ISSUES OF LEARNING IN VIRTUAL REALITY

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The central issue for Education in virtual reality is transfer of learning. There are two kinds of transfer of interest: generalization of experience in VR to later experiences in VR, and transfer of experience in VR to behavior in physical reality. The generalization question is relevant to interaction with information in VR, the transfer question is relevant to simulation of physical interactions.

As well, VR poses deeper, more philosophical issues for Education. With good teaching, attention comes first, learning comes after attention is focused. And learning is primarily action. VR provides an empowering context for focus of attention, and learning through action. For curricula, VR provides a substrate for construction of arbitrary learning environments. The idea is simple, everything we do to educate with words and with pictures can be provided as virtual experience. We can vary location, scale, density of information, interactivity and responsiveness, time, degree of participation. VR provides the opportunity for individualized instruction and personalized learning environments. VR provides an automated, responsive learning context, autonomous entities that can track behavior, guide interaction, and remediate errors. The issues will be identify tools and sequences of behavior that provide long-term learning. These are the same issues of curriculum development in general.

Another broad question is that of natural semantics. VR makes sense when what a student sees and hears has a meaning that does not require explanation. Most sciences have natural semantics, most symbolic studies (the three Rs) do not. What are the tools and techniques for non-symbolic teaching? Can we accomplish community based learning in the virtual commons?

VR generates a strong emotional response, one of empowerment. The issue of control and freedom is central to practical classrooms. Will VR undermine the authority or techniques of traditional teaching? Are emotion and participation able to be integrated in teaching using VR?

Most fundamentally, VR teaches active construction of the environment. How will learning be effected when students can try experiments and experience consequences virtually?

VR is fundamentally a powerful cognitive tool. Students are not merely co-participants, bringing their perspective within the same context of an object of study. Rather students can become the object, see and act in the virtual world as if the object. How do we approach a technology

that explicitly permits modification of body image, of self-image. How do cognitive models become manifest? Can we learn about learning with the tools of VR?

Foremost, VR is for multiple participants. Each student will have a unique world, with communality between worlds negotiable rather than enforced. Fundamental educational assumptions about common learning become immediately questionable and testable.

There are serious negative issues to address also. The most important is that of cognitive restructuring. What are the effects of training our senses and our thoughts to virtual worlds? What are the compatibilities between virtual and actual? This returns us to the central educational question of transfer, but from a new perspective.