not persistent or distributed.

The field of virtual world design is a fairly new area of research without a strong theoretical or methodological foundation. In my personal endeavor to develop an approach to this kind of design efforts I have found valuable support in the writings of the American philosopher Michael Heim. In this text I have tried to relate Heim's theoretical framework to some of the issues that I believe to be important in understanding virtual world design in the form of four lessons. After the account of these lessons I will take a closer look at the issues of structure, function and interaction in relation to one of my own design projects, as an attempt to make sense of these lessons in a concrete design process.

INTRODUCING VIRTUAL REALISM

In 1992, Michael Heim had a lunch meeting with David Gelernter—the author of *Mirror Worlds* and *Machine Beauty*—where they discussed the growing divide between the people building computer systems and those becoming increasingly alienated by computer technology. Seven months later Professor Gelernter was severely injured by a mail bomb sent to him from the so called Unabomber, a pathological neo-luddite who targeted people he saw as advocates of the technological revolution for his sinister, sometimes lethal, attacks.

In his first two books—*Electric Language* (1987) and *The Metaphysics of Virtual Reality* (1993)—Michael Heim had written about an ontological shift that is presently occurring all around us. He talked about how we change our ways of thinking when using a word processor instead of a typewriter or how the nature of our experiences shift when we use something like VR technology. At the centre of the ontological shift that Heim was examining lies computer technology; the same technology that Professor Gelernter identified as the divider in a cultural clash that he himself became a victim of.

In his third book, Heim decided to address the problem of the growing divide. In *Virtual Realism* he develops the idea of a middle path between the utopian network idealists and the reactionary naïve realists. In the book Heim describes five aspects of the virtual middle ground. These five aspects are (1) clarifying the language of virtual reality, (2) creating a feed-back loop between the engineers of virtual reality and the public, (3) observing current shifts in telepresence, (4) cultivating premodern somatic awareness through the practice of Tai Chi and (5) developing appropriate design models for virtual worlds (Heim, 1998:1, p. 46; 1998:2).

This paper will focus on the fifth aspect of creating the virtual middle ground to see what virtual realism implies to virtual world design. It is an aspect of virtual realism that Heim has continued to explore extensively after finishing the manuscript for the book (Heim, 2000:1) and the material I have used here also includes some of his more recent writings and publications as well as notes from communications between the two of us.

LESSONS FROM VIRTUAL REALISM

Lesson 1: Technalysis

In order to know how to design a virtual world we need to understand something about what virtual worlds are and what they potentially can be. Since virtual worlds are a new phenomenon, we need methods for developing this kind of understanding. Heim has his philosophical roots firmly placed within the phenomenological tradition beginning with Husserl and then in particular following Heidegger's branch (Heim, 2000:2). Phenomenology is dedicated to describing the structures of experience as they present themselves to our consciousness. Heidegger particularly stressed that phenomenology should bring forward what is hidden in ordinary, everyday experience. In *Being and Time* he attempted to describe what he called

the structure of everydayness or being-in-the-world. To Heidegger, one is what one does in the world.

When Heim sets out to define an appropriate method for understanding our being with technology he propagates the need for an active first-person engagement as a way to achieve this understanding. If we want to investigate the meaning of a world from a human perspective, we need to focus on the interrelations to understand the components of the world, the way the nail belongs to the hammer which in turn belongs to the intentions of a user as he unmistakably heideggerishly puts it. It is in the acting in the world that its properties are revealed (Heim, 1998:1, p. 90–91).

The first-person study of new technologies also brings to words the way our reality is transformed. Heim uses the term technalysis to denote our descriptions of encounters with new technology. It is important to make these encounters explicit before the technology blends into »the invisible furniture of everyday life« (Heim, 1998:1, p. 47) in order to make critical judgments about specific technologies rather than the wholesale praise or rejections typical of the networked idealists and the naïve realists.

At the root of technalysis lies a desire to understand the values of technology based on experience. Technalysis can be seen as a sort of phenomenological manuals for technological artifacts and a mirror image of an ordinary computer manual. Instead of—as in an ordinary manual—describing to a human how to use a certain technology, the aim of technalysis is to describe the changes in the mindset of a person who comes in contact with the technology. When the computer manual might say, »When you push button X, this happens in the computer« a technalysist might instead state, »When I push button X, this happens to me and my view of the world« (Heim, 2000:3).

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I have not engaged in any low-level technalysis in the way exemplified above but I do embrace the idea of seeking understanding through experience. For me this approach led to several years of ethnographic studies of virtual worlds in order to obtain an inside view of the specific characteristics of the social interaction in these environments. At the time, much of the research presented was conducted with an outside perspective, and my results contradicted some of their findings. Studies based on media richness theory and other related theories tended to rest on a positivistic grounding and be decontextualized and task related.

While their results indicated that on-line interaction is inferior to face-to-face interaction and only suitable for simple formal tasks, I found that the interaction

in virtual worlds cannot be mapped against f-t-f interaction. By having an outside view, they mistakenly assumed that f-t-f interaction can be used as the gold standard that all other forms of interaction should be measured against. The inside view revealed that the new context makes comparisons flawed since interaction based on the unique characteristics of the medium is inherently different. I also found other assertions regarding computer-mediated communication to be too categorical and exaggerated. Both the propagators as well as the skeptics made claims about anonymity, lack of hierarchies etc. that did not hold up when compared to lived experiences. Finally, I found that mediation had been mistaken for fantasy by most people—researchers and the general public alike—who had not engaged extensively in mediated interaction themselves. They simply assumed that if two avatars interact in a virtual world, that interaction would not have any implications outside that specific context. But my experience is the reverse, while interaction mediated through avatars may be very different compared to f-t-f interaction, it's still real people with real feelings interacting. Turning off the computer does not erase any of the consequences of the interaction. If you learn something new or if you are offended, for better or for worse, you will still remember it (Jakobsson, 2001).

Lesson 2: Habituation

According to Heim, virtual worlds should strive for something between pure fantasy and photo-realistic reproduction of the physical world (Heim, 1998:1, p. 48-49; 1998:2, p. 3). Most virtual worlds available on the net today strive very hard to reproduce the physical world. The Holodeck from *Star Trek—the next generation* (a VR environment which is impossible to distinguish from the physical world) is often referenced both by developers and users as a goal to strive for. Just as I found that people with an outside view thought that interaction in virtual worlds belonged to the unreal domain of playing and fantasies, I have found that the strive for photo realism is a longing for authenticity. But reality will not be attained by technical refinement of the systems, virtual worlds become real to us through our habituation of them, just as the reality of the physical world is a result of our dwelling in it (Heim, 1998:2, p. 3).

We should also remember that computers were originally designed for organizing data, not for facilitating human communication. So there is a need to project—through our active effort—the human back into the system by focusing on the functional, rather than structural aspects of the world. The value of the virtual worlds cannot be measured by how much they look like the physical world, but by

how well they can serve the functions that we attribute to them (Heim, 1998:2, p. 3; 2001).

By doing this we open up for possibilities to transcend the physical world. By incorporating imagination and fantasy into the design process we can make virtual worlds that are more attractive by offering something extra to the participants. Heim describes this as letting us have less gravity as avatars than as primary beings. This advice can be taken literally to mean that virtual worlds should not have gravity, or only partial gravity, as the ACCD World that Heim's design team has created in the Active Worlds system. But it can also be interpreted metaphorically, staking out a direction for design of virtual worlds that allows for a touch of whimsy and playfulness, not as ends in them selves, but as means for achieving the goals of the worlds (Heim, 1998:2, p. 3).

Lesson 3: Essence

In *The Metaphysics of Virtual Reality*, Heim offers a list of concepts that are connected to the essence of virtual reality. They are simulation, interaction, artificiality, immersion, telepresence, full-body immersion, networked communications, activity/passivity, manipulation/receptivity, remote presence, and augmented reality (Heim, 1993, p. 109-128). Over time some of these concepts have been de-emphasized. The importance of full-body immersion is for instance also propagated in Virtual Realism but in a later comment on the book Heim admits that this conviction had been shattered by trying new systems with interaction possibilities smooth enough to allow the user to psychologically »slip into« the virtual world on the screen. »The photo of the author on the jacket of Virtual Realism shows me against the background of [the Active Worlds world] Atlantis. The jacket photo was the very last step in the publication process and at that time I was already groaning at the limits of my ›strict‹ definition of VR in the first chapter of the book.« (Heim, 2000:1) Part of the lesson about the essence of VR is that immersion as a psychological or phenomenological effect cannot be measured using any simple algorithm focusing on sensory input. Engagement and interactivity can give the VR sensation using standard PC equipment.

One of the primary ideas behind ACCD World was to investigate the inherent properties of the medium. (Heim, 1999, p.5) Instead of relying on concepts from other media like film, painting or theatre, Heim wanted to focus on the unique characteristics of this medium to develop its own aesthetic. He notes that, e.g., cinema is both passive and linear while VR has first-person engagement and free naviga-

Figure 1. From the ACCD World.



tion that is complicating the possibility for a narrative structure while opening up for new possibilities such as playability (Heim, 1999, p. 5; 1998:2, p. 5; 2001).

But although the medium is unique, it does have important similarities with other media. One of the desirable characteristics of a virtual world—playability—is a term used to describe a central and elusive characteristic of computer games. The distinction between virtual worlds and computer games is sometimes impossible to make, at least according to my definition of a virtual world, so they inevitably have many things in common. Even when a virtual world has a work-related theme, the avatars will still offer a fictional displacement. People will perceive the »lightness« of the environment that will reflect in their behavior (Heim, 2001).

The discussion about influences from other art forms brings us back to the discussion about realism. In the book *Understanding Comics*, Scott McCloud makes a very strong case for what he calls amplification through simplification. By focusing on the significant details, an artist can amplify meaning in a way that realistic art cannot. Concepts are prioritized over detail to enhance the function of the representation. Leaving realism behind also paves the way for things to happen that usually does not happen in the physical world. Just as animators know that if you are going to have a coffee cup start singing, you should concentrate on giving it the possibility of an identity rather than making it look as much as a physical coffee cup as possible (McCloud, 1999, p. 30–41).

In the same way it is possible in virtual worlds to construct buildings where doors are portals to other parts of the world, or different worlds, where walls talk to us, and where a small room can contain a much larger one. And it is probably a good idea to somehow try to prepare visitors to these possibilities through the style of the building. So while the essence of virtual worlds lies in its unique characteristics and can't be derived from comparisons with other media, there is valuable input to gain by studying everything from game design to animated film.



Lesson 4: Substance

According to Heim, western science has traditionally been preoccupied with substances on the expense of processes supporting the substances. Post-Newtonian science has, however, made a shift in this respect towards energy fields and interrelations between entities that has made new phenomena appear. One could say that it is a newfound interest in the context of substances. A similar shift can be observed in modern philosophy where the subject-object dichotomy gave way for an interest in the context in which substantial entities and psychological subjects can arise. Heidegger's notion of a world as a »context of involvements« is an example of this development (Heim, 2001:2, p. 2).

Heim argues that the same shift of focus is called for in the understanding of virtual worlds. Caught in ideas stemming from traditional architecture, we have been looking for the substance of the worlds in its building blocks. But whereas the material of physical buildings plays an essential role in the construction of physical environments, attempts to reproduce these materials in virtual environments only lead to the construction of fundamentally hollow and empty facade that imprisons the participants rather than set them free.

We have to leave the idea of designers providing a fixed environment consisting of graphical elements that we then think simply has to be filled with people to create communities. Instead we have to direct our attention to the event-based interactions to locate the »substances« of virtual worlds. »A good virtual environment, therefore, is not an object seen in and for itself but an environment that blends into the user's activities.« (Heim, 2001:2, p. 2-5)



BUILDING FUNCTIONS

Confuse

The function centered approach was taken as the starting point when I led a group of designers in the creation of a virtual environment called Confuse. By forming the name of the world from its intended function—conference use—we alluded to the fact that we tried to build a function rather than a building structure. By looking at ACCD World we could see that the reaction against structural realism into the area of structural fantasy can lead to interesting revelations but also new problems. Without a ground plane or other structural entities mimicking the physical world, especially inexperienced participants easily run the risk of feeling a bit disoriented and overwhelmed by the experience. This is perfectly acceptable and even





Figure 2.
The Function synthesis.

desirable in a place like ACCD World which was created to make a statement about, among other things, alternatives to structural realism.

In Confuse, on the other hand, we wanted something less confusing (excuse the pun) that still was alleviated from the clutches of structural realism. Instead of only focusing on positioning the design correctly on the line between fantasy and realism, we focused on providing functions instead of structures hoping that we had found a synthesis beyond the dichotomy of realism vs. fantasy (figure 2). This triggered us to use a standard non-descript building material that could be easily remodeled in an iterative prototyping design process. It is no coincidence that the building blocks of the world bears a striking resemblance to Lego™ since another research issue we investigated was how physical models could be utilized in the design process and the physical building material we used happened to be Lego. The function we wanted to accommodate for was meetings. We divided this into four categories, small meetings between two to four people, medium sized group meetings with four to eight people, presentations with eight to sixteen people and a general pre/post meeting mingling area as shown in figure 3.



Figure 3. *Confuse.*

Figure 4. The small room and the blue room.



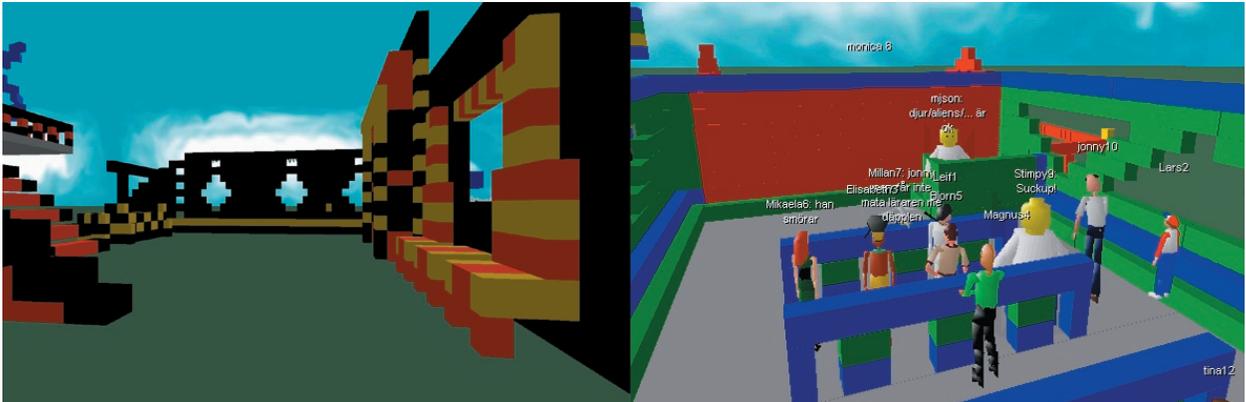
Each function corresponded to a room in our building. For the small meetings we wanted to enhance the intimacy of the meetings by making the room small. We also placed a table in the middle that we hoped would work as a subtle positioning cue to make people position themselves at an appropriate distance each other and in the field of view of the other participants. Since walls do not stop an avatar in one room from seeing what someone in another room types in the chat window, we did not make the walls solid. The holes in the walls were intended as a reminder to the participants that these walls lacked the function of enclosing the communication, that everyone in the building could »hear« you (figure 4).

At the ground floor we put a mingling area for people to interact more informally, wait for others to arrive etc. To signal to the visitors that this was something more than an entrance hall that you only pass on your way to the other rooms we put a small bar and a couple of chairs there. Although it was not possible to get a drink from the bar or sit on the chairs, we saw them as filling a purpose in signaling the function of the room (figure 5, left).

The room for eight people and above was designed as a lecture hall with one person standing on a podium in the front, facing the others. I had on earlier occasions noticed that when virtual world presentations are given in open spaces, the audience tend to move around and talk among themselves during the presentation which in turn tends to make less experienced presenters freak out. Therefore we placed railings in the room to make the audience distribute evenly in the room and stay put with their attention directed towards the speaker during the presentation. We had noticed a general feeling of restlessness in the interaction between avatars in Active Worlds and this was an attempt to bring some peace by providing a functional context (figure 5, right).



Figure 5. The mingling area and the lecture hall.



Beyond Confuse

Our idea was not to create a complete finished environment, but to create something that could be altered and added to indefinitely, but we did reach a point where we felt that the foundation was in place and we could start using our creation. That was when we realized that all was not well in Confuse. It was not that people did not like the building. Being immersed in Lego leaves very few people unaffected. But it was not utilized at all as we had expected. My first lecture there had not even started properly before I realized that there was no chance of me giving a forty-five minute presentation with the students listening quietly to what I had to say.

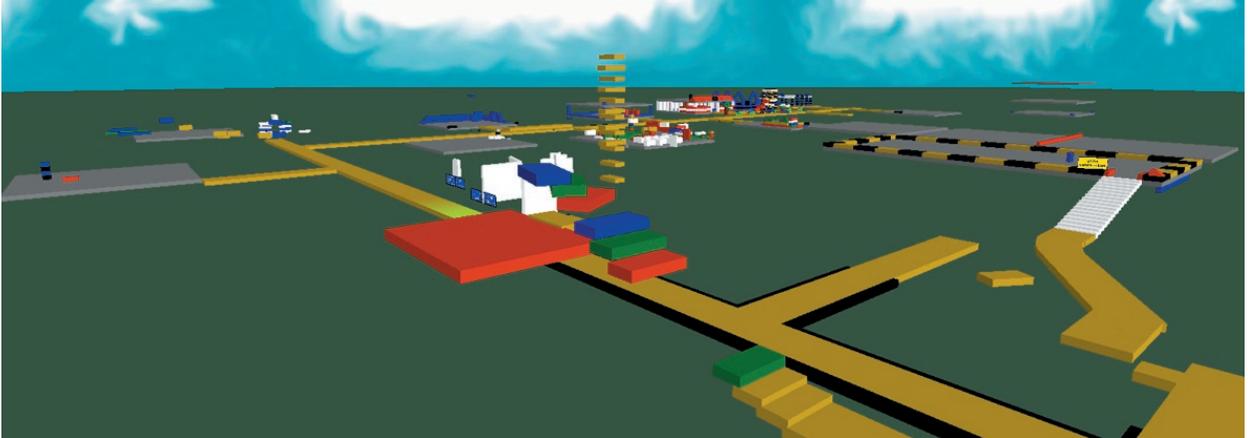
It slowly dawned on me that it is not possible to take a function, e.g. a lecture, out of its physical setting and implement it the same way in a virtual setting. It is not just the structural aspects that change, functions are also transformed. In fact, we had made the same mistake as the people importing structural realism but on another level. We had tried to import functional realism. So once again we find ourselves faced with the problem of having to strike a balance between realism and fantasy. At the same time as we want to make use of the participants' understanding of what it means to be in a learning situation we have to transform the function to fit in, and make use of the properties of, the medium.

Confuse never became the hit we had hoped for as a virtual meeting place. Since it only was put to sporadic use, it is hard to tell how well the specific design solutions worked in practice. The only thing I can say for sure is that the participants do not adhere to position markers in the way we had intended. I have used the small meeting room at a number of occasions, and almost never have the participants lined up around the table in the manner we had predicted. While the people I meet with often do keep »eye contact« with my avatar, they seem just as happy standing in the doorway or halfway out on the balcony during discussions. I guess the lesson here is that avatars do not take furniture as »serious« as humans do which is in





Figure 6. View of the free building area in Ogel.



line with the idea that the building structures are subordinate to the functions. The problem was just that we did not know how to support the function properly. The really observant reader might have noticed that while the avatars in the medium sized room (figure 4, right), which does not have any directional cues, are facing in all directions while the avatars in the lecture hall (figure 5, right) are all facing the podium. This behavior is perfectly in line with our intentions, although they did not distribute as evenly as I had planned for in the lecture room. But since the environment did not function as intended anyway, we did not use it enough to tell if this behavior was consistent.

Although the Confuse world was unsuccessful, all it needed to become a success was a reformulation of its purpose. Since we all agreed that the process of building the environment in virtual Lego had been tremendous fun, we decided to make a clone of the Confuse world, and make that clone open to the public so that anyone could have a go at the wonders of virtual Lego building. That world—named Ogel—proved a big success. We have used it for several courses in teaching virtual world construction and design, people from all over the world have taken advantage of the possibility of making their own creations in the world, and it has received honorable mentions within the Active Worlds community (figure 6).

FUNCTION VS. INTERACTION

As we learned in lesson four, Heim has suggested that it is in the event-based interactions that we locate the »substances« of virtual worlds (Heim, 2001, p. 2). This re-wording of the concept of functions opens up for a more detailed understanding of what a function actually is. One part of a function is the event and one part is the



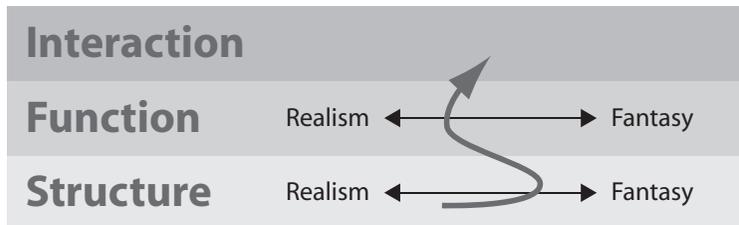


Figure 7.
The path towards
interacture.

interaction. The character of the event will change from instance to instance, but the interaction is a more stable component.

All the different contexts I have studied, including conferences, design work in groups, recreational social interaction in groups and development of close social relations in and around virtual worlds share some interaction characteristics. There is a layer of interaction that is more fundamental than the layer of function. It does have the same division between realism and fantasy and the same call for balance is still valid. But the interrogation into the nature of social interaction in virtual worlds promises insights that are more general and thus can work as helpful advice in all kinds of virtual world design projects. It is time to introduce the final level of my model and the design approach that comes with it.

Interacture

The interacture approach to virtual world design entails two things. First of all it suggests that the design process should begin at the interaction level as opposed to the function or structure levels. Beginning at the correct level is not enough, however. It is also, as on the earlier levels, a question of striking the correct balance between realism and fantasy.

Beginning with the process issue, we can look at the interacture model as an inversion of the path we took in the process of coming to terms of the different levels of virtual world design (figures 7 and 8). Instead of ending up at the interaction level, this is where the design process should depart. Interaction issues are at the very core of virtual world design. Knowledge about social interaction in virtual worlds also transfers well between different contexts and affords some dearly needed stability to base the design on.

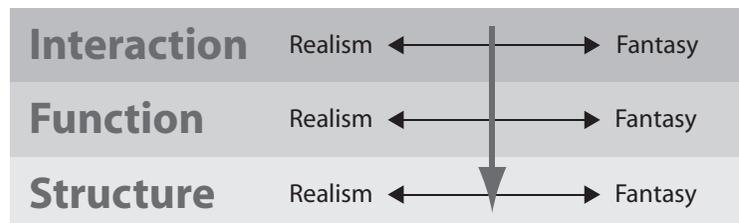


Figure 8.
The interacture model.

Then comes the function level, and as the last link in the design chain we have the issues of material structures. The interacture approach does not alleviate the designer from dealing with the issues of function and structure. The function will have to be implemented somehow, and knowing that function should be addressed ahead of structure, that the balance between realism and fantasy should be considered and that the implementation might look very different from how we »implement« functions in physical contexts has perhaps not taken the designer that much closer to a good solution, only away from a bad one.

The interaction level of my model carries the heart of virtual world design. Striking a balance between realism and fantasy on the interaction level is about understanding what is new and what is not within the social interaction. Bringing up this subject is like coming home for me since I have been spending most of my time the last couple of years doing ethnographic studies of social interaction in virtual worlds and I can talk at length on this subject. But this is not the time and place to do that, and I have done so elsewhere (Jakobsson, 2001; Jakobsson & Popdan, 1999). Instead I will conclude by noting that the interacture model is my contribution to the fifth aspect of virtual realism, the development of appropriate design models for virtual worlds. Exactly how appropriate it is, I will leave it to others to decide.

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