

**Virtual Reality in
America
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Academic Setting

Garfield Middle School is fifty years old and located in the central part of Albuquerque. It is considered an inner-city school with all the concomitant issues that plague such a school. The population of GMS is approximately 650 students: 78% Hispanic, 18% Anglo, 3% American Indian, and 1% African American. Economically, family incomes range from extreme poverty to upper-middle class. More than seventy percent of the students qualify for free lunch. In addition, two-thirds of the students qualify for Title 1, the federally funded reading program. Our students, on average, read anywhere from two to five grade levels below their current grade level. Garfield Middle School is also identified as a bilingual school, and receives extra support for the monolingual and LEP (limited English proficient) students.

This curriculum unit will be taught to an eighth grade enriched English class. These students have a range of abilities, but they typically read on a seventh grade to college freshman level. For many their writing skills are below average; they need much support in terms of grammar, sequencing, coherency and logic, clarity, detail and description, etc.. A surprising number of the enriched students do not read outside of class for pleasure, and even fewer write for pleasure. Having taught this category of student for the past seven years, it is clear that a number of them have been "spoon fed" [The teacher provides the reading material, the pertinent vocabulary, the practice questions (which are generated by a "learning company"), and a test that directly includes a number of the practice questions.] Oftentimes, there is little or no discussion of the novel, but rather the teacher lectures on the "important points" to remember for the test. Rare is the case when we educators trust our students to engage in quality discussions. Yet, over the past seven years my students have demonstrated the ability and the desire to do so—and not just in the enriched classes. The topic of discussion does play a role in the liveliness of debate. Virtual Reality ought to stimulate their mental juices, while at the same time raise important ethical questions for us to chew on.

Unit Goals

The goals for this unit align with *Albuquerque Public Schools Scope and Sequence*, which aligns with the State Department of Education's standards and benchmarks. (The quoted words come directly from the *Scope and Sequence* for language arts, eighth grade level. Italics added by me for emphasis.)

Students will examine "how *themes* in literature are a reflection of human issues and experiences."

Students will "respond to, examine, and critique *historically or culturally significant issues and events* portrayed in literature" which affect the society at large and/or the individual.

Students will view, "comprehend, analyze, and interpret formal and informal ... visual works, ..." from various cultures and time periods to note the significant changes in the representation of space. They will contemplate how these changes impact our ideas about our place in the universe.

Students will read, discuss and "respond to a variety of literary and mass media" formats. In addition to reading novels within the genre of cyberpunk, they will find, read, and present opinions of newspaper and magazine articles having to do with issues relating to topics within the field of virtual reality (VR), advanced information systems, and computer technology in general. They will also watch films clips that raise ethical questions and societal concerns with regards to VR, and other related disciplines.

Context and Background

Rationale

Virtual Reality is a technology in use now. It offers many possibilities:

- growth in human understanding of physical nature and consequently

ourselves

- understanding how mechanisms work at the subatomic level
- presenting complex information in a format that is easier to comprehend
- enabling business to be conducted in a less expensive manner
- enabling medical researchers to understand how drugs work at the molecular level and to design target-specific medicines

But with the possibilities come concerns for how this new technology may have unintended consequences. Therefore, we must ask the tough questions, and be willing to engage in ardent debates. Current concerns will be addressed:

- In what ways does virtual reality have the potential to alter the way we think?
- Will we confuse "virtuality" with reality?
- How is the idea of "image" critical to this new technology?
- How is our definition of physical space ("here," "there," and "that") already being altered?
- How likely is it that our concept of self and identity will change? In what ways?
- How will our sense of community be altered?
- Is it likely that one's sense of loneliness and isolation will only increase, rather than decrease, as we "jack in" to cyberspace?

Students are members of this society which relies heavily on advanced information systems and increasingly on computer automation in the workplace. It is clear that they must all have some level of familiarity with basic computer technology and software programs if they hope to be gainfully employed. Most businesses use computers in some capacity and require employees to receive some level of training on them. Yet how

many employees, let alone employers, go beyond the basic level of day-to-day operations with computers to question the deeper, potentially disruptive transformations taking place with this technology?

Often enough we hear on the news, or read in the local paper, about the most recent advance in computer chip design. The underlying promise is to make our life better by making our interactions with others take place faster and more efficiently, whether it be with our bank or our business partners, with our family or our friends. But rarely do we hear on the local news of the latest research and development being carried out by the "digerati" (the term for the digitally literate as coined by Steve Lohr) in places like MIT's Center for Advanced Visual Studies or its Media Lab, Xerox Corporation research labs in Palo Alto, or the Pentagon's Defense Advanced Research Projects Agency (DARPA), etc...

And how frequently does the media keep us informed, let alone well-informed, as to the progress or setbacks of a particular project in bioengineering, artificial intelligence, self-organizing systems, computer-aided image manipulation techniques? This is not to imply that we have no access to this kind of information. It is to say that the media does not allot the time for adequate coverage of these issues as it should, especially given the importance of these technologies in our lives. We, the taxpayer, the citizen, the voter remain in the dark. How can we voice our opinion if we don't have enough information with which to formulate one? How can we be expected to fulfill our duty as a citizen and vote on critical issues when we are not kept abreast of the most recent developments and setbacks, or the likely gains and risks in which our high-tech firms are engaged? (On a related note; are there classes offered through the local community colleges and universities addressing the historical and cultural dimensions of our fascination with transcending the physical realm?)

Students should be made aware of the latest developments in computer technology and its use in other fields, and have the opportunity to discuss the possible ramifications. Virtual Reality is only one field within the discipline of computer science, but it has the potential to profoundly impact the way we perceive our world and ourselves. This is why it should be brought to the attention of our students.

There is no one definition of virtual reality, yet all can agree that it is an experience of something created by means of a computer. Often it is described as an experience of simulated reality. Where is this simulated experience of reality taking place? It takes place in

"cyberspace." What is cyberspace? This is an interesting question (and a bit easier to approach than the question of exactly *where* is cyberspace). The answer is rather circular in that many people use the terms virtual reality, cyberspace, the net, the matrix, augmented reality, and synthetic space interchangeably. Its definition changes depending on whom you ask.

People immersed in cyberspace act and react as if what they are experiencing *is* real. This has to do with the ever-improving image-making capabilities of the designers and engineers of VR environments. (Here is a good reason to actively teach students about the history and relevance of *the image* as the message, in addition to the medium as the message. And while we are at it, why not throw in a mini-lesson on figurative language, symbolism and the reconfiguring of definitions as important components in altering conceptions of reality?)

A number of technical problems arise when attempting to create a life-like experience in a simulated environment. One example is "lag." Lag is that very brief, yet perceptible, amount of time between a user shifting her visual focus and the computer recalculating all the information coming in from the peripherals and going back out to the user in the form of an updated picture. For the initial users of VR this delay in the change of scenery was too noticeable to impart a real, life-like experience. Some new ideas in the realm of math (specifically boundary mathematics) are helping inventors and computer programmers fix the problem of lag in VR. (This important development will not be addressed in this paper, but suffice it to say that it plays an important role in the conceptualization of space, the observer, and the actions undertaken by the observer in virtual reality or cyberspace. For those who may be interested, read Chapter 3, "Boundaries: Mathematics, Alienation, and the Metaphysics of Cyberspace," in *Virtual Realities and Their Discontents*.)

Some feel that there are other problems more serious and pernicious with VR than just "technical problems." How is VR changing our concepts of physical space, identity and community? How are computers capable of affecting the very way in which we think? What might we be like if the human brain was surgically enhanced with a computer chip, or in some other way intimately connected to a network? Has the imposition of computer technology onto a largely unaware, uncritical population in some way altered the ways in which we relate to one another? Will we become little more than data in a network of information to be manipulated? Is the natural, physical environment in which we live and operate today truly at risk of being replaced by the digital New World of the cyberists, a synthetic

environment designed to meet our every need and wish? If this became the case, would it be bad or just the next step in our evolution as a species?

At the heart of these concerns lies the notion that past technologies (such as the telephone, car, radio, and television) all contributed in some manner to social fragmentation. It can be argued that past technologies supported the move away from community rather than toward it. One would think that these technologies made it possible for more people to come together; and in a sense this was true. We could listen to a wider variety of voices and opinions on a number of issues, listen to music from faraway places, or watch programs dreamed up by those with experiences and mindsets different from ours. Yet these "meetings" were unilateral and passive; they were not face-to-face interactions. We did not share in the same way as we did in the past.

With the advent of the personal computer, more and more people join chat rooms each day. By some estimates net traffic increases by approximately 20,000 people per day worldwide. There is more opportunity to meet like-minded folks on the net at specific sites, to buy items not available in your local stores, and to access information not located in your local library or university libraries. Yet people today are experiencing less face-to-face interactions than people of previous generations. We still have television to watch, the radio to listen to, and computer games to play, but these devices do not require the presence of others. The telephone is in a different category, perhaps, but these days people seem to be talking more about trivial things on their phones rather than engaging in discussions of a serious nature. Perhaps face-to-face engagement is not all that important? But what price will we pay for the convenience of e-mailing, teleconferencing, or shopping on-line? How are we altering the ways in which we interact, or fail to interact, with one another? Might not "digital age" pathologies be worse?

Another perhaps less well known issue that has some people concerned is that the very way in which computers process information (Boolean logic and hypertext) may be affecting the way we think. Does a change in the technology of knowledge lead to a change in our relationship to knowledge? Could this further lead to a change in how we perceive ourselves? Are our machines, as mirrors, reflecting that which we have already become? Is this what frightens us? Many appear to be oblivious to how computer technology could be (or is) impacting us on a deeper level. What we become depends on what we are now and on the choices that we make now. Maybe that is why Jaron Lanier, an important name in the early stages of VR

development, suggested the name "intentional reality" for this field of technology. We get out of our technological appliances what we put in. If we don't like what we've created, then we must question *ourselves* first, redirect our focus, and reprogram our tools. But we must be cognizant of the potential for our new tool to change us irrevocably. In some real way the "nature of order depends upon the nature of the human being... the machines we create are an expression [of the] hidden and increasingly powerful machine within *us*." (Talbot 36). Is the increasingly intimate connection between our machines and ourselves so subtle that the majority of us do not even think to question the situation?

We must encourage our students to engage in debates over these technological and scientific issues, to read disturbing fiction that paints a grim portrait of what we could become, and to watch films and film clips of movies such as *The Matrix*, *The Sixth Day*, *Lawnmower Man*, *Dark City*, *Total Recall*, *The Thirteenth Floor*. Technology plays a critical role in defining reality, and it often operates as an invisible backdrop, so that we are rarely aware of its profound impact on us: "Computer technology is so flexible and adaptable to our thought processes that we soon consider it less an external tool and more a second skin or mental prosthesis." (Heim) This latest tool, the computer, is impacting our lives in a very real way. Better for us to become aware of the possibilities for profound changes in our communal life. We need to have conversations about the fact that technology is never neutral. There are winners and there are losers. There are gains to be made and losses to be endured.

What is Virtual Reality?

There are a number of definitions for what constitutes virtual reality, depending on whether one is a researcher at MIT developing the next step up in quality peripherals, a military scientist investigating simulated flight or creating mock-tank battles, a lawyer visiting in cyberspace with another lawyer to revise a legal document, a medical researcher who wants to understand the structure of a molecule in order to design a drug that will only bind with that particular molecule, an architect who wants to show the client her new house before the building materials have even been ordered, a kid or an adult experiencing a virtual trip to another world while at an amusement park, or a lonely teenager who plugs in daily to the virtual community available in a chat room online etc.. Why this array of answers to the question of what is virtual reality? We are a culture which tends to loosely use our words, for one thing, and we tend not to be too concerned with specifics, in general:

When we talk about virtual reality, we have to keep in mind that it is indeed a technology, not simply a nebulous idea. It's not synonymous with illusion or mirage or hallucination. Virtual reality is not a state of consciousness or a simulated drug trip. Virtual reality is an emerging field of applied science. But because virtual reality belongs to contemporary culture, it expresses and reinforces many of the broad experiences we share as members of a common culture. Our culture intentionally fuses – sometimes even confuses – the artificial with the real, and the fabricated with the natural. As a result, we tend to quickly gloss over the precise meaning of virtual reality and apply the term "virtual" to many experiences of contemporary life (Heim 4).

Even though there are a number of interpretations as to just what VR is, according to Ann Weiss many can agree that it is a computer-generated experience of something. This experience of a simulated environment is taking place somewhere between the individual and the host computer. Where and what is this place? This place or space is known interchangeably as cyberspace, VR, the net, the Matrix, Metaman, the hive, the global superorganism, etc... (It can get rather confusing at times as even people who are considered the experts do not consistently use standardized definitions). There are many ways of describing this place/ space in which the experience known as VR occurs. When we speak of cyberspace, "we mean a not-quite-actual space, something existing in contrast with the real hardware space, but operating as though it were real space... [It's] the juncture of digital information and human perception, the "matrix" of civilization..." (Heim) It is "not a space in the standard, three-dimensional sense of the word, but a metaphor, a symbolic "place" we "inhabit" but are not present in physically. More precisely, it refers to the anticipated fully sensual "live-in" or "englobing" environments that we will be able to enter by hooking ourselves up to a computer." (Slouka). Or it can be viewed as "a shared virtual universe operating within the sum total of all the world's computer networks." (Pimentel and Teixeira's).

Many who have had a VR experience describe it as a *form of reality*, but know it to be a life-like recreation of what we experience outside

the VR hardware. For this group cyberspace, or VR, is a construct of our imagination and not some near sentient mass organism that will take us through our next evolutionary step. They admit that the technology is impressive and that one does feel as if "you-are-there." Howard Rheingold recounts an experience of virtual fishing wherein he "did feel a sensation spookily similar to that feeling of something *alive* at the other end of the line...." (Rheingold 26) But those who view VR as just a construct of our imagination brought to "life" by our technological know-how, keep a firm grasp on the notion that the "there" is not really anywhere but in our imagination.

Others define VR as a tool used by a number of people in different industries to help further their aims. For example, in the world of finance a stockbroker could wear a HMD that is providing her with up-to-the-second trading action while she is advising a phone client. In just this same way an airplane pilot could simultaneously read the control panels on his transparent visor while still safely flying the plane. An architectural firm could construct a virtual building in cyberspace according to client specifications. Then it could give the client a guided tour. If the client is not satisfied with the outcome, she can make modifications at no extra cost, and the firm will not incur any additional expenses. In this way they both save money. In the military, training officers can put men through simulated war conditions to help them develop fighting strategies and coping mechanisms before they actually need them. It could alert these trainers to those individuals who may not be able to endure such stress, thereby putting the entire unit at risk in a real situation. In this scenario, those individuals could be counseled out of the profession saving everyone time, money, and possible loss of life

Michael Heim and his kind conceive of VR as "a new layer of reality." Heim acknowledges that it is a technology within the field of applied science, but he disagrees with those who view the computer as just another tool in our cache of tools. He seems to agree with Philip Zhai's idea that the computer is more than just a tool. According to Zhai, tools such as the car, the telephone, the airplane and television are made for "manipulating natural and social processes," and they are tools precisely because "they are separated from us, and using any one of these tools does not usually affect the fundamental ways in which we perceive the world." (xiii). Both men agree, however, that the computer is more than just a tool because it operates in such a way that it does influence and even change the way we perceive the world. Heim goes further in claiming that "when a technology touches our language, it touches us where we live," and it changes the way we think. The computer, in general, fundamentally causes us to think in a

new way, to see things differently.

Another group are avid supporters of VR who believe it to be a new way of being - a totally new reality in which our natural abilities are expanded or enhanced through intimate connections with the computer. In this view the notion of computers as strictly tools is abandoned. This is the vision of the future portrayed in cyberpunk author William Gibson's novel, *Neuromancer*. Phillip Zhai believes that VR technology will enable the entire framework of the physical world to be reconfigured (along with our perceptions of it, I assume?). We will no longer think of the computer as a tool, but rather as an integral part of what we are. For these people the idea that VR is a false, "consensual hallucination" (the phrase coined by Gibson and used to describe cyberspace) or an imaginary world is utter silliness: "On the contrary, it is a fecund and powerful mode of being that expands the process of creation, opens up the future, infects a core of meaning beneath the platitude of immediate physical presence." (Levy 16). Then there is a "fringe" group of these adherents whose beliefs are more extreme. They believe that not only does VR usher in a new way of being, it is the coming of a personalized universe. Their vision is not that of a simulated reality into which we step upon donning the appropriate VR hardware. Their vision is of "a universe in which 'dumb' objects, 'electrified with smartness,' entirely subject to our will, form a seamless web around us. In this new world, the environment will be both synthetic and eerily alive; the dividing line between 'the born and the made' will blur." (Slouka 67). For them the individual, the "I", does not exist. Individual identity is a big lie. As Kevin Kelly sees it, "The apparent individuals that life has dispersed itself into are illusions." What's real for this group of believers is, "the mass, the hive, the headless swarm. The intelligent whole made out of moronic parts... Superior, uncontrollable, damn near sentient in its own special way, this mass organism will take us 'beyond Homo sapiens' to the next great stage in human evolution." (Slouka).

Into the Computer

Cyberspace is a computer-generated space in which interactions can take place between humans and computers, humans and humans, or between humans and artificial beings or objects. The interactions occurring in this space require the "three I's" of VR: immersion, interactivity, and information intensity.

It is the computer's job to handle the information intensity—the data coming in through the user's peripherals—and to convert it into a simulated environment that looks and feels real. The sounds, textures, color and quality of interaction must be highly integrated and

balanced; otherwise, the human brain can discern that the environment is not life-like. In fact the quality of the interaction in cyberspace is in large part determined by the computer's capacity to run complex software. "Interaction comes from the computer's lightning ability to change the scene's point-of-view as fast as the human organism can alter its physical position and perspective." (Heim 7). As the processing ability of the computer has dramatically increased, some of the earlier technical problems associated with VR feeling real have been eliminated or dramatically reduced. (such as lag).

It is the job of the peripherals to isolate the participant from the real world and immerse him in the computer-generated world. It is also the business of the peripherals to feed back to the computer the intentions of the user, so that the computer can instantly update the images and interact with the user. The peripherals help eliminate any sense of this not being a real-time, real-life experience. They are designed to accomplish two things at once: to convey output from the computer to the user in the form of sight, sound and touch; and to relay back to the computer information and instructions from the user. Basically, the gadgets or peripherals include a wrap-around head-mounted display (HMD) that shows the three-dimensional images which the user sees. The HMD also contains a camera which tracks the user's eye movement and relays this information back to the computer, so that it may continuously update the image. One needs a dataglove/cyberglove or hand-held device in order to manipulate objects in the virtual environment, and in order to receive feedback from the object such as its texture, temperature, or the pressure it is exerting on you. The third requirement is a three-dimensional sound system, so that sounds seem to be coming from all around one as they would in real space. There are even haptic feedback devices that respond to the forces applied by the user's muscles, and in return provide the sensation of resistance. For some experiences in VR a datasuit (like a dataglove but covering the whole body) is used to completely track the user's sensory output, and to provide the host computer with the information it needs to constantly update the graphics environment according to the user's gestures and orientation. Once an individual is fitted with the necessary equipment he is ready to be plunged into the computer, or cyberspace. If the graphics, sound, and ability to manipulate or interact with the objects are good, then the person will have the impression of emerging into a new space. In essence, he is immersed, dipped, dunked, or baptized into another reality - *virtuality*.

As Heim and others have noted, we humans have been plunging into other spaces for millennia. Immersion devices are nothing new. They

have been present in some form or another as humans have been dipping into other worlds for most of recorded history: partaking in ritualistic chanting, sacred dancing, meditation; imbibing of mind-altering substances and the breathing in of incense; going into caves to experience sensory deprivation in order to come face-to-face with one's true self; attending an Elizabethan play; or heck, just slapping on headphones and cranking up the CD player to listen to one's favorite music. We have been trying to escape from one thing into another thing for a long time. When we listen to a good storyteller, watch a captivating movie, or are engrossed in the study of a painting, we are in a sense being engaged on another plane of being. We have entered a symbolic space that requires us "to suspend our beliefs in one set of involvements in order to entertain another." We humans are symbol-loving creatures who "are essentially immersive beings who love to dive into other strange environments- even if those environments lack the oxygen and sunlight we need to survive." (Heim 19). Perhaps it is a fundamental part of our nature to create realities within realities, which we escape into from time to time?

Types of VR Experience

Simulation- These data worlds were first used by the military in flight simulators to provide a life-like flying experience for training pilots. They wore a head-mounted display (or a heads-up display) that contained photorealistic, real-time images of terrain exactly like that over which they may be required to fly while engaged in battle. The army used battlefield simulations to train soldiers in tank divisions. Now these types of data worlds are being employed in the field of medicine to train surgeons, in pharmaceutical companies by chemists who are creating designer-molecules, and in the entertainment industry for a variety of purposes.

Telepresence- Robotic research added another dimension to the concept of VR. A human operator could now use a robot to observe and manipulate objects in a real environment is remotely located and deemed too dangerous or impossible to reach by conventional methods. Telepresence does not include the imaginary worlds of art, entertainment and math. A flesh and blood human is single-handedly making decisions which affect real change in a real-world location. They are simply using a robot as their eyes, ears, nose and hands.

Full-Body Immersion- The user dons VR hardware of some type (current research is focused on eliminating any type of body wear) and is made to feel that his body has been projected into a new space in which he can interact with graphic images in a real-time, real-textured manner. The fantastic thing about this type of VR is that

two people can see and interact with one another in a synthetic environment that doesn't physically exist outside of the computer.

The obvious point to be made is that virtual worlds can be connected and shared by any number of people. And here is where the whole idea of networked communications hit with a big bang in the mind of Jaron Lanier: "Because users can stipulate and shape objects and activities of a virtual world, they can share imaginary things and events without using words or real-world reference." (Heim 116). Two key points in this idea, "imaginary things and events" and "without using real-world references," are worth further discussion. They seem to be the main points of contention for those worried that we are becoming a culture of distraction, and one that is less able to distinguish the real from the synthesized.

An Ontological Shift

Backing up for a moment, let's briefly consider past inventions that represented an ontological shift—a change in our concept of reality (due to a change in our knowledge and awareness). The first was the invention of writing. It expanded the capacity for memory beyond a single lifetime. Next came the printing press which made the ownership of books by the individual possible, and indirectly increased the number of readers. The typewriter enabled more books to be written and published which lead, indirectly, to increased readership. And now we have the electronic word (word processing) replacing the printed word. In addition, the computer's ability to generate images has lead to the diminishing use of conventional photography; static modes of representation have given way to multi-sensory, multimedia presentations in which illustration (once again, the image) dominates.

All these inventions profoundly changed the way we have interact with one another, and how we perceive ourselves. (Many writers have documented the effects of these technologies on societies, so they will not be addressed here.) The computer is the latest invention to make such a deep impact on us. The difference between the computer and all the previous inventions is that the computer "touches us where we live. The chief inventors of word processing were aware of this. These visionaries were not marketing a commercial product but seeking a revolution in the way we think. They wanted to alter radically the way we interact with language." (Heim 8). Douglas Engelbart, who put together the first text-processing hardware, believed that the computer was a symbolic manipulator which could supercharge human thought at the level of language. Since then a number of people have written software programs to "affect our prose composition, our word choices,

and even our logical processes." (Heim 9). An ontological shift has occurred.

Infomania

Ours is a culture of distraction and "infomania." With the advent of computers we now have information overload. We have little idea as to what information is important and what is rubbish. We have more word processed documents, more spreadsheets, more computer-generated glossy brochures, more computerized statements, piles of word-processed reports, not to mention the hundreds of junk mail emails and voice mails. The language mechanics and word choices in these reports and messages reflect the state of the English language - manic, frenetic, and garbled. We, for some reason, think that more is better, and we fail to realize that much of this information lacks a context; therefore, it lacks significance. Everything that we word-process is automatically turned into computer language: the code of 0 or 1, off or on, no flow of electricity or the flow of electricity. All information is necessarily flattened or leveled by this process. How can there be significant information when it is fundamentally all treated in the same manner—as a combination of zeroes and ones? Information becomes "knowledge bits" - easier to store, retrieve, and manipulate, but lacking an obvious context. In order for language to be significant, the words must resonate within us; and this means we must have the time to read, reflect and question. This is exactly what we lack—the time to get through all the information that just keeps pouring in. Infomania erodes our capacity to recognize significance, and with this comes a sense of disconnectedness.

How the Computer Affects Thinking: Boolean Logic and Relativism

How can the way in which computers process information possibly change the very way in which we think? Our language is being computerized through the use of Boolean logic. Boolean logic is named after the nineteenth-century mathematician George Boole, Boolean logic is a form of algebra in which all values are reduced to either TRUE or FALSE. Boolean logic is especially important for computer science because it fits nicely with the binary numbering system, in which each bit has a value of either 1 or 0. Another way of looking at it is that each bit has a value of either TRUE or FALSE. (http://www.webopedia.com/TERM/B/Boolean_logic.html).

According to Michael Heim, Boolean logic which leads to us operate "at a remove" from our everyday involvement with things. Hypertext "unsettles the logical tracking of the mind," and has ushered in "a literacy that is prompted by jumps of association and intuition." The

links associated with the electronic word fosters the perception of a "continuous textuality." We can move smoothly, quickly, and whenever we want between documents by clicking on a link. The move is seamless. This affects how we read, how we perceive the level of importance of a text, and how we are "interfacing with our own thoughts." The speed at which we can access information using hypertext changes even the quality of knowledge. In addition, the use of graphic outliners, which are built into every software program, has changed how we write and how we think. Through the use of outliners, ideas and their sequencing are now "fluid, dynamic and unconstrained as they travel along graphic trees." (Heim).

Boolean logic is used as the search vehicle in computer-based inquiries. It uses formulas to symbolize logical relationships between groups of things that have certain properties. First Boolean logic classifies things, then algebraic symbols are used to express any relationship between those things that have been classified. The things being classified are known as terms or as algebraic variables that may or may not refer to actually existing objects. Boolean logic can use terms that are empty or null—meaning they have no members in the set. For example, the set of unicorns or leprechauns could be compared with some other set, but these objects have no existence in reality. Yet, we can analyze, compare and contrast, manipulate, discuss or show relationships between these items that don't exist, accept as ideas. "The system is that of algebraic formulas, and abstract relations among variables being plugged into these formulas, not a concrete content. It operates in a domain of pure formality and abstract detachment... an intricate net of abstract relations having no inherent connection to the things we directly perceive and experience." (Heim). We can deal with non-realities, but treat them as if they are real. Then we slowly begin to lose sight of their artificiality and begin to operate within a higher level of abstraction in which we are further removed from direct experience and from intuition. Could this explain why the younger generations seem to have weaker critical thinking skills?

What is not remembered by most of us is that logic, before Boole, was the study of statements about things referred to directly. The focus was on the way that direct statements or assertions connected and held together. If the statements were well connected, and the conclusion was well supported by the arguments (which are made up of these well connected statements), then one could be fairly certain that his summation of an event or occurrence was valid. After Boole, "direct statements have value only as instances of the relationships among abstract symbols." (Heim). In other words, statements of language

pertaining to actually existing things are treated "strictly as algebraic variables and not as universal terms" referring necessarily to physical objects. One useful analogy for understanding how words are treated in Boole's system is to think of terms functioning like drawers that may or may not contain something. An example of such a term that has no actual members in it is the class of leprechauns. This is a null or empty set. The important point to remember about Boolean logic, as Heim reminds us, is that "The terms reveal relationships among themselves, but they remain unconnected to existence or to the direct references of firsthand experience."

How does Boolean logic work? How does the computer quickly access the type of information you need? First, you type in key words or a phrase; then you include the word "and," "or," or "not." Using Alfred Glossbrenner's description of Boolean logic, if the request contained the word "AND [this] means a record must have both terms in it. OR means it can have either term. NOT means it cannot have a specific term." (Heim 14). This seems harmless enough. But what we fail to realize is that Boolean logic limits the kind of question we can ask, which in turn restricts the type of answers that are given. This has a profound impact on how we envision our world. The answer we get guides the very construction of our model of whatever it is we are investigating. We are ignorant of this influence.

Boolean logic is the vehicle that transforms meaningful thought into byte-sized information that lacks connectedness and significance. Language gets encoded as data. All terms are equal in meaning as the computer manipulates the ones and zeroes. General relationships between the sets are evident, but the more complex associations are lost. Presumably, objects as separate entities are negated as well. A terms significance is relative, provisional, partial and equal in value with Boolean logic. No hierarchy of meaning can be established. This aspect of the computerization of language is not surprising when seen in context. Over the past twenty years the growth of particular disciplines within computer science and the movement in literary analysis (taught in our universities) known as deconstructionism, has had a profound impact on our society. Briefly, deconstruction was a method for analyzing text in the literary field. The focus was on language and the difficulty associated with interpreting the author's meaning with respect to a word, phrase or passage. The deconstructionist would isolate certain elements in order to show (often quite reasonably) that all meaning was provisional. The point? Relativism. The upshot of this movement was that all truth was deemed subjective and facts had to be reevaluated in light of this new view. Many of the deconstructionists insights had merit. They

believed it is difficult to know, at times, what an author is saying in a passage; that how we see ourselves is circumscribed by our culture's ideological bent; and that the act of interpreting history is a subjective business. But these insights should lead us to a greater sensitivity, not a denial of the facts. We should not fully disregard the interpretations of those who analyzed an event earlier on.

The problem is that deconstructionism moved quite readily and quickly into other disciplines—"to the 'text' of history, identity, and culture as a whole. These, too, were shown to be unreliable, riddled with gaps and inconsistencies, indeterminate to a fault." Mark Slouka, in his book, *War of the Worlds*, makes the connection between deconstructionists and "cyberists" —those computer savvy extremists who believe cyberspace is just the next step in our evolution as a species. Cyberists are a product of their time—the age of *relativism* and increasing *subjectivity*. "Like the deconstructionists, the cyberists were enamored of the concepts of indeterminacy and instability; like the deconstructionists, they projected a fashionable, kaffeeklatsch nihilism; like their predecessors, finally, they were morally neuter, less interested in constructing truth and meaning—however provisionally—than in dismantling them." (Slouka 35). The important difference between the deconstructionists and the cyberists is that the former had only theories to argue that nothing exists outside ourselves. Everything is a matter of personal perspective. The latter have machines— applied deconstruction—to make the theory a reality. Hence, we have cyberspace and virtual reality where the individual *does* determine what will be in *his* reality. There is now the possibility of a personalized universe. Each time the user hops into a computer network and takes on a new persona, the "cyberspace world would adjust accordingly, proving that just as there *is* no core self, neither is there an objective reality outside the individual mind." (Slouka 36).

How the Computer Affects Thinking: Hypertext

Hypertext is a dynamic referencing system in which all texts are interrelated. It is a program for manipulating written materials so that pertinent information can be quickly located. It enables one to access materials that are related, however peripherally, to the initial inquiry. For example, while reading the original document you can place the cursor on any word or phrase which has a link symbol attached to it, and call up all texts within that database which have those same words in them. It allows the user to quickly conduct multiple searches.

In physics, the word hyper refers to "another dimension." For example, hyperspace is space with more than three dimensions. When

speaking of hypertext we are speaking of words having an added dimension— Words and phrases appear juxtaposed or superimposed. The sense of a sequential literature of distinct, physically separate texts gives way to a *continuous textuality*. Hypertext is using associations and making jumps among the texts from various books, articles, and written materials in the database. As it does this it is impossible for the user to know exactly how the associations were made among the various texts. It is this jumping, or *non-sequential movement*, that is fostering a new kind of literacy, one that is characterized by jumps of association and intuition. Hypertext unsettles the mind causing it to be jumpy rather than smooth in its approach to reading or thinking. Rather than a linear, line-by-line, page-by-page, book-by-book approach to reading, we have jumping around going on. (Could this explain some cases of children with reading difficulties?) The mind does not make the connections very clearly items when it is operating in this fashion.

Another feature of hypertext, reminiscent of Boolean logic, is its leveling ability. The whole notion of primary and secondary text is non-existent as all texts are virtually *co-resident*: The link indicates the implicit presence of other texts and the ability to reach them instantly. All texts are, therefore, on an equal level, so to speak. And a change in sense of time occurs. Knowledge exists in an eternal present — everything is only a click away. Indeed this is one of the allures of hypertext—the intellectual distance melts away. It emulates divine access to things—the user leaps through the network with all this information at his fingertips which breeds the illusion of knowledge, and hypertext favors this illusion by letting the user hop around at the speed of thought. This may be a danger: information may be knowledge, but knowledge is not wisdom.

How the Computer Affects Thinking: Graphic Outliners and Idea or Thought Processing

We have so much stored information that we do need a quick way to access it effectively, hence hypertext. But we must think about how this increase in speed may affect a change in epistemology—the study of what constitutes knowledge. Technology, especially that which is connected to our use of language, affects the way we represent what we know, which in turn changes how and what we think about knowledge. The computer has an added feature in that it interacts with us, and is not like other tools upon which we act.

One way of representing what we know, in writing, involves the use of outlines. When used in writing, outlines help us to learn more quickly a body of information by reducing it to the essential points.

The time it takes to absorb the data is speeded up and the ease of learning is enhanced. Peter Ramus, a 14th century logician, first advocated the use of outlines as a means for organizing, clarifying and condensing information for memorization. Ramist outlines presented knowledge as topics branching visually across a silent page. Individuals could absorb truths printed in books at a remove from the direct challenge of discussion. The outline supported the general desire in education to make learning easier. Outlines were used extensively in all the academic disciplines and are still taught.

When it came to the teaching of writing, especially non-fiction, outlining was the first skill one learned. The idea was to think about the main points and the supporting details that would make your argument persuasive. This required one to think carefully and critically about the sequence, logic and flow of the ideas. Before the real writing began, one had to organize one's ideas in a logical, sequential manner, hence the outline. The outline fosters linear thinking; there is a beginning, a middle and an end. Ordered logic becomes a norm for the thought process; it even becomes synonymous with careful thinking. Quality writing signals careful thinking, which in turn is usually associated with outlining. The outline is the visual representation of one's thought process. The hierarchy inherent in the outline guides the mind to what are the most significant points (the topic sentences) and what are the less significant points (the subtopics). Outlining is basic thinking.

What happens when the outline is computerized? One major difference between the two types of outlines is that the computerized one is interactive. Computer outlines are not, strictly speaking, outlines. They are outliners. There is a give-and-take feel to the process of outlining on the computer. No longer is the outline static and fixed in the space between the blue lines of the paper. It becomes dynamic and highly interactive. For example, the software program being used to create this research paper will not allow certain sentence constructions. A green or red mark is used to notify the writer that an error has been made. Some have remarked that this interaction makes one feel as though word processing fits their thought processing like a glove or second skin.

Electronic outliners are flexible, which is a second difference. You do not have to re-do an entire outline in order to make a change—just cut and paste, or hi-light and backspace. According to Heim, "Most outliners openly advertise a postmodern thought process; they encourage an order that floats and shifts. Nothing remains rigidly fixed." Outlining is a creative environment as one can plan, think and write simultaneously in the same plane of mental space. The writer

can turn his attention towards the connections between various ideas and let the software handle the architectural aspect of writing.

"Thoughts are linked rather than subordinated." Once again, there is no hierarchy. It is also an environment in which you can think more creatively as some aspects of the writing process are, in essence, taken care of for you. They are built into the software. Some say they even specify notions of how we should think: "Outliners incorporate dynamic interaction: free-form text searches, on-line references, and hypertext facilities. All these belong to thought processing." (Heim 47).

The Allure of Cyberspace: A Techno-Christian Heaven?

In her book, *The Pearly Gates of Cyberspace*, Margaret Wertheim lays out the history of our various conceptions of space. She makes the argument that over time our notions of physical space and spiritual space have shifted, and with these shifts come the newest version of the "age-old tension in Western culture between body and mind—in all its myriad manifestations, including that particular manifestation that Christians call 'the soul.'" Cyberspace is a wholly new space or domain the creation and expansion of which is reminiscent of the Big Bang theory and "a digital version of Hubble's cosmic expansion, a process of space creation." This new space is growing every day by an estimated 20,000 new subscribers worldwide, who sign-on to become net-citizens, or "netizens."

Wertheim also says that although cyberspace is a by-product of physics, it is not "bound within the purely physicalist conception of the real." Once again, we find ourselves having to "address the material realm described by science, and an immaterial realm" (that in which the Net operates). It is immaterial in the sense that it has no specific "there" associated with it. (It reminds one of the description of the electron existing not as a physically discrete particle, but rather as a cloud associated with the probability of finding an electron in this cloud.) In addition, this new space is more than a data-space as much of what goes on in it is for social interaction and communication: "This new digital domain functions as a space for complex mental experiences and games. In this sense, we may see cyberspace as a kind of electronic *res cogitans*, a new space for the playing out of some of those immaterial aspects of humanity that have been denied a home in the purely physicalist world picture. In short, there is a sense in which cyberspace has become a new realm for the mind." In a sense mind, as thought, is immaterial. It is at the same time a new realm for the imagination and a new realm for the self. Cyberspace is the laboratory in which we experiment with new constructions of self. We take on different personae that can act or live in a different space

and time.

According to Wertheim, cyberspace represents the "New Jerusalem," the heavenly city. In this place death has no dominion. We transcend the limitations of our fragile, mortal physical bodies. There is the potential salvation (everlasting existence in the network?) for the elect (the digerati?) who understand and accept the teachings (of the cyberists?) and enter into a union with the One (the global network?). "The perfect realm awaits, we are told, not behind the pearly gates, but beyond the network gateways, behind electronic doors labeled '.com,' '.net,' and '.edu.'"

Wertheim goes on to say that for the faithful Christians death is not final. It is a temporary state of inactive being. Death signifies the beginning of a journey to "the Heavenly City of the New Jerusalem, the final Heaven, wherein the elect will dwell forever in the light of the Lord." For the devout cyberist, "computers are the portals to the new Heavenly City; cyberspace is our new home." Michael Benedikt states that cyberspace will enable us to make up for our "Fall from Eden, to redeem ourselves in God's graces." Here we would be allowed to rid ourselves of the impure, mortal body and become beings of light existing timelessly in a godly space: "Divorced from our bodies" we would "finally attain the fulfillment of our species." The boundaries between self and others, here and there, past and future, nature and machine, life and death would fade away. This represents the culmination of all our efforts and signifies the end of our journey.

The elect in Christian doctrine are those whose names are found in the "Lamb's book of life" because they followed the teachings of Christ. They are the beneficiaries of the promised New Jerusalem, Heaven. Those who are proficient at navigating and maintaining their existence in cyberspace will be the new elect. These "infonauts" or "cybernauts" will live in the light, dwell in this new heaven and "Death will be no more; mourning and crying and pain will be no more, for the first things have passed away." (Revelations 21:4).

Nicole Stegner postulates that just as in Heaven, so too in cyberspace will a number of Christian ideals be realized. First, we will overcome the physical limitations of the human body. Sickness and death have no reality in cyberspace. We exist as purely energized beings, as creatures of light in motion. "We will all become like angels, and for all eternity,". Second, the kingdom is open to all who can afford to buy a computer and pay the monthly internet bill. It helps if you can read the "good book(s)" containing the documentation for the software. Third, just as in Heaven, all in cyberspace are considered equals. The barriers of race, gender, age, body shape, socio-economic

status, or sexual orientation are hidden from everyone "...and here everyone can at least pretend to the illusion of perfection." Fourth, cyberspace is also the place to find that other who loves you for you, for your essence or spirit, not your great legs or pretty face. This is the Christian ideal of pure love. It is interesting to note the increase in the number of people who meet on the internet and fall in love. And what is the big attraction of chat rooms among teenagers if not to meet mister or misses wonderful? And finally, cyberspace promises to make us creatures of knowledge and immortality, to fulfill the promise held out to Eve in the form of an apple by a serpent.

Western Culture's Changing Views of Space

The argument can be made that one aspect of our history is marked by our attempts to locate ourselves in space and time. Myron Kruger, an early pioneer in the field of VR, says that with this effort comes "the altering of the definitions of physical space, of identity and community." Virtual reality is the new space, the new domain. It is the realm of our soon-to-be existence that requires us to once again make changes in the meanings of the terms just mentioned. We are reinventing ourselves, redefining ourselves. This is something we have been doing and will continue to do. As noted by Kruger, it seems to be our destiny to redefine ourselves.

For the past 2,500 years Western culture's philosophies and religions have embraced a dualistic view of reality that splits it into matter and spirit. The Greeks viewed the human in terms of soma (body) and pneuma (spirit). But it can be argued that for the Greeks the body was somewhat more important, hence all the statues exemplifying their ideals of physical beauty and grace.

In Later Judaic thought, the concept of pneuma undergoes further development and eventually gives rise to the complex Christian notion of soul. If we consider what consumed a large portion of time and energy, we would note that from the fifth to the 15th century it was building magnificent cathedrals and fighting the infidels or converting the heathen in order to save their souls. The Christian medieval era was focused on enriching the human soul through the creation of objects of splendid beauty the purpose of which was to help the human contemplate the divine. The purpose was not to edify the human body for its own sake. The physical body was of little importance; spirit ruled matter in the "mind" of that time.

There was a change in focus from about the 15th through the 17th centuries and on into the present day. With the Renaissance (rebirth) we focused our attention once again on the physical concreteness of the body, as did the Greeks. And with the scientific revolution and its

machines and technologies (which made our lives easier), we became even more wedded or bound to a materialistic, concrete touch, smell, see, hear, taste sort of reality. Our mapping of lands, oceans, skies, subatomic space, and cosmological space are proof of our intense interest in and moderate mastery over physical space. But we no longer have a place for even a vision of spiritual space here in the West. Our conception of physical space extends infinitely in all directions, taking up all available, and even conceivable territory. We do not have a truly dualistic cosmology in Western culture today. There is no room for *pnuma* (spirit) here. Ironically, the medieval Christian world picture did recognize and incorporate a space for body and a space for soul. It was a genuinely dualistic cosmology, with the added important point—the two orders mirrored one another, and in both cases *humanity* was at the center.

We have developed impressive technologies and created an abundance of goods that do both expand and enrich our physical existence. But what price have we paid? Has it been at the expense of some part of our nature? Have we denied the existence of some part of ourselves, which will not tolerate being denied without painful repercussions? Is this denied part reaching out for existence and expression in the new reality of cyberspace?

A number of critics fear that we have not been keeping humanity at the center of our existence. We have become isolated, selfish individuals who want to abdicate our responsibilities to one another by escaping into a simulated environment that caters to our every whim. For these critics our most recent developments in computer technology represent an attack on reality and threaten to scatter the self even more so. We are already a culture of distraction and increasing abstraction, less capable of focusing on our very real social problems: urbanization, consumerism, increasing mobility, loss of regionality, growing alienation from the landscape. We should be asking about the potential of our newest computer technology for dismantling the self, culture and reality as we have known them. A few of us are doing exactly that.

Mark Slouka sees recent developments in the computer world moving us in a direction which attacks reality as we have known it. His basic fear is that we are becoming increasingly enamored with simulated reality, and less willing to engage or act in the physical world. He is concerned with the cyberists' vision of a future in which individualism does not exist. Cyberists speak of an "emergent hive mentality," wherein we are members of a "yet-to-be-defined global superorganism" existing in a collective state. And for Slouka virtual reality is proof "that the barrier separating [the] original from

simulation, fact from fake" is taking place, leading to "the slow bleeding of reality into illusion."

One of Stephen Talbott's fears is the subtle ways in which the computer is "quietly altering what it means to be wise or sensible." He worries about how some people (the cyberists and digerati- those in the position to make their vision a reality) believe in the inevitability of a global superorganism becoming the new paradigm. He notes that there seems to be little in the way of head-on discussions on a public level about the conflicts between technology and the broader values of society. We do have talk radio personalities who bring up some items for discussion, but they do not invite the experts in the fields of virtual reality or artificial intelligence to speak on their programs. Why not? He questions how it is possible in a "society founded so centrally on the creative initiative and freedom of the individual, we should today find this same individual so utterly helpless before the most urgent social problems." We do not pull together as community, nor do we see ourselves as being fundamentally connected to one another by our very humanity. In fact, he questions what it means to be human in a culture that is entering into a new kind of space and time - virtuality. (Ironically, we are trying to develop global villages via the internet, as real villages are being destroyed.)

Myron Kruger says that this is now the age of artificial experience and "what we have made in turn will make us." But we do not have to become paranoid and fearful. We can and should be consciously aware of the benefits and dangers of our newest technological efforts and discoveries. It is up to us to determine what we become through our machines, since they are manifestations of us. As Stephen Talbott has remarked, "In all social affairs the nature of the order depends upon the nature of the human being." We already have complex, unanalyzable interactions taking place within our machines, but "this order is not given in advance, and is not inherent in the technology itself, which only defines the range of possibilities. The form we give to those possibilities will reflect ourselves." If we don't like what is taking place, then we must critically look at ourselves and make the necessary changes in ourselves first. One thing we can do is shift our focus from the "digital abstractions that surround us to the physical world we inhabit [which] will require, above all, cultivating a certain skepticism toward the pronouncements of the technologically enraptured." A second thing we can do is talk about our basic human needs, drives, desires, fears and pathologies. Then we should attempt to understand how our technology supports these in both positive and negative ways. A third thing we can do for students is to show them

that we have a long history of redefining ourselves and our reality. It is critical that they keep in mind a vision of what it means to be humane, to be a part of a larger community whose health depends on the health of each individual, and that we are all co-creators of our existence.

Virtual reality can bring to light and life the worst in us— vanity, delusion, ego, and self-obsession, or that which represents our highest ideals—understanding, compassion, forgiveness and unconditional love. It is up to us to determine how we will employ our newest machine. Just recall that what we make, in turn makes us.

Lesson Plans

1. We will hold discussions on a number of issues raised in the above material, after the students have read a condensed version of the narrative. Some areas that I would like to focus on include:

- a. What are some universal ideals revealed in the Christian ideals?
- b. What constitute basic human needs, drives, fears and desires?
- c. What happens when some of our basic needs are not met?
- d. In what ways could virtual reality offer us the opportunity to realize some of our ideals?
- e. In what ways could virtual reality manifest our fears and pathologies?

2. We will read William Gibson's novel, *Neuromancer*. As we read the novel,

students must take notes and consider how universal ideals are presented, and how basic human needs are being met or perverted. They will have to make a judgment concerning Case, the main character. Is he human or non-human? They will have to make an argument for their position. Should the same guidelines for living and being apply to people like Case as they do for humans? Why or why not? What's your rationale?

3. We will watch the TV version of the movie, *Lawnmower Man*. The students will take notes on the main character, Job, and on the themes the movie has in common with the book *Neuromancer*. The students will write two compare/contrast essays. One will consider the

characters Job and Case: In what ways are they similar? How are they different? The second essay will entail looking at the universal themes being raised in both the book and the movie? The student will then choose one theme about which to write.

4. We can study propaganda devices such as oversimplification, misuse of statistics, card stacking, transfer, etc... Transfer is the use of symbolism to persuade and influence. This would also be an opportune time to teach about imagery and the power of the image.

5. Students will scan the newspaper, magazines and various publications, both on-line and off-line, for articles pertaining to any of the themes we have or will be discussing. They will prepare a synopsis of the article and state their praise, concerns and questions for the article. They will then present it orally.

Bibliography

Gibson, William. *Neuromancer*. New York: ACE, 1984.

Heim, Michael. *The Metaphysics of Virtual Reality*. New York: Oxford University Press, 1993.

---. *Virtual Realism*. New York: Oxford University Press, 1998.

Levy, Pierre. *Becoming Virtual: Reality in a Digital Age*. New York: Plenum Trade, 1998.

Markley, Robert. "Boundaries: Mathematics, Alienation, and the Metaphysics of Cyberspace." *Virtual Realities and Their Discontents*. Baltimore: John Hopkins University Press, 1996.

Rheingold, Howard. *Virtual Reality*. New York: Simon and Schuster, 1991.

Slouka, Mark. *War of the Worlds*. New York: Harper Collins, 1995.

Talbott, Stephen. *The Future Does Not Compute: Transcending the Machines in Our Midst*. Sebastopol, CA: O'Reilly and Associates, 1995.

Wiess, Ann E. *Virtual Reality: A Door to Cyberspace*. New York: Holt and Co., 1996.

Wertheim, Margaret. *The Pearly Gates of Cyberspace: A History of Space From Dante to the Internet*. New York: W.W. Norton and Co., 1999.

Zhai, Philip. *Get Real*.

