

CHAPTER 1

Emergence of Virtual Spaces

1 EMERGENCE

People living at the end of the nineteenth century saw the first movies. The Pathé brothers, owners of fun fair attractions and movie producers and distributors, presented movies directed by Melies to small audiences under a tent built next to other attractions such as magicians, fire throwers, and sword swallows. The movie theater found its audience and its own specific space several decades after the first screenings of the Lumière brothers, in a fancy restaurant called the Café de Paris. The layout of the movie theater, a space designed for a collective viewing experience, remains unchanged still today.

At the end of the twentieth century, online three-dimensional (3D) games reached audiences of millions of people sharing the same virtual space through a multiplayer online experience. The convergence of networking, the internet, and interactive 3D worlds changed a gaming experience based on one desktop into a virtual space experience played by an unlimited number of people.

Comparing the evolution of virtual spaces and the evolution of other media helps us understand the emergence of new types of viewer's experience and of new audiences through time. Trying to define an audience and a viewer's experience for virtual spaces seems to be a priority for a young medium with a direct appeal to large audiences. This chapter tries to answer several questions about virtual spaces and the future of the viewer's experience.

2 DISCUSSION ABOUT VIRTUAL SPACES

This chapter takes you through a virtual conversation that takes place in a group that includes designers, producers, developers, and 3D artists.

More detailed information on the following participants can be found in Biographies.

Ken Perlin is a professor in the Department of Computer Science at New York University. He is the director of the Media Research Laboratory and the co-director of the NYU Center for Advanced Technology. His research interests include graphics, animation, and multimedia. Ken won an Academy Award for Technical Achievement from the Academy of Motion Picture Arts and Sciences for his *noise* and *turbulence* procedural texturing techniques, which are widely used in feature films and television.

Miro Kirov is a sculptor and a 3D artist from Bulgaria who works and lives in New York. For the past 4 years Miro has been creating a virtual human body for Advanced Educational Systems at New York University. Miro and I collaborate on the Dynamic Virtual Patient project and on virtual space installations with James Tunick and Studio IMC.

Zach Rosen is a designer and developer who lives and works in New York. Zach is a researcher at the Interactive Telecommunications Program at New York University, where he graduated. Zach and I collaborate on several virtual reality projects funded by New York University. Related projects illustrated in this book include the Aphrodisias project and the Dynamic Virtual Patient project.

Florent Aziosmanoff studied psychosociology and cognitive sciences before becoming artistic director at the Cube in Issy-les-Moulineaux, France. He created the association ART3000 and the Festival Premier Contact with his brother Nils and the team at the Cube. Francois directs the “Atelier de creation” at the Cube, a workshop for artists and authors creating virtual reality projects and real-time interactive systems. Artists and authors can develop projects from scratch using decision-making techniques including artificial intelligence and artificial life.

2.1 Let's Start the Discussion

What are you looking for when entering a virtual space?

Ken

When I enter a virtual space, the most important thing that I look for is a feeling that I'm entering a world that will touch me emotionally, that I can immerse myself in. It's a very childlike feeling of wonder when it works.

Miro

I am looking first for the ground under my feet. If the world is a simulation, then the virtual environment is our reality. Knowing that the world is a three-dimensional abstract expression floating in space is just another option.

Zach

When entering a virtual space, my first goal is to learn the methods of manipulating the space. This can take the form of locomotion, cursor navigation, sound manipulation, etc. During this brief orientation, I am looking for visual or auditory feedback to let me know that my actions are causing a reaction. Now that I know the tools that are available, the second step is to explore these methods to determine their capabilities. If I know how to make the character walk forward, can I get him to walk stairs? If I whistle to change the color of the screen, what happens when I whistle louder or softer, higher or lower?

Once I am comfortable communicating with the space, I can begin discovering what the purpose of the world is. As essential as instant feedback was to help orientate me with the controls, I am now looking for reference points or clues to tell me where to go or what to do. Is there a location I must discover or a mission I must accomplish? Am I here only as an observer or am I an active participant? At this point I am in the hands of the developers to guide me toward their intended purpose for the space.

What is the importance of the viewer in the design of virtual spaces?**Ken**

The viewer is the most important thing in the design of virtual spaces, just as the reader is the most important thing in the design of a novel.

Florent

We can be sure of one thing: the viewer alone cannot “turn” any reality into a virtual reality environment without the input of the author. Let’s take the example of a visitor walking inside the park surrounding the Chateau of Versailles, a seventeenth century garden designed and created by Le Notre. The viewer is immersed inside a landscaping project inspired by a certain vision of the world at the time of King Louis the XIV. Although everyone

can browse freely and at his or her own will in the alleys of the park, each visitor is constantly reminded of the rules created by Le Notre. For example, the timing of walks and transitions between various sections of the garden are rigorously designed. The visitor can feel the dramatic perspective of the space starting from the castle, going over the “green carpet” and the Grand Canal. The view of the horizon is blocked by a row of poplars from Italy and projected toward the sky. The visitor, immersed inside this grandiose and calm space, can see thousands of visitors following their activities quietly. One can feel how the layout of a space suggests a world united and pacified. This is certainly the world that Le Notre, the author, intended to design.

Zach

When designing a virtual space, every decision must incorporate a consideration for the resulting effect on the user’s experience. While it may be interesting to explore visual phenomena or push technical boundaries, the reaction of the user should remain a primary concern. Successful interactive installations entice the user to participate by using visual clues to suggest that something will happen if the user touches the mouse, screen, etc. If a virtual space is too active when there is no user input, viewers will take less interest in interacting and become passive observers. A space that understands what the user is feeling will help to orientate the user and improve his or her understanding of the purpose of the space.

Miro

The importance of the viewer is essential for virtual spaces. The role of the viewer can be passive, observant, active, or interactive. The whole purpose of virtual space design is to achieve an immersive and interactive experience between the viewer and the world.

Can you describe a viewer’s experience—situation or emotion—that you find specific to a virtual space? Can you compare the experience of a viewer inside a virtual space with an interactive moviegoer’s experience?

Ken

I think that virtual reality spaces are very good for communicating awe and mystery, if they are properly done. I have never seen an emotionally effective interactive movie, so it’s hard to compare the two.

Miro

Our mind is a funny thing. It is like sponge. It absorbs everything. I had this strange experience of being totally immersed in some 3D world and vice versa. After long hours of 3D game playing, the experience of elusiveness of the surrounding world is a kind of inversion of reality that can be a dangerous thing!

The moviegoer can immerse into the story, the drama, but has no control over it. He or she is a passive contemplator of it. It is very linear in time. The virtual space viewer has more of a choice over actions and what to see. It is very much like life. We are in a certain situation and we have to make a choice with its consequences.

Zach

If there are no apparent guidelines or goals, the ideas of the developer will not be successfully communicated to the audience. The most common reaction that I see with viewers of virtual spaces is confusion. Unlike film or television, virtual spaces are flexible at being active or passive creations. The message of a virtual space can be a lost process when viewers get confused. There is a very sharp learning curve that takes place when someone decides to participate in an interactive installation.

Florent

We can be tempted to look at virtual reality the same way we look at movies. The viewer is in both cases taken inside an immersive sight and sound system, with the addition of a mouse or keyboard in the case of a virtual reality environment. But we can grasp major differences between virtual reality and movies when looking at the way real-time systems change the way to deliver content and the structure of the content being delivered. Differences may be even stronger than between theater and cinema. In virtual reality, the viewer's experience goes beyond sequential storytelling. Let's take again the example of the garden surrounding the Chateau of Versailles. The viewer's experience of a virtual reality tour of the garden may be very different than watching a movie about the park of the Chateau of Versailles. In one case, moviegoers follow a point of view that can't be changed; in the other case, viewers are free to choose their viewpoint and the location of the camera and to create their own editing, etc. I am not sure if traditional movie editing can be used the same way in virtual reality.

The way content is delivered in movies and in virtual reality is so different that I am not even sure that they can be compared. There may be a way to reuse some formal experiences borrowed from movies—for example, framing, moving the camera, and mastering the tempo of a scene.

Can suspension of disbelief be part of the viewer's experience in virtual spaces? Is this something that you are looking for as a visitor, as a designer?

Ken

Yes. In fact, I think it is all about suspension of disbelief. That is the factor that allows us to make extremely nonlinear choices in design (focusing on some things and ignoring others), much as a filmmaker might focus on only certain characters and leave others sketchy.

Miro

It depends on if your virtual space is mimicking the sense of reality and perspective, if the meaning of the word “space” is perceived as a tangible form. The Cartesian coordinate system usually used for virtual environments should not necessarily be a way to present things from our imagination, but it can be used as an aid.

How can people learn from virtual spaces?

Miro

Well, virtual spaces can enhance the way we see things and memorize valuable information on the reality of things. We still see the world as a flat pancake. Only at some point of the coast, looking at the sea, can we see that the world is round on the horizon and yet we believe it's round from our knowledge. In this context, we would be able to experience different kinds of perspectives of representation with the help of the technology—for example, we could perceive a patch of grass from the point of view of an insect.

Zach

It is essential to remember that realism and believability are two separate entities. Designing a realistic space will lock you into a constant

comparison between your work and its real world counterpart. It is a thankless struggle because the real world will always seem more “real.” Rather than focusing on realism, bring the viewer into a new realm. Do not be afraid to let them know that this is a different type of reality where some things may be recognizable and some things may seem disturbingly different. As long as you are consistent, the audience will believe every piece of your new world.

As a designer of virtual spaces, you are blessed with an audience that expects to be transported to a new reality. Treat your viewers as you might treat an out-of-town guest: you may want to show them how to get around or what is available for them to see or do. Your space can be as close to or as far from the real world as you decide and your audience will follow you there, but if you leave them without any reference point, any rules, or a motive, they will feel lost and retreat from your space.

Is it possible to use some linear content to tell a story inside a virtual space?

Florent

The question is open. I currently design *Le temps de l' amour*, a virtual reality fiction that uses linear content. The viewer can jump in the story but can't control the delivery of the content. The viewer can only control his or her viewpoint on the story. The viewer is placed in a situation similar to Wim Wenders' angels in *Wings of Desire*. My contribution to this project is to give full access to all the levels of the story for the viewer, including present, past, and future. I am to give not only an unbiased report about what happened inside a specific scene but also the subjective, conscious, and subconscious viewpoints of a character in the scene. This open system lets you change your point of view on the story rather than changing the elements of the story. Since my original idea was to mimic a movie, this experience gave me the opportunity to think about how to create stories for movies by allowing the viewer to have total freedom to choose a viewpoint.

In movies, the director chooses a point of view for you. For example, the director chooses the main character or two main characters if there is a duo. Other secondary characters—who tell us other ways to see the story—help to structure, to contradict, or to embellish the main character. Even

movies built around the opposition between two protagonists (such as a man and a woman or a cop and an outlaw) need to emphasize the point of view of one dominant character. This constraint comes from the limited duration of a film, which is about 2 hours. This is just enough time to present one way of looking at the story; using the unit of the sequence gives a way for the viewer to measure time, emotion, and cognition. We know that the cinematographic language is partly based on the ability of the viewer to project himself or herself on the main character. It seems impossible to change the main character, the viewer's referential, during the time of a sequence.

Are you interested in the utopian dimension of virtual spaces? Do you find a place for ambiguity, unexpected events, or failure in virtual spaces?

Ken

I don't see how you could have a utopia without ambiguity or unexpected events or failure. After all, those qualities are a necessary part of being human—without them we are not in a utopia but rather in a sterile lifeless place.

Miro

No, I do not believe in a utopian dimension of virtual spaces. The surprise event is crucial in this type of environment. It can be a great educational tool to teach people to see and react to. Unlike life, in virtual spaces failures can be fixed, conditions restored, resources regenerated. Virtual worlds are more forgiving in that sense.

Zach

The possibilities for expression in virtual spaces are truly endless. It is a medium that can combine nearly every other type of media and contains all of the flexibility and power therein. Utopias are one possibility, but dystopias are also effective as political or societal commentary or explorations of phobias. Ambiguity and discontinuity can also be used as effective tools as long as they are used intelligently and do not confuse the audience so much that they lose interest.

Is it possible to create storytelling systems with autonomous characters in virtual reality?

Florent

In 2001, I created an adaptation of the tale of *Little Red Riding Hood* with three autonomous robots.¹ The robots were small animated dogs with 20 motors, several sensors, cameras, and microphones. These truly autonomous machines could manage their environment and could acquire complex behaviors similar to artificial life and artificial intelligence. I was working on the simple story of *Little Red Riding Hood* in which the little girl, the wolf, and the hunter are set up inside a repetitive system of relationships. I was interested in the moral, social, and psychoanalytic aspects of the tale that can be found in the study done by Bruno Bettelheim.²

The wolf is looking for Little Red Riding Hood, who listens anxiously until the hunter brings the situation to an end. After the encounter, each actor is reset to walk around until a new set of circumstances brings the actors together again. The play is designed to repeat itself indefinitely with various versions of the same story line. The robots were created to play among people in the streets. They were designed to respond to an environment that could change according to the context—for example, interactions with viewers could interfere with the story line. Viewers could help to end the story, to protect Little Red Riding Hood, or to create new situations. The wolf looking for the color red could be misled sometimes by a kid's red shoes or a person's red handbag.

Creating this piece followed the same constraints that we apply to virtual actors inside virtual reality; the tools are also very similar. This piece required tweaking parameters for various behaviors and creating responses to external stimulations while controlling the equilibrium of the whole system. For example, if Little Red Riding Hood walks too fast, the wolf may never catch up with her. The dangerous wolf becomes a pathetic character, and the story line is completely changed.

¹ Bettelheim, B. (1976) *Psychanalyse des contes de fées—The Uses of Enchantment*. Paris: R. Laffont.

² Sony's Aibo robots created for 1erContact festival, organized by ART3000—Le Cube, Issy-les-Moulineaux (France). Urban installations of digital art are presented throughout the city.

I was very surprised to see how the play performed remarkably well on the functional level, on the storytelling level, and in relationship with the audience. I noticed that the audience did not want to interact directly with the piece. Children wanted to have a specific relationship with one of the characters and specifically with Little Red Riding Hood. Some of them tried to create a personal relationship with the character of their choice, trying to protect it from other actors or from other visitors. Watching these behaviors made me understand the kind of new space I was looking for.

Which references, books, movies, music, and examples of other topics would you recommend to the reader?

Ken

Turn off the lights, get a good projector with a good sound system, and go back and watch *2001: A Space Odyssey*. Think about the way Kubrick plays with time to create mystery, the way the film raises questions in your mind just by juxtaposing virtual spaces that are very different in our emotional and cultural landscape.

Miro

Alice in Wonderland, *The Little Prince*, Kafka, Joseph Campbell's lectures. Escher always fascinated me, Calder's sculptures, Van Gogh's skies. Some of the performances of Cirque du Soleil, Aida at the Met, Frank Lloyd Wright's Guggenheim museum building. For films, Fritz Lang's *Metropolis* is a classic; Terry Gilliam's *Brazil* too. Kubrick's *2001: A Space Odyssey* is not taking place in 2004. I find it fascinating to live through times that others dreamt about in the past. Spielbergs' futuristic experiments with today's cinematic story telling are interesting too.

In *Microcosmos*, the movie, a patch of grass is shown from the point of view of an insect. What a wonderful example of how to see the world in a different perspective.

2.2 Notes on the Discussion

I added the following notes after "listening" to the discussion.

Designing virtual spaces is some kind of a reduction of the cinematographic art to its most essential elements, a trip back to the origins of capturing motion and the invention of the first cameras.

Virtual spaces are mostly designed like a set of trade-offs and alliances between the sensuality of the virtual body, the presence of a virtual character, the presence of the viewer, and the spatial arrangement of machines producing images faster and in more seducing ways.

Designing virtual spaces and making movies can share similar goals, with each one following a different process leading to these goals:

- 1** Finding new ways to distribute camera locations in space
- 2** Focusing the viewer's attention on significant details
- 3** Walking through terrains held together by a story and creating connections, bridges between the ring enclosing the spaces of a story and the rest of the world
- 4** Moving forward in all possible directions inside a multidimensional world

Magicians use psychology to distract the audience from the trick being performed, and they use technological skills to perform their tricks. David Copperfield's mastery of technology allows him to execute parts of a trick that remain unseen by the audience. The suspension of disbelief required by the viewer during a magic trick is short compared to the duration of a movie. Putting together a puzzle of psychology and technology has always been a central element of fun fair attractions and circuses, from designing a roller coaster to displaying optical illusions. Movies are based on a similar illusion of perception. Moviegoers are under the impression that they view movement instead of single picture frames. Moviegoers perceive movement as the result of an alliance between a psychological factor, believing in an optical illusion, and a technological factor, making that illusion permanent over time.

