

## Virtual Reality Technology and the Future of Education

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In her masterful account of technology's impact on modernism by way of acoustical space, architecture, and audio technology, Emily Thompson writes that "science was the driving force behind the historical process of modernization" (Thompson, 1999). The story she tells of the manipulation of acoustic space to reinforce modern values in spaces created by architects illustrates an important point for consideration of VR. Science, in the form of VR, has increased its grip on the real, on the empirical, ironically by means of technologies of illusion; those who study and write about the social and cultural consequences of VR have allowed it to do so by theorizing VR as an approximation of the real, whereas the opposite is true: The real is an approximation of VR.

Numerous writers and theorists have engaged the difficult philosophical matters that attend the distinction between the real and the virtually real, and they are worth engaging, but the differences that they point out are less and less insightful. At worst such engagement leads to a theoretical blockage. At best it leads to interesting, albeit relativistic, conjectures about social relations. Either way it does not tell us much about the practice of being in VR, which is the point at which theorizing about VR should begin. In part this theoretical blockage is brought about by confusion between VR as mental construct (e.g., cyberspace) and as network (e.g., the Internet). The former is what Robins and Webster consider as "the network spaces that have been created in and through new information and communications technologies" (Robins & Webster, 1999) that they rightly critique "as a banal space...a pacified space...Bill Gates' managed world of 'friction-free' exchange...in which the last trace of material inertia vanishes. It is an illusory space" (Robins & Webster, 1999, 239). The second kind is also illusory. Though we can point to the devices used to make the network and understand how connections are made between those devices, we cannot understand more than the flow of data across and through them. VR is neither in our imagination nor is it in our networks, particularly not in the case of VH and other immersive VR environments. It is, instead, a space bodily, physically, occupied by one or more humans, created by technological means, articulated to the cultural, artistic, political and economic structures of its designer(s), experienced by its human inhabitants.

Our confusion about the nature of VR is the result of assumptions about per-

ception and imagination and has its roots in the vestiges of theories about mass communication and mass society. For decades theorists have sought to understand social relations at the mass and local levels. The bridge between those levels has been built on the largely unacknowledged matter of suspension of disbelief, on the sense we have that others are attending to the same sounds, images and stories as we. But theories regarding the suspension of disbelief are relatively few (at least in media studies). How do we know there are others, how do we know who they are, how do we know they are like us or unlike us? Noting that, in and through communication, we know the answers to those questions has averted epistemological crisis. But the phenomenology of the matter has been disregarded.

Phenomenology must be brought to the fore in VR, however, and VH is a good illustration of the need to do so. What is VH? On one level, that of the physical and material, it is a technological apparatus, software and hardware, that creates images and sounds. On another level, the epistemological, it is a museum or gallery that engages the viewer in particular, predetermined ways, with those images and sounds. On still another epistemological level it is a historical narrative that, in largely linear fashion, tells a story of a place and time.

VH is also a theory, or at least a theoretical apparatus, both of history and of education. Intended to teach about history, VH objectifies ideas of learning, transmission, knowledge sharing, communication, and of history's artifacts—the bits and pieces that make history what it is. For example, while the time and space of Harlem are not discrete but rather continual, for purposes of VH's design they must be discrete and bounded in time. That is, the designer must make choices about which “slice” in time to create the virtual environment. Even if one were to design a “time lapse” environment, in which one could view the changes to the neighborhood over time, one would not, indeed could not, experience time in VH as its inhabitants had and still do. To do so would require literally living in the virtual environment. Similarly, design decisions must be made concerning the objects that make up the virtual environment. Though one can learn much from photographs and recreate them in a virtual environment, just like nonvirtual space the virtual environment is not bounded. Is it best to “populate” a finite region of Harlem, all of Harlem, or areas beyond it as well? To what degree of detail should it be designed? Will leaves and papers blow down the street and form piles against a building? Will we notice if they do, and upon noticing what will we make of them and of the environment from having them present?

For another example, among the decisions that are made by those who design the VH environment are ones in anticipation of the ways those in the environment will attend to visual and aural material. Particularly in an immersive virtual environment such decisions cannot be taken lightly, for people immersed in the environment are able to move throughout it at will (unless the designer deliberately restricts movement, which would distract one

from immersion). What catches my attention and causes me to head toward the Apollo Theater may not catch your attention, and thus you may move toward the Cotton Club. In other words, being in VH means being embodied within those ideas concerning presence within the environment, and attending to its features in roughly the same way no matter who we are or from whence we come. VR, in other words, relies on the notion that humans are sufficiently “hardwired” to attend to stimuli in more or less the same way.

But the belief that they do so does not sufficiently account for meaning making, and therein lies the cause for the aforementioned theoretical blockage. For VR to work it must be presupposed that we attend to it just as we attend to reality. It is as if we look to technology, in this case VR, to create a form of “immaterial” reality that we can lightly juxtapose to material reality, and in so doing we contain it, demarcating technological reality from human reality. To unblock ourselves we must acknowledge that VR causes us to consider meaning making as an activity that machines may also do. In VH, as in many other computer programs, actions and reactions are measured, weighed, and acted upon. What distinguishes such activity in VR is that the act is that of making space, of creating immersive environments within which humans make meaning.

It is a mistake to think that the success of the VH effort rests on ensuring that the humans who experience it learn by making the same meanings. We do not attend to the same visual and aural cues as one another, and we certainly do not make the same of them when we attend to them. VH is only the beginning of what VR can and should do in terms of education, and believing that it must impart the same meanings to all who experience it will surely be the end of its evolution. It will be difficult, of course, to consider the alternative. Difficult questions will be asked, about assessment and about power. How do we assess learning in VH, particularly if we acknowledge its interpretive dimensions? How does a teacher control a situation when confronted with students’ innate desire to explore the VR spaces and not be confined to them?

The use of VR in education represents another phase in the evolution of learning. We now use books, films, and audio to bring people into the classroom, and we have motor vehicles, and even computers, bring students outside the classroom. We now have wireless (and other) networks blurring the distinction between inside and outside the classroom, and in some sense we can have rooms within rooms and spaces within rooms by using VR technologies like the CAVE.

What happens to the relationships between teacher and student during this evolution? There are two ways to answer this question. The first is instrumental and directly connected to assessment in the traditional sense, and the answer it provides will lead us to use VR as we have used other media in the classroom. It will become a technology of transmission. It may more efficiently or favorably impart knowledge but it will not meet its potential. The sec-

ond, more fulfilling answer is found by thinking of VR as a place in which students create knowledge and get to know places by exploration. They may spend time, walk around, talk to people and avatars. We will need VR to be persistent, easily accessible and navigable, reasonably photorealistic, and we can achieve the technology to make it so. We also need to think about our educational values, and consider more than efficiency and rigid scheduling. We must consider and use VR in education as a space of individual encounter and learning. Questions designed to test students' participation and memory miss the point. Therefore, we must find new questions to ask students. The traditional "What did you learn?" or "What did you do?" will not suffice. We should also make the effort to ask questions that permit students to relate their experiences and develop their understandings in narrative form. If we do not make that effort we will have made the VR experience the technological equivalent of a field trip, the nearest thing to one of Ferris Bueller's days off.

In VH, historiography itself is rewritten, or, more appropriately, revisualized. There are photographs galore of places and people, there are even films, and there are some audio recordings of Harlem during its renaissance. Unlike the modern process of photography, of taking the three-dimensional and transforming it to the two-dimensional space of the photograph, VH must take the opposite approach, however. It seeks to take information from two-dimensional images and make them three-dimensional. It needs to take monophonic recordings and place (literally and figuratively) audio in a three-dimensional space in which sound is directed, reverberant, spatialized. The effort is akin to taking a phonograph recording, placing it on the turntable, and having the precise opposite of recording occur. When the needle is dropped on the record, musicians literally, corporeally, flow out of the speakers and into the room. Creating immersive virtual environments such as VH is a difficult process technologically, requiring massive amounts of data storage, data transfer, networking, computing, and graphics processing. It must also utilize technology that is able to grow exponentially, to scale along with our knowledge of history and along with the making of history. It is also startlingly difficult in other ways, as it requires new forms of historical practice, of transforming our narrative approach to history and our approach to teaching and learning about history.

The precursor to the development of these new forms, required to make VR a meaningful educational experience, is to change the focus of our theories about VR. On the level of theory VH and VR bring new tools for thinking about space and about time. To date we have largely dealt only with VR as spatial technology, but it can also provide us with an opportunity to reconsider the relation between time and history. Spatial manipulation in VR is a given; it is, essentially, its *raison d'être*. But time, too, can be manipulated. We could, for example, experience VH over time, in fast forward or slow motion, either backwards or forwards. We

could also see days compressed into seconds; we could view buildings going up, changing, and getting torn down and rebuilt. We could allow one block to move through time, backward or forward, while those around it remain unchanged.

Why should we engage in such practice? To demonstrate that history is an alternative in time. It is the path chosen, but it was not the only path. Why may we not view history as it might have been? It is tempting to think that, in regard to cultural heritage, VR is virtual history. But that is redundant. All history is virtual. The experience of history in VR, its phenomenology, has the potential to create the ground on which the absoluteness of historical narrative can be questioned and challenged. It is an opportunity to materialize history as practice (both in the experience of VR and in its making), and to engage it as spatial and contextual in a temporal realm that is manipulable by the user.

I began this essay by noting Thompson's observation that in the late nineteenth century "science was the driving force behind the historical process of modernization." We can, thanks to the form and nature of VH, say that VR can become the driving force behind a new process of historicization, one in which the humanities and the sciences can join to create alternative educational environments and alternative philosophical and theoretical systems.

### Works Cited:

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