

## THOUGHTS ON THE VIRTUAL BODY

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The central question is one of inclusion, are we looking from the outside or from the inside. Humans are inside their bodies, but we are facile at seeing our bodies from the outside, as in looking at your hands while typing.

### Seeing From Within, Seen from Without

Display devices (monitor, head-mount, sound), when seen from outside, appear to be doing just that, *displaying* to our senses.

Consider a pair of glasses, however. When we bring a pair of glasses in front of our eyes, we see a field distortion of optical images. Glasses display curved light. They are transparent, effecting only the convergence of light rays to our eyes. But, seen from the outside, glasses are a display device.

We identify strongly enough with glasses that we are wearing that the curvature they cause is taken to be reality. In fact, since glasses usually improve sight, we take the display created by glasses are more real than the one we see with our unaided eyes. Seen from the inside, glasses are extensions of our sight, In seeing something from a subjective perspective, the something becomes invisible, it become part of us.

*Presence* is the measure of transfer from out to in.

In a short step, the case of glasses becomes more dramatic. Imagine a pair of glasses with infrared detection capabilities. By wearing these glasses, we extend our intrinsic capabilities into seeing the infrared. Night glasses, when seen from the inside, enhance the performance of the wearer's eyes beyond all other non-aided humans.

Technologies can be observed or they can be absorbed. Observation makes us call the television a display device, it displays moving pictures which we watch. But when we are absorbed in the story of a television show, that show becomes our world, the television becomes our eyes, we see the story.

Reading is perhaps the most extreme form of *crossing* from reality to representation. Somehow we convert what, from the outside, seems to be complex collections of squiggles, to what, from the inside, seems to be experience.

Humankind has an amazing propensity from crossing without confusion. We can carry hundreds of context sensitive behaviors...taking the toy as the real.

## VR Display Devices

VR display devices are designed to be included by the participant as the participant's senses. Using the vocabulary of the inside, that is, describing the physical devices of VR as though they were our sense organs, we would say that eyephones are perceptual aides. Like glasses, eyephones extend our sight. But they extend it into largely unexplored realm of cyberspace.

Our desire to improve the eyephones, to see photorealism, stems from our personal desire to improve ourselves, and here, our sight.

The 6df position trackers which allow us to synchronize our physical movements with concurrent events in the virtual world are called sensors since, from the outside, they sense our movements. Were we to absorb sensors into our own perceptions, they would be effectors, the parts of our (virtual) body which signal just where we are. Hand tracking becomes hand kinesthetics.

Here's a table of some devices and their outside/inside functions:

DEVICE	OUTSIDE	INSIDE
eyephones	video display	visual perception
6df trackers	motion sensors	kinesthetics
earphones	audio display	aural perception
spaceball	movement control	travel
monitor	window	environment

VR devices are a suite of Extended Self Hardware: "your senses into cyberspace". In general

senses                      transducers                      virtual world

Presence is the closeness of fit between senses and transducers. Both are the physical aspect of the virtual body. The virtual world is inhabited by the virtual body, while closing the loop between participant and virtual world is *semantics*. The physical/virtual loop is closed when effect meets expectations.

Physical literalism is a 1-to-1 map from the physical body to the virtual body. This of course, requires complete realism; there is always a particular bias or degradation imposed by a transducer. The body:

