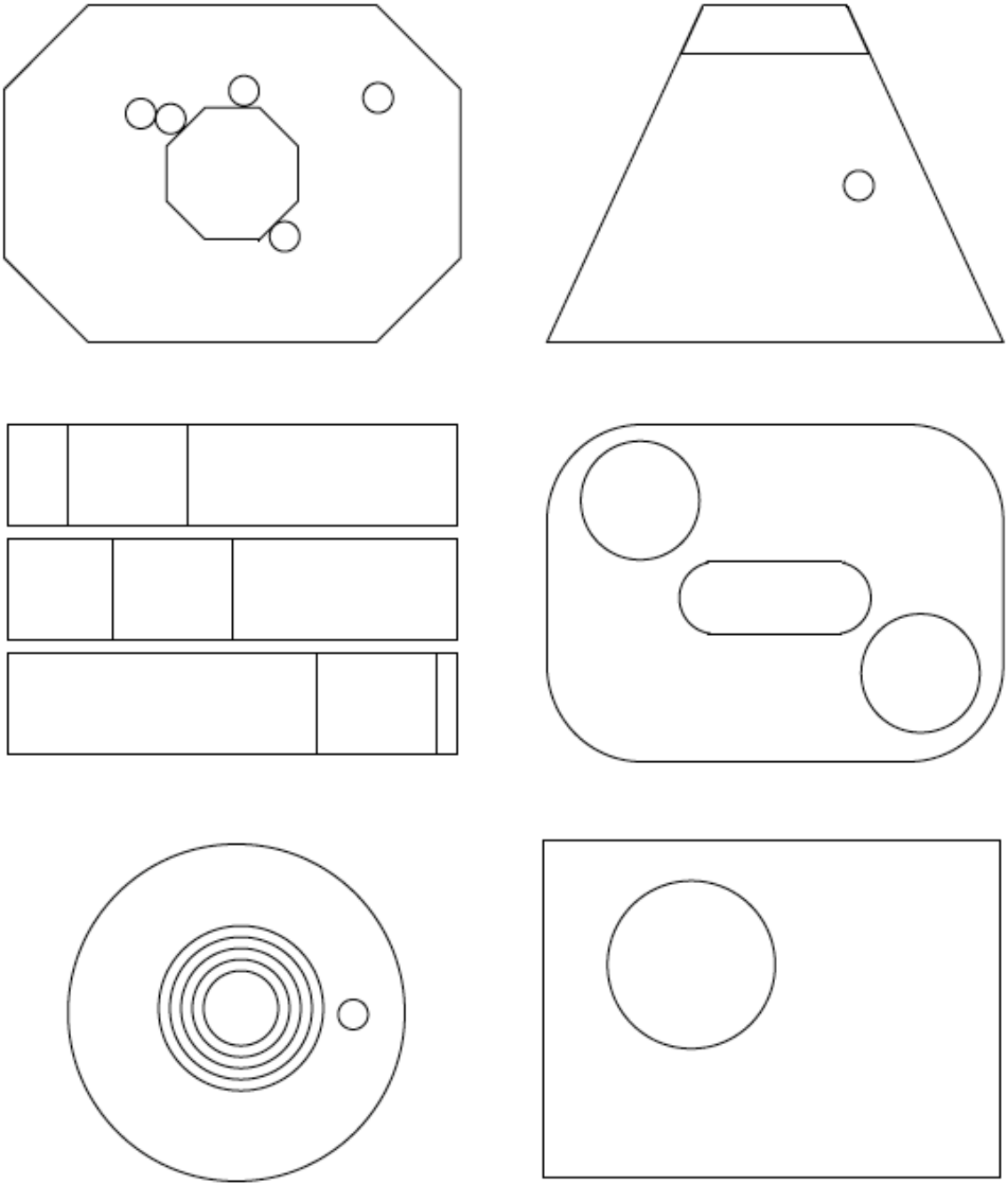
PLAYTIME IN THE WHITE CUBE

game art: between interactive art and video games

by andrew hieronymi



MFA thesis - UCLA D|MA - 2005

ABSTRACT

This thesis argues for the need to examine the user experience in video game play using the setting and methods of interactive art. It proposes to investigate the field of game art from a user perspective by situating it at the intersections of art, games and interactive media. It then gives a thorough depiction of the accompanying thesis project *MOVE*, an installation using computer vision and full body interaction allowing participants to experience a number of gestures and actions usually performed by avatars in video games.

ACKNOWLEDGEMENTS

Thanks to my thesis committee Erkki Huhtamo, Victoria Vesna and Mark Hansen at UCLA Design | Media Arts for their support and patience. Thanks to Osman Khan for camera vision code sample and installation assistance. Thanks to Tatsuya Saito for introducing me to C++, OpenGL and OpenAL. Thanks to Aaron Koblin, Peter Cho, Takashi Kawashima and the Game Design students of the 2005 UCLA Summer Institute for their enthusiastic help with the testing of *MOVE*.

Special thanks to Casey Reas, my thesis committee chair, for his guidance and weekly critical input.

And lastly, special thanks to Togo Kida for his invaluable hard work and dedication as project assistant on *MOVE*.

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1. INTRODUCTION

On a Saturday evening in Spring 2005 I visited an exhibition of Michael Naimark's interactive installations at the Art Center's Williamson Gallery in Pasadena. Michael Naimark, a "pioneer in alternate media and member of the Architecture Machine group at MIT, a precursor of the Media Lab, helped develop the *Aspen Movie Map* (1978-79), one of the first interactive movie events." (Wilson 2002, 698) The small retrospective at Art Center showcased a number of his interactive works, such as the *Golden Gate Flyover* (1987), an installation allowing visitors to navigate a grid looking at a top-down view of San Francisco, or *Be Now Here* (1995-97), a UNESCO-funded project showcasing 360-degree imagery of various ecologically endangered locations from around the world.

But the piece that really grabbed my attention was *Karlsruhe Moviemap* (1991), an installation that lets you drive a streetcar through the German city as if you were the conductor. On a projection screen you see a film of the actual streets of Karlsruhe as seen from the streetcar, and the interface allows you to navigate through a number of different routes taken by the streetcar. The setup involves an industrial strength joystick rigged into a metal stand that you operate while standing. The joystick can only be pushed forward and pulled backward to adjust the speed of the streetcar by slowing down or fast-forwarding the movie projection, and two buttons next to it allow for left and right directions. The feeling of speed and immersion is exhilarating.

After the exhibition on the same night, I decided to pick up again a video game that I had been playing for a few months and try one more time to overcome the obstacle where I was stuck and which prevented me from advancing in the game. *Metroid Prime* (2002) is a 3D shooter developed by Nintendo for its GameCube gaming console (2001) where the player takes the role of Samus, an "interstellar bounty hunter whose objective is to search the planet Tallon IV for signs of illicit activity on the part of the Zebesian space pirates and put a stop to them once and for all." (*Metroid Prime* review, Gamespot.com) The part where I was stuck was a particularly difficult one where Samus has to defeat Thardus the rock monster. Defeating this giant boss made out of rocks involves aiming and shooting at his seven weak spots while it attempts to crush you as it rolls around or throws rocks at you. You have limited ammunition and can only see the weak spots through a thermal visor. To make matters worse, a small snow tempest starts giving you limited visibility through intermittent use of the visor. Needless to say that defeating this 'boss' required repeated attempts while learning by trial and error the best strategies. Nevertheless, on that night after only a few attempts I ended up defeating Thardus the rock monster.

Playing a video game and visiting an art gallery are usually considered very different activities, but on this particular night I could not help seeing strong similarities in these two juxtaposed experiences. The most obvious reason for seeing shared qualities in video games and interactive installations is their reliance on interactive technologies, but that was not the only aspect in which they resembled each other. In fact, it is precisely because both use a similar system that made me want to investigate further the differences and similarities beyond their technologies.

From a user perspective, they both offer a fun, immersive experience. Nonetheless, the nature and purpose of the interaction are different.

Both works involve a joystick/gamepad as input device. They both use a screen as output device. The setting on the screen offers in both of them a first-person view of a 3D representational environment. In both environments the navigation is limited to the directions given with the controller: left, right, forward, backward.

Interaction through this interface offers in both environments a strong sense of immersion; a somewhat restrained sense of navigational freedom and a sense of control. In *Karlsruhe*, the immersion is created by the highly realistic quality of the images you control (film footage), as well as the close relationship between the activity of operating a joystick to control the movie and the act of operating a real streetcar. In *Metroid* you have a plastic controller in your hand and you act within a highly stylized 3D computer-generated world. What makes the immersion effective is not so much the illusion of reality but the range of control you have over the virtual world.

This range of control requires a development of skills that you acquire through learning and repetition, skills that require hours of gaming before you can feel comfortable with the controls and are able to acquire the necessary hand-eye coordination to perform successfully in *Metroid*'s hostile environment. At the same time, *Karlsruhe*'s control scheme is very simple and can be picked up almost immediately by anybody and can be enjoyed instantaneously.

Additionally, the simplicity of control in *Karlsrhue* is facilitated by the lack of challenge. There is no obstacle, no way of acting right or wrong, winning or losing. The project allows for exploration through the environment either in a systematic fashion by following each route to be explored or through aimless navigation.

By contrast, in *Metroid*, Samus and consequently the player is constantly under tension and ready to confront obstacles and hostile creatures. Players can lose life points if when confronted they do not react appropriately and 'die', meaning having to restart the game at an earlier stage.

Karlsruhe, through its immersive and 'fun' experience, is nonetheless creating a layered experience. The installation is offering a virtual tour of the city, yet at the same time, it's aim is to bring attention to the limitation of the navigation, of the virtual world. (Huhtamo 1995, 90). The work is designed around what media theorist Erkki Huhtamo calls *metacommentary*, an artwork that reflects upon the experience it offers.

If *Karlsruhe* is able to create this layered experience about interaction and navigation through a fun, immersive experience, could it be possible to create a layered interactive work that would reflect on the complex interaction of a video game such as Metroid Prime? What strategy should be applied to create metacommentary about video gameplay?

> "For all the discussion of gaming culture that you see, the actual experience of playing games has been strangely misrepresented. We hear a lot about the content of games: the carnage and drive-by killings and adolescent fantasies. But we rarely hear accurate descriptions about what it actually feels like to spend time in these virtual worlds." (Johnson 2005, 24-25)

In the past decade or so, cultural institutions have become increasingly interested in addressing the topic of games, and more precisely the topic of digital games. As the mainstream video game culture keeps growing and competes with other media like film and television as an increasingly important source of entertainment, gaming has become a hot topic to investigate.

Academia has been looking at games as new uncharted territory and almost from the start comparing it with previous media. Academics coming from film theory, electronic literature or media art are analyzing games and trying to understand what makes them so unique when compared to other media. There is a growing literature on video games with studies about controversies surrounding violence in video games (Raessens 2005), the military background of video game development (Penny 2004), their role in children's behavior, (Turkle 1984) the formation of online game culture (Turkle 1995), etc... There have also been a lot of studies about the specificities of video game interaction (Juul 2005), consequences of video game addiction, as well as video game skill learning (Loftus 1983).

At the same time, interactive art has been an important field of investigation for the past three decades, with major festivals around the world and a significant body of theory covering this form of art.

If we presuppose that one of interactive art's main preoccupations has been to deconstruct interactive technologies through various strategies, and if we agree that video games offer a different type of interaction, then is there a need to examine the video game play experience?

In order to find possible answers to this question, this paper will investigate what strategies interactive art is using to comment on interactive media, analyze the video game play user experience to understand the differences between interactive media and video games, and finally describe my related thesis project *MOVE*, an interactive installation aiming to deconstruct video game play.

In the first part, I will describe three shows from the past decade, which attempted to showcase projects that could be qualified as game art. The description of their qualities and shortcomings from a user perspective will serve to initiate a discussion of three main differences in context between the game industry and the art world: purpose, modes of production and audience.

In the second part, I will analyze the differences and similarities in interactive art and video games through three core elements found in the user experience of both fields: *interaction*, *outcome* and *interface*. This will lead to a better understanding of the differences and similarities in both fields and help to articulate possible strategies for deconstructing video game play by using the medium of interactive art.

Finally, in the third part, I will describe my installation project *MOVE*, explain my inspirations and motivations, and reflect on different types of user reactions to the installation.

I will narrow my research as much as possible to the close relationship between user and artwork/game/system, excluding any discussion around the topics of representation, narrative versus simulation discourses, political messages, or multi-user and network systems.

2. CONTEXT

In November 2004 I visited an exhibition entitled *alt+ctrl*, 'a festival of independent and alternative games' at the Beall Center for Art and Technology, a small gallery space located on the campus of UC Irvine. The projects selected for the exhibition, curated by Antoinette Lafarge and Robert Niedeffer, could fit into two broad categories: the first is what is called 'machinima', single channel videos edited with scenes captured from video gameplay. By selecting specific events from games, and editing them together, artists build meaning and comment on video game culture and its themes like war, violence, death, etc. with a critical and analytical angle. The second category could be qualified as 'independent game design'. Generally developed by teams but not always, these game appropriate game design formulas from mainstream digital games like first-person shooters, and try to create an experience for the user straying from the mainstream. Because these games are usually for non-profit, they can afford to be more experimental in their subject matter or their game mechanics than commercial digital games.

In 2001, *Game Show*, an exhibition curated by Laura Steward Heon was held at Mass MoCa. This show also featured games by artists and independent developers, but with a different approach. Instead of focusing solely on computer games, the show hosted projects that dealt with gaming as a topic of investigation but were not necessarily games per se. The projects at *Game Show* were done in different media, ranging from sculpture video, painting, photography and new media, and most of the participating artists had a background in art instead of game design. Some of the projects were gallery installations, others could be experienced on a computer screen, but not all the projects were interactive.

A few years before *Game Show*, another exhibition dealt with the topic of games, albeit this time in a more indirect manner: *Serious Games, Art - Interaction - Technology*, was a show curated by Beryl Graham at the Barbican Art Gallery in London in 1996. *Serious Games*' focused exclusively on the work of new media artists. These artists weren't making games or even addressing the topic of gaming directly, but because they were sharing with digital games the same computer technology, had similar formal elements in their work, such as interactivity and a certain playfulness.

These three shows provide a good representation of the wide array of projects that can be called 'game art'. They are also a good starting point for a discussion about the issues that emerge when one attempts to bring together game and art. I isolated three main issues relative to these shows which will be discussed in this section: First, what is the purpose of a game art project: is it to entertain, to offer fun and distraction or is it to address more serious issues? Second, what are the modes of production of game art: should artists learn the trade of game design in order to develop successful game art? And finally, who is the right audience for game art: should gallery goers become gamers to appreciate a game art project? I will try to clarify these issues by analyzing some of the reaction that these three shows elicited among art critics.

2.1 Should art be fun?

In the catalog of *Serious Games*, critic Regina Cornwell makes a strong case against fun, insisting on the necessity for artists to go beyond the most obvious use of interactivity, that which can be experienced in video games, and the responsibility for

artists to explore more serious issues in order to fight against the 'Disneyification' of the art scene in America:

> "Does interactive work, enforced by the association with the computer game and because it requires some kind of rapport with audiences, fall into a trap and simply aid the cultural climate of fun, somehow automatically operating against seriousness?"
> (Regina Cornwell 1996, 12)

For Cornwell, the association of video games and interactive art based on their inherent participatory qualities is seen as unfortunate and a potential source of confusion, since video games are about fun while interactive art should be addressing 'deeper issues'.

At the same time, art critic Francis Hwang in his review of *Game Show* in *Artbyte* entitled "Are we having fun yet?" (2001), complains about the lack of fun in most of the show's artworks. Hwang felt that artists who are interested in games and want to do work around that topic should get a better understanding of what makes a game successful, or more simply put, what makes a game fun.

> "Quite frankly, *Game Show* is no fun. (...) That's not surprising because though fun may seem trivial, it is not easy. Few can articulate what makes a game like chess, go, or Tetris so addictive, and that ignorance may account for the underwhelming nature of MASS MoCA's new exhibition *Game Show*." (Hwang 2001, 66)

So, interestingly, Hwan and Cornwell are emphasizing opposing features when judging the qualities of a game art project. For Hwang, the project has to be fun before anything else, while for Cornwell the project needs a certain depth, seriousness beyond fun which she feels is essential in art.

Ultimately what comes out of these contradictory positions is that a successful game art project probably needs to have qualities of both game and art. So are fun and seriousness compatible?

According to game theorist Huizinga, playfulness can be seen as the opposite of seriousness, yet, ironically, one can find seriousness in play:

> "The significance of 'earnest' is defined by and exhausted in the negation of 'play' - earnest is simply 'not playing' and nothing more. The significance of 'play', on the other hand, is by no means defined or exhausted by calling it 'not-earnest', or 'not serious'. Play is a thing by itself. The play-concept as such is of a higher order than is seriousness. For seriousness seeks to exclude play, whereas play can very well include seriousness." (Huizinga 1950, 45)

The fact that seriousness can be found in play might suggest that there are at least two forms of play, one in which the player is enjoying the activity as an end in itself, what psychologist Mihaly Csikszentmihalyi calls an *autotelic* experience, in which "the person is paying attention to the activity for its own sake" and one in which the player is "focused on its consequences" (Csikszentmihalyi 1991, 67) and is attempting to reach a goal.

It is not so obvious to simply conclude that this second type of play is what game art should thrive to reach, just because it involves an experience beyond the simple act of play itself. One of interactive art's main preoccupations, after all, is to focus on the experience of interaction itself, and since game art is so closely related to interactive art, maybe it too should consider reflecting on the interaction, in this case playing a game. Maybe the difference between games and game art lays in what media artist Jim Andrews calls "the degree to which the work confronts the problematical issues it

raises; the degree to which it questions the assumptions of the world it creates or simulates;" (Andrews 2004, 220).

We can conclude that a game art project definitely needs to offer the viewer something more than what a traditional game offers. Yet it is important that when adding something to the experience, the project does not lose gaming's main constituent, namely its 'fun factor'. How do artists achieve this difficult task? Do artists have to become game design experts?

2.2. Artists as game designers?

> "*Game Show* artists could benefit from a little more study of what exactly makes traditional games fun." (Hwang 2001, 67)

This emerging field, unofficially called 'game art' seems still to be searching for defined categories, and has welcomed so far under its umbrella a wide array of projects, as the very different exhibitions described above have shown. Yet not everybody seems to agree on what direction game art should take, if it should take a single direction at all.

One approach by artists interested in games has been to comment on or reference games, not by trying to create a game but instead by using media traditionally used for art such as painting, installation, sculpture, video, etc. This type of work will usually focus on aspects of gaming that are peripheral to the act of playing. They will be about game culture, game characters, game narrative, etc.

A second approach is using the gaming medium but to disrupt it to a point where the game is not really playable anymore, thus bringing attention to either formal or content-based elements of the game. Players will not be immersed anymore and will look at elements that they would not have noticed if immersed in the game. Good examples are usually found in works that deal with video games, and focus on game engines, game environments, video game themes like violence, etc.

The third approach and the one that brings game and art the closest, is the attempt to use the medium of games and instead of disrupting gameplay, to incorporate in the fabric of gameplay elements that will make the player aware of certain aspects of the act of playing. It is a much smoother approach than completely disrupting the gameplay and creates a more interesting and blurry distinction between what is game and what is art. Because of this blurriness some of these projects are sometimes hard to qualify and are not even considered art but more experimental games. Because they are trying to bring forward something more than simple closure achieved by the transparency of interface, they have something in them that qualifies as art.

One important issue with this third approach is when games and art are blurred to the point where you actually ask your audience to play instead of look at or even participate. There is a risk of alienating the audience for one main reason. Games require a time and effort investment in order to be enjoyed.

2.3. Gallery goers as gamers?

> "The first and last thing that should be said about the experience of playing today's video games, the thing you almost never hear in the mainstream coverage, is that games are fiendishly, sometimes maddeningly, hard." (Johnson 2005, 25)

As we have just seen, one of the biggest challenge game art projects are facing is that games and art are actually aiming for different reactions from their respective audience. Games offer closure while art aims for a layered, open-ended experience. Even if these seemingly opposite goals can be combined within a single work, there still is an important obstacle facing traditional art audiences. The time and effort the audience is willing to invest in interacting with a game art project in order to master it.

Playing a game often requires learning hand/eye coordination, a skill that is not usually associated with experiencing an art piece, even an interactive art piece. Can a game art project skip altogether games' requisite learning curve? How do you convey a game to an art audience which has little or no previous experience playing video games without alienating it? Do you need to meet your audience half way?

One way of addressing this issue is to make sure that the audience is able to go through this learning curve process within a reasonable time frame, unless the setting invites for longer gameplay.

During my visit of the exhibition *alt+ctrl*, I remember being disappointed that the games were all screen-based video games, with many being 3D games that required significant skills to control and longer to complete or experience in a satisfying manner than one would want to spend in a gallery visit. Only a few games were designed to be experienced in a short time, and those games were designed to be played in a web browser online. There were no site-specific games; most of the projects were meant to be experienced on a small monitor with standard input devices.

In February 2005, Antoinette La Farge, one of the curators of the show, visited UCLA and gave a talk about *alt+ctrl*. During the question and answer part after her presentation I expressed my disappointment with her curatorial decisions regarding the type of games she chose. Besides mentioning financial limitations as one reason for not having interactive installations, she commented as follows:

> "Very few games can really be played for a short time it is very very hard to show them in a way where people will spend enough time with them to even get a general idea of what is going on and most people don't want to be in a gallery space for very long anyway. (...) It may be that ultimately [that] this kind of a setting isn't the right place for people to experience games." (Antoinette La Farge 2005)

La Farge's comment is mainly addressing digital games played on a personal computer, which require a significant time investment from the player. She is overlooking arcade games that were designed with the intent to be played for short periods of time. Nonetheless, the bottom line is that if artists want to address art audiences with little video game play skills, they need to be aware of the learning curve factor.

In this section I have focused mainly on the reactions of an art audience and art critics towards projects mixing games and art. That is because the shows that I used

as examples of game art were held in institutions (gallery and museum) usually dedicated to exhibiting art.

In the end it might be that it is the game audience that will benefit the most from game art and not the art audience. If game art projects are going to be commenting on the game experience, they will inevitably find references to video games, and those references will most likely be picked up by people who play games. Steven Johnson believes that what really sets gamers apart is their ability to handle with calm the tension and lack of control one finds in modern video games:

> "I think they have developed another skill, one that almost looks like patience: they are more tolerant of being out of control, more tolerant of that exploratory phase where the rules don't all make sense, and where few goals have been clearly defined. In other words, they are uniquely equipped to embrace the more oblique control system of emergent software. The hard work of tomorrow's interactive design will be exploring the tolerance - that suspension of control - in ways that enlighten us, in ways that move beyond the insulting residue of princesses and magic spells." (Johnson 2001, 177)

One might deduct from the above quote that playing video games might end up being as much of a requisite for experiencing game art as understanding other art forms.

3. GAME ART: BETWEEN INTERACTIVE ART AND VIDEO GAMES

To explain why I think game art is at the intersection of interactive art and video games, I have drawn a diagram (Figure 3.1.) depicting game art's position within the context of art, games and interactive media. I put at the bottom left side of the triangle the category of art, representing visual contemporary art. At the bottom right side, the category of games, representing non-digital games. At the top edge of the triangle, I have put interactive media, representing digital media allowing for user-input. At the left, in-between art and interactive media we have interactive art, a category I will describe in detail in the next chapter. At the right side of the triangle, between games and interactive media, is the category of video games. Finally, in the middle of the triangle is what can be called game art, a combination of interactive art and video games. In the following sections I will compare these two categories in order to further define an approach to game art. I will focus on three elements that are essential to both of them: *interaction*, *outcome* and *interface*.

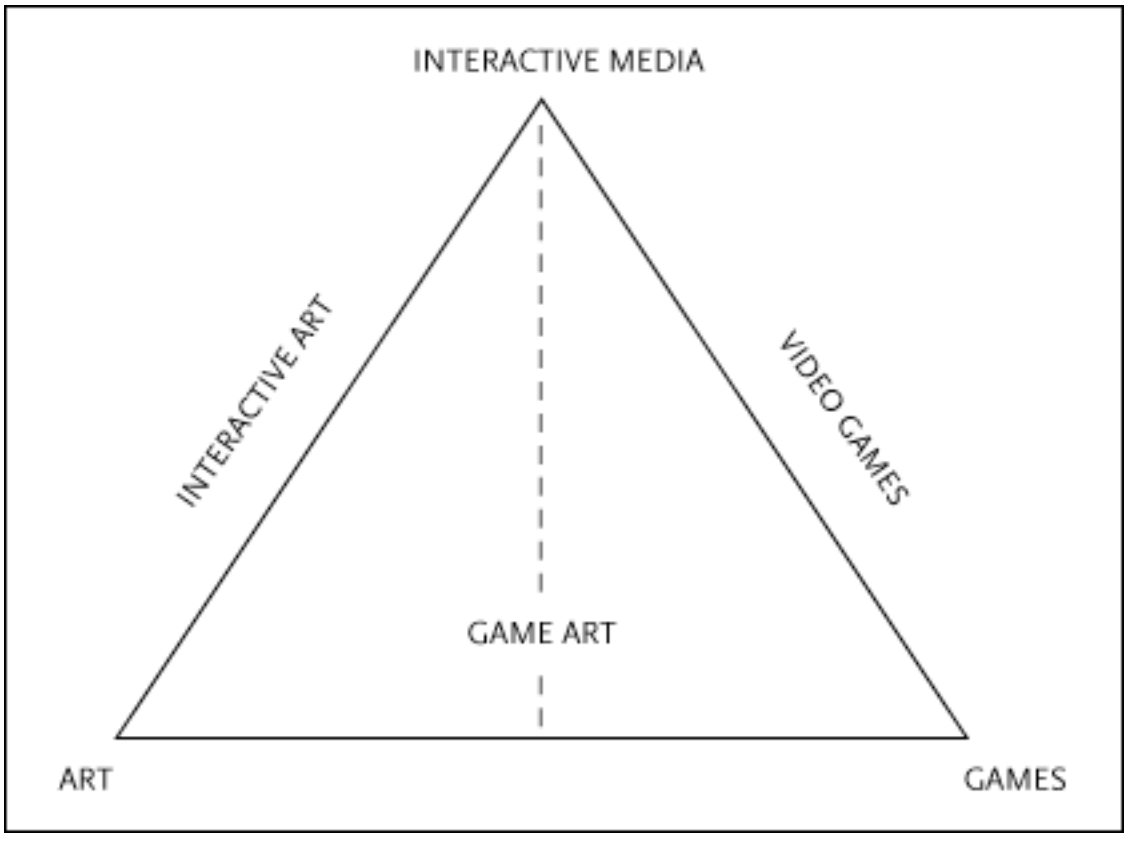

Figure 3.1

3.1 Interaction

What is interactivity? Because it is such an important element of games, a definition of interactivity by game theorists could probably apply also to other forms of interactivity like audience participation in cultural forms not related to games. In their essay "Game Design and Meaningful Play" (2005), Katie Salen and Eric Zimmerman divide the act of interaction into three separate modes:

- *Cognitive interactivity*, which deals with the "psychological, emotional and intellectual participation between a person and a system." (Salen, Zimmerman 2005, 70)

- *Functional interactivity*, namely describing the "functional, structural interactions with the material components of the system," (Salen, Zimmerman 2005, 70) be it real or virtual. This interaction is closely related to issues surrounding interface.

- *Explicit interactivity*, which the authors call interaction "in the obvious sense of the word." (Salen, Zimmerman 2005, 70) It basically covers all the choices that a user makes during interaction, including the physical act of interacting, pressing buttons, or shouting in a voice recognition system.

These three modes of interactivity, even though they were conceived within the context of games and video games, will be useful to help us better understand the idea of interactivity in installation art and interactive art.

3.1.1. Installation art

In her book *From Margin to Center: The Spaces of Installation Art* (1999), Julie H. Reiss gives the following definition of audience participation in installation art:

> "The essence of Installation art is spectator participation, but the definition of participation varies greatly from one artist to another, and even from one work to another by the same artist. Participation can mean offering the viewer specific activities. It can also mean demanding that the viewer walk through the space and simply confront what is there. Objects may fall directly in the viewer's path or become evident only through exploration of a space. In each of these situations, the viewer is required to complete the piece; the meaning evolves from the interaction between the two." (Julie H. Reiss 1999, 13)

If I compare this definition of participation in installation art with the three modes of interactivity, we can see a direct parallel in Reiss' description dividing participation in the viewer's actions (explicit interactivity), the role of physical objects in the space (functional interactivity) and the meaning evolving from the interaction between the piece and the audience (cognitive interactivity).

As we will see later with interactive art, in early installation art from the 1950s and '60s, the simple fact of bringing to the attention of the audience that they were part of the piece and that the piece needed them in order to be complete was often the only content and intent of the piece, a strategy close to Huhtamo's definition of *metacommentary*:

> "The term 'metacommentary' is used to refer to an art practice which continuously de-mythicises and de-automates prevailing discourses and applications of interactivity 'from the inside'." (Huhtamo 1995, 84)

Push and Pull: a Furniture Comedy for Hans Hofman (1963) is a work by Alan Kaprow, a New York-based artist who is considered one of the first installation artists, and whose early pieces were called *Environments*. In *Push and Pull*, the Environment consisted of two rooms where the audience was invited to move around pieces of furniture. This 'participatory' activity had no meaning in itself besides the physical act of moving things around, thus becoming aware of the space and the physical activity itself. Critics and audience alike soon acknowledged the highly subjective nature of installation art. The personal experience of participation was a key element at producing meaning.

> "A glance at reviews of exhibitions in traditional media in those same issues of Art News reveals the predominance of primarily objective descriptions. In the reviews of Environments, the approach switches to a subjective point of view. This demonstrates the potential for an Environmental situation to inspire the viewer to examine his or her own perceptions of and reactions to the situation." (Julie. H Reiss 1999, 33)

Robert Morris's *Untitled (Three L-Beams)* (1965) is an installation with three identical L-shaped sculptures positioned differently in a room. Since the pieces are identical except for their orientation, it is only by walking around them that one is able to experience their differences, thus bringing attention to the movements needed to do that. Even though there is no direct physical interaction between the objects and the viewer, there is an emphasis on body interaction; the movement of the user is what constructs meaning.

> "In a viewing situation, both the sameness of the forms and the awareness of their difference is experienced - simultaneously or sequentially. There is a time factor involved in this unveiling, and a participatory factor as the viewer confronts the objects. The individual's experience of the work and the questions the work might raise regarding the nature of art constitute participation." (Julie H. Reiss 1999, 51)

In Bruce Nauman's *Performance Area* (1969), the artist invites the viewer to traverse a long and narrow corridor between two wooden panels. When the viewer arrives in the corridor, the angle of the perspective is such that he cannot predict the exact width of the corridor and as this becomes increasingly narrow, it provokes in the viewer a strong sense of discomfort.

> "Nauman ran into definite trouble with New York audiences when he started showing austere, 'behaviorist' environments - a corridor so narrow it could be passed only sideways (...) Nervous urbanites found such work conductive less to mind expansion than to anxiety attack." (Julie H. Reiss 1999, 84)

This type of work emphasizes controlling and even manipulative aspects the artist has over the behavior of the viewers, an issue that will be even more predominant in interactive art as the interaction becomes more sophisticated.

These four elements, metacommentary, subjectivity of the viewers, body awareness and artist control are issues that will be pushed further in interactive art.

3.1.2. Interactive art

I refer to interactive art as the type of work that emerged during the 1970s and '80s when artists were increasingly experimenting with computer technology. Artists were interested in using the technology to pursue different aims than the scientific, academic and military institutions.

The first main application of computer technology by artists was to continue to push further the issues that were being investigated in installation art, namely the role of the audience in the work of art as well as the role of the author. Both of these issues lead to more sophisticated audience participation allowed by the interactive nature of computer technology.

The other main application was also influenced by the installation art of the 1950s and '60s, the idea of metacommentary, of using the work to question it's own materiality. The main difference in interactive art was that instead of questioning the gallery space or the museum, as artists like Michael Asher and Daniel Buren were doing at the time, interactive art turned towards questioning technology and its possible applications. It is the combination of these two approaches, audience interaction and metacommentary, that constitutes one of the main focuses of most early interactive art.

Before the advent of the World Wide Web in the early 1990s, interactive art consisted of an interface using custom hardware and software, usually build by the artist or by technicians under the supervision of the artist, and was experienced by the audience in public spaces, in galleries or media festivals. The audience interacted with the piece by operating or triggering a reaction through hardware and getting visual or audio feedback after the input had been processed by a computer.

More sophisticated interactions were made possible than with installation art and lead to important genres, such as exploration of virtual spaces and interaction with artificial life.

Pioneer interactive artist Myron Krueger's most influencial work is *VIDEOPLACE* (1974). In *VIDEOPLACE*, the visitor faces a projection screen. Another screen behind him is backlit in order to produce a high contrast image for a camera and allow a computer to distinguish the visitor from the background. The visitor's image is then digitized to create a silhouette and the system can then analyze its posture and movement, and it's relationship to other graphic elements projected on the screen. The system can then react to the movement of the visitor and create a series of reactions, either visual or auditory.

Krueger used the *VIDEOPLACE* framework to generate a series of interactive scenarios that could be experienced by visitors. One of them is called *CRITTER*, and involves a sophisticated interaction between the visitor and a visual representation of a small critter. The user sees his silhouette on the projection screen. The critter is also drawn next to the silhouette and reacts to the body movement of the user. *CRITTER*'s artificial intelligence helps it decipher the movements of the visitor and reacts accordingly. In his book *Artificial Reality II* (1991) Krueger gives a short description of *CRITTER*'s behavior:

> "*CRITTER*'s general behavior is to cavort with you, chasing your image around the screen. If you hold out a hand, *CRITTER* will float down and land on it. If you stand still, *CRITTER*'s ambition is to climb up your silhouette until it reaches the top of your head, where it does a jig on celebration. At other moments, *CRITTER* chases an open hand or dangles from an outstretched finger." (Kruger 1991, 46)

The importance of a work like *VIDEOPLACE* lies in its ability to offer unencumbered interaction to the users. To interact with *CRITTER*, users do not need to operate any hardware technology, they do not need to get familiar with any interface or symbolic software, all they need to do is move their body in reaction to what they see on the projected screen.

Jeffrey Shaw's *The Legible City* (1989) is another landmark work because it synthesizes very well a number of different themes common to interactive art. *The Legible City* is an installation consisting of a stationary bicycle positioned in front of a projection screen. By operating the bicycle the user can see on the screen through a first person perspective a representation of a city made out of block letters and navigate through it in real time. The letters representing the buildings form a text about the city that the user is able to read as he navigates through the streets.

One of the successful features of this work is the contrast between the intuitiveness of the interface (riding a bicycle) and the complexity of meaning as well as layering of different readings of the piece. Navigating the city allows users to take different routes and have different experiences each time they interact with the work. The familiarity of the interface means that users are immediately comfortable interacting and there is no learning curve or confusion as to what has to be done to interact with the piece.

Both *VIDEOPLACE* and *The Legible City* are successful interactive artworks because they offer a simple, intuitive interface that allows users to trigger more complex meaning. If we look back at our three modes of interaction, cognitive, functional and explicit, we see that both works offer a rich and varied interactive experience in all three modes. As we have seen with the installation work previously, here too a subjective experience is an important factor in the appreciation of the work. David Rokeby, a leading interactive artist writes in "Transforming Mirrors" (1996) on the importance of subjectivity in interactive art:

> "To some degree, the subjectivity of interpretation is the topic of these works. The artists allow the interactor to establish a personal identity in the context of the work; this identity is a reflection of the decisions that the interactor makes on their path through the possibilities presented. It is possible, and generally intended, that the interactor try out other possible identities, to explore alternate readings of the same structure." (Rokeby 1996)

Ironically, it is in their attempt to combine interface intuitiveness and metacommentary that these works are confronted with a paradox. The more intuitive the interface, the more transparent its mode of presentation, the less it is telling about its constituents. However, if the piece was not intuitive enough, it would run the risk of not being able to reveal all of its potential through interaction.

As Krueger writes in *Artificial Reality II*, there are two important steps in the interaction process, first attract the participant to interact with the piece, and then keep him interacting with the piece. These two steps are crucial to successful interaction with *VIDEOPLACE*:

> "It is important that participants understand the experience. They must know or be able to figure out how they are influencing events in the artificial reality. Times when they are confused about how they are participating or what they must do to proceed should be minimized, for such moments are never pleasant." (Krueger 1991, 96)

Some artists are in favor of a less transparent interface in order to emphasize the inner-workings of the technology, a trend I will come back to in more detail when I investigate the interface.

Interestingly, as much as these two steps create tensions in interactive art, they are fundamental elements of the design of games, as we shall see in the next section.

3.1.3. Video games

> "Playing games is a complex psychological engagement that blends creative exploration with narrative in a form of mediated communication that infuses young peoples engagements with participatory intensity." (Kline, Dyer-Witheford, de Peuter 2003, 18)

As I have shown previously with *Metroid Prime*, interaction in video games can be quite demanding and require the player to go through a steep learning curve. The authors of *Digital Play* (2003), Kline, Dyer-Witheford and De Peuter acknowledge that complexity yet they warn that one should not be fooled into believing that interaction in video games offers players complete freedom within a virtual world:

> "Choosing a corridor, character or weapon - a rail gun or a chainsaw in a *Quake* death match - can be very absorbing. But it is hardly a matter of radical openness or deep decision about the content of play. Though gamers navigate through virtual environments, their actions consist of selections (rather than choices) made between alternatives that have been anticipated by the game designers. Gaming choice usually remains a matter of tactical decisions executed within predefined scenarios whose strategic parameters are preordained by the designers."
> (Kline, Dyer-Witheford, de Peuter 2003, 19)

The authors of *Digital Play* argue that it is a marketing fallacy to advertise creative interactivity in video games when in fact gamers are ultimately subject to the control and decisions of the game designers. According to the authors, the main objective of game designers is to create an experience as seamless as possible where nothing disrupts the players from the virtual world in which they are immersed.

This means that video game design and interactive art have very different, even opposite, goals since there cannot be a focus on metacommentary if nothing can disrupt the illusion of a coherent, created world.

Nonetheless, as we have seen previously, even though interactive art's discourse is often about the interaction itself, it too has to conform to certain user-driven rules, such as having an appropriate hook to draw viewers into the interaction or a certain amount of intuitiveness to keep them interacting. These two elements can be nonetheless kept to a minimum in interactive art if the artist deems it necessary since there isn't always a need for complex interaction in order to make a piece successful.

In video games, however, having a hook and keeping players engaged is an essential part of creating successful game design. In their book *Rules of Play* (2003) Erik Zimmerman and Katie Salen consider these two steps the two core design elements necessary to achieve what they call *meaningful play*:

> "Beginning a game means entering into the magic circle. Players cross over this boundary to adopt the artificial behaviors and rituals of a game. During the game, the magic circle persists until the game concludes. Then the magic circle dissolves and players return to the ordinary world. These two actions, crossing into the magic circle as well as maintaining its existence, represent two of the chief challenges of designing meaningful play. The two actions require a carefully orchestrated double seduction. First, players are seduced into entering the magic circle of a game. Second, players are seduced into continuing to play."
> (Salen, Zimmerman 2004, 333)

In traditional games, entering the magic circle means accepting the rules of the games and playing according to them for the duration of the game. It also implies having knowledge of those rules beforehand. It is assumed that the average chess player, for instance, has at least an understanding of how each piece can and cannot move, if not a more advanced knowledge of the rules of opening, etc.

Steven Johnson, in his book *Everything Bad Is Good For You* (2005) argues that this requisite knowledge of the rules is not a given in video games. Johnson says that contrary to traditional games, video games are often started without any knowledge or skill and that these are built as the player goes along. He names this behavior *probing*:

> "Many of the rules - the identity of your ultimate goal - become apparent only through exploring the world. You literally learn by playing. This is one reason video games can be frustrating to the non-initiated. You sit down at the computer and say, 'What am I supposed to do?' The regular gamers in the room have to explain: ' You're supposed to figure out what you're supposed to do.'" (Johnson 2005, 42)

Having to probe the game in order to figure out what to do would go to a certain measure against the idea that the game offers a seamless world to interact with. If the players have to figure out the rules of the games, they are obviously thinking beyond the fantasy created for them and in a way taking a step back and considering how the game was put together, if not on a technical level, at least on a design level. This approach, if not directly considered a metacommentary about video games, shows that probing a game is not too far from the exploration required from the audience of an interactive art installation. Video game designers, even though concerned about limiting the state of confusion of players, are giving them enough leeway to figure out the game for themselves.

> "Probing the limits of the game physics is another oft-ignored facets of gaming culture. I suspect most hard-core gamers would acknowledge that part of the pleasure of their immersions comes from this kind of pursuit, (...) because there is something strangely satisfying about defining the edges of a simulation, learning what it's capable of and where it breaks down. (...) Video games force you to speculate about what's going on under the hood. If you don't' think about the underlying mechanics of the simulation you won't last very long in the game. You have to probe to progress." (Johnson 2005, 47)

The second step leading to what Zimmerman and Salen call meaningful play, which consists of keeping players in the magic circle, relates to giving them consistent feedback about the decisions they are making during gameplay. The authors of *Digital Play* call the decision of the player a 'selection', to underline that it doesn't really involve complex problem solving from the player. Johnson, however, calls this process *telescoping*. He argues that games in the past decade have become increasingly complex to the point that players have to constantly keep track of short-term goals and how these relate to longer-term goals:

> "I call the mental labor of managing all these simultaneous objectives 'telescoping' because of the way the objectives nest inside one another like a collapsed telescope. I like the term as well because part of this skill lies in focusing on immediate problems while still maintaining a long-distance view. You can't progress far in a game if you simply deal with the puzzles you stumble across; you have to coordinate them with the ultimate objectives on the horizon." (Johnson 2005, 54)

This concept of telescoping is very similar to what Zimmerman and Salen call the *micro* and *macro level* in a game:

> "The micro level represents the small, moment-to-moment choices a player is confronted with during a game. The macro level of choice represents the way in which these micro-choices join together like a chain to form a larger trajectory of experience."
> (Salen, Zimmerman 2004, 71)

As opposed to the previous step that Johnson called probing, namely to figure out the rules of the game, and which could be compared to a certain extent to making sense out of interactive art, telescoping does not really have a corollary in interactive art. Telescoping involves managing goals, making the right decisions in the game, and introduces one key difference with interactive art. The idea of direct consequences of

the choice one makes. Interactive art doesn't offer choices to its audience. Since there is usually no winning or losing in an interactive art setting, you can explore all the different possible behaviors without being penalized.

Managing effectively the micro and macro level in a game requires practice and a learning curve that is also absent from interactive art. The functional and explicit interaction in interactive art is usually straightforward even though the meaning of the action (the cognitive interaction) is not always explicit. In a video game the constant reward feedback will always tell the players how well they are doing and give them motivation to continue building up their skills. This reward feedback has often been described negatively by critics as a simplistic interaction pattern, meant only to fulfill gamers' desire for control and give them a false sense of mastery seen as irrelevant outside of the game world. Interactive artist David Rokeby warns fellow artists to be aware of the danger of the preconceived ideas about game-like interaction their audience could bring with them when experiencing interactive art.

> "For many people, interaction has come to mean 'control'. People look to interactive technology for 'empowerment', and such technologies can certainly give the interactor a strong sense of power. This is clearly the attraction of video games. (...) Interaction is about encounter rather than control. The interactive artist must counter the video-game-induced expectations that the interactor often brings to interaction." (Rokeby 1996)

What Rokeby overlooks in his analysis of video-game interaction is that more often then not, playing video games is not about control but about the lack of it. Playing video games gives you a heightened sense of vulnerability, of having to be constantly on your toes, on the look out to survive a hostile environment.

Even if control and mastery are the ultimate goals of a game, it is likely that the player will spend most of the game attempting to gain that mastery rather than exercising it. David Sudnow, an accomplished piano player devoted an entire book entitled *Pilgrim in the Microworld* (1983) to the task of gaining mastery of the early game *Breakout* (Atari 1976). His account shows that it is the process of acquiring the necessary skills to master the game that is at the core of video game play, and it is a process that can be painful:

> “If the minutes of my first screen clearing were among the tensest I’d ever known, this literally nightmarish bout at the machine was undoubtedly the most irritating learning experience of my life. These games sure provoke some heavy-duty feelings. I more than once came close to throwing the knob at the paddle and at times I seriously worried about my mental health.” (Sudnow 1983, 110)

Ultimately, what gamers are after is not to reach the end screen or get the highest score but to be able to get to a level of skill where they can play the game in an almost automated way, what Csikszentmihalyi calls *flow*:

> “First, the experience usually occurs when we confront tasks we have a chance of completing. Second, we must be able to concentrate on what we are doing. Third and fourth, the concentration is usually possible because the task undertaken has clear goals and provide immediate feedback. Fifth, one acts with a deep but effortless involvement that removes from awareness the worries and frustrations of everyday life. Sixth, enjoyable experiences allow people to exercise a sense of control over their actions. Seventh, concern for the self disappears, yet paradoxically the sense of self emerges stronger after the flow experience is over. Finally, the sense of the duration of time is altered; hours pass by like minutes, and minutes can stretch out to seem like hours.” (Csikszentmihalyi 1991, 49)

If reaching a state of flow is the ultimate goal of video game playing, it is definitely far from what most interactive artists set out to offer their audience with their work. Being immersed in a video game to the point where all the skills have been

internalized seems at odds with interactive art's goal to reflect upon the interactive process. On one hand, it can be said that interactive art offers a more open-ended experience, not giving the user the satisfaction of closure, and therefore allowing users to bring to the piece their own subjective interpretation. On the other hand, games can be seen as requiring from the player a significant commitment to building skills to reach that closure, and it is the process to gain that mastery that should be looked at as a valuable interactive experience and not the ultimate goal. Saving the princess is only an excuse, a pretext to play the game. Players ultimately develop a relationship with the game that is just as subjective as the experience of an interactive art piece, mainly because of the learning curve.

If interaction in gaming can be said to be just as sophisticated as interaction in interactive art, it could still be argued that once flow has been reached and the game has been mastered, there is not much left to ponder when the game is over. In the next section we will focus our attention on the different possible outcomes in games, game art and interactive art to see what the differences and similarities may be.

3.2. Outcome

> "**Quantifiable outcome:** Games have a quantifiable goal or outcome. At the conclusion of a game, a player has either won or lost or received some kind of numerical score. A quantifiable outcome is what usually distinguishes a game from less formal play activities."
> (Salen, Zimmerman 2004, 80)

Quantifiable outcome, according to Salen and Zimmerman, is what differentiates game from play. If a game's outcome can easily be defined, and indeed *must* be easily defined or else it is not considered a game, play's outcome is more ambiguous. If we consider the general outcome of art, 'quantifiable' cannot be used to qualify any parts of what an audience is being left with after experiencing a work of art. However, 'ambiguity' is an important element when evaluating the quality of the experience. Game theorist Jesper Juul warns against the pitfalls of oversimplifying the categories of art and games, yet for the sake of clarity sums it up as follows:

> "In a very simple view of art, art is what is ambiguous, whereas most games tend to have clear rules and goals." (Juul 2005, 20)

What often makes an artwork interesting is that it can be experienced again and again without ever exhausting itself through anything resembling *quantifiable outcome*. Where game offers closure, play and art offer ambiguity through open interpretation.

3.2.1. Play versus games

*_Arteroids_* (2002) is an online game art project developed by Jim Andrews borrowing the simple mechanics of the classic early shooter *Asteroids* (Atari 1979). In *_Arteroids_*, instead of operating a small rocket that shoots at rocks, the player is in control of a word and shoots at other words coming towards it. If the player successfully hits another word, that word explodes and scatters letters all over the screen. After a few successful hits, the screen gets littered with letters from different explosions. The idea behind *_Arteroids_* is that the positioning of random letters next to each other will permit players to read random words and thus create a sort of poem generated by gameplay. *_Arteroids_* offers two different modes of interaction, *game mode* and *play mode*. In game mode the player is confronted with increasingly faster

words coming towards its word/ship and has to shoot/avoid the other words in order to survive and generate poetry. In play mode, players are given a level of customization of the environment. They can choose the words they want to shoot in order to have a better control of the poetry they will create. They can also decide to be invulnerable and thus keep shooting at words even if the words collide with their word. For Andrews, it was important to add the play mode to the game as he felt that game mode was not giving the player enough creative control:

> "To some extent, *Arteroids* came to be about the differences and similarities between game and art, which find their intersection in the notion of play. When we play, we are creatively engaged in guiding processes. The processes themselves guide our activity, but we are also guiding the processes, perhaps adjusting them or departing from them in ways that make the play more meaningful to us." (Andrews 2004, 219)

For Andrews it was really important to offer players an opportunity to experience the project without the challenge and requisite skills that a game like *Asteroids* demands. Even though in game mode the player can reach a level of poetry as satisfying as in play mode, there is a key difference between the two modes. In game mode, the poetry has to be reached through a flow state, a state where conscious decisions are relegated to automatisms and reflexes, whereas in play mode, players can take their time, and slowly make decisions on the words they want to use and how they want to place their letters, even if both modes use the same basic *Asteroids*-like mechanism. Thus, Andrews assumes that for an interactive project to be able to offer an art-like experience, it is important that users do not fall into a flow-like state but retains all their intellectual decision-making capabilities. He emphasizes the importance of a *play* behavior versus a *game* behavior and believes that play is at the intersection of game and art.

In their book *The Study of Games* (1971), renowned game theorists Sutton-Smith and Avedon give useful examples to help distinguish play and game. The authors use an account by child behavior theorist Piaget, who describes a baby throwing his head back so that he can focus on a ceiling light:

> "He seemed to repeat the movement with ever-increasing enjoyment and ever-decreasing interest in the external result. He brought his head back to the upright position and then threw it back again time after time, laughing loudly." (Avedon, Sutton-Smith 1971, 5)

This example shows that even though the action is repeated in a similar manner, for a similar purpose, the goal is not really to accomplish anything but the action itself, the act can then be considered without a defined goal or quantifiable outcome. Based on this example Avedon and Sutton-Smith call this behavior *play* and define it as "an exercise of voluntary control systems" (Avedon, Sutton-Smith 1971, 6).

The authors then observe another baby, who is sitting in his mother's lap and who is grabbing one of her fingers. The mother pulls her finger away, and the baby tries to snatch it again. They continue this process repeatedly, the baby trying to grab the finger and the mother pulling it away. Avedon and Sutton-Smith call this behavior *playing a game*. The authors differentiate this behavior from the previous one in that this behavior has a goal on both sides, to capture or to prevent capturing the mother's finger by the baby whereas the other behavior was non-functional. The author derives the following definition of game based on this behavior, "An exercise of voluntary control systems in which there is an opposition between forces, confined by a procedure and rules in order to produce a disequilibrial outcome". (Avedon, Sutton-Smith 1971, 7). Their conclusion is that one of the main differences between games and play is based on the outcome of the behavior:

> "Games are repeatable because of their systematic pattern and their predictable outcomes. Play on the other hand is less systematic, and is open-ended with respect to the outcomes." (Avedon, Sutton-Smith 1971, 7)

Play being defined as an open-ended type of action, without a goal or purpose, is then closer to traditional art than games. Play would seem more likely to generate an experience which allows the audience to bring to the work their own interpretation, without being tightly constrained in a specific direction leading to a quantifiable outcome. This might be one of the reasons why interactive artists usually favor play over a game-like experience, an experience that would be too constraining and not open to layers of interpretation.

A good example of play in interactive art is the installation piece *Text Rain* (1999) by Camille Utterback and Romy Archituv. *Text Rain* has a similar setting to Myron Krueger's *VIDEOPLACE*. A projections screen shows users their shadow image along with animations of falling letters. Whenever a letter 'collides' with a shadow, they are stopped in their fall. Using this simple mechanism, users can move letters around and create words. The game has a similar aim as the *_Arteroids_* project, letting users combine letters to create words. This time though, instead of using a game engine, players can simply use their body movements. As we have seen with *CRITTER*, the interaction is simple and intuitive, yet allows users to experience a wide array of expressive playfulness. For Utterback, it is important that the piece offers a relaxing experience, distinct from a game-like interaction. It never requires participants to develop or learn a particular set of skills that would allow them to 'master' the interaction in the environment. In *Text Rain* if the letters fall past the participants, they do not get penalized. Likewise, if they succeed in creating a word, they do not get rewarded.

> "Using a video camera as an input device allows the letters in *Text Rain* to respond to a wide variety of human gestures and motions. There is no 'wrong' way to interact with the piece. Because most of one's body is visible in the virtual space of the screen as well as in the physical space in front of the screen, a pleasurable confusion results between the screen space and the real space." (Utterback 2004, 221)

So as we just saw initiating play instead of a game-like activity seems to be a more effective way to engage an audience in an interaction with a work that will lead to an open-ended outcome, the type of outcome that is closer to what one experiences when exposed to non-interactive forms of art. Nonetheless, if one's aim is to confront the essential elements that constitute a game, than those elements are not to be found in the type of open play described above.

3.2.2. Beyond mastery

The main issues of game-oriented interaction as described in the previous sections are not met in open play. A flow-like state is not likely to be reached as there is no need to learn skills, nor any risk-taking. However, these are exactly the type of interaction elements that should be studied if one wants to approach games on a metacommentary level.

Here is the paradox: if game art wants to reach a level of metacommentary, it needs to address the fundamental elements of game interaction, which cannot be addressed through open play, but have to be reached through an immersive, flow-like experience. However, the automated, immersive quality of a flow-like experience doesn't encourage an analytical, intellectual state of mind. One way that such a state of mind could be reached would be to go beyond flow, once the skills have been

mastered and internalized to a point where the brain can again deal with conscious interpretation.

In their book *Mind at Play: the psychology of video games* (1983), Geoffrey and Elisabeth Loftus compare the acquisition of video game skills to learning to touch-type. In the following excerpt they explain how skills shift from the cognitive to the motor part of the brain:

> "When you learn a motor skill, it is not under control of the motor system from the start. At first you spend a lot of time thinking about what you're doing. As learning progresses, it gets taken over to a greater degree by the motor system.
> This phenomenon is nicely illustrated when you learn to touch-type. After you have memorized the keyboard and fingering, you still have to take cognitive (conscious) steps of going to long-term memory to retrieve information about both the location of the key you want to strike and the finger responsible for it.
> Only then is the motor system summoned to perform the action. Gradually control is transferred from the cognitive to the motor system. In fact, the expert typist, unlike the beginner, is typically unable to quickly and accurately reproduce the keyboard any more. What the fingers have learned, the mind has forgotten." (Loftus 1983, 67)

Once players have shifted the skills needed to interact within the game from the cognitive to the motor part of their brain, they find themselves in an interactive exchange with the system where they can again start to question and explore the constituents of the game/artwork since they are not immersed anymore in a completely flow-like state.

This interactive exchange has a potential to generate an outcome that does not necessarily involve 'winning the game' but could lead to more open-ended, multi-layered outcomes.

The philosopher Bernard Suits, in his book *The Grasshopper: Games, Life and Utopia* (1978), gives a good example of the dilemma that can result when players are in complete command of a game and yet are not interested in winning. The following excerpt illustrates how a shift in outcome in a game opens up possibilities, generates confusion and unexpectedly brings into focus the constituents of gameplay:

> "Smith and Jones were the two remaining finalists in the celebrated Ming Cup Playoffs, and an enthusiastic group of fans had assembled to watch the match. Smith served, and the first game began. It bade fair to be an excellent match, as the ball flew back and forth between the contestants. But when, after five minutes, no point had been scored, the audience became restless, and some grumbling began to be heard. And after another five minutes it became clear that the players were not trying to score points against one another at all. They were simply trying to keep the ball in play.
> 'Come on, play the game!' was heard on all sides.
> 'We are,' Smith called back to the crowd.
> 'That's not ping-pong,' was the angry rejoinder.
> 'No, it's not,' put in Jones, 'It's a different game.'
> 'But how do you decide a winner?' cried another spectator.
> 'There is no winner in this game,' Smith answered.
> 'Then how do you tell when the game is over?'
> 'That's a good question,' was the breathless reply." (Suits 1978, 133-134)

Even if the players in Suits' story are not taking the game anywhere, the mere possibility that it could be taken somewhere different than its predictable outcome is revealing enough. This abrupt decision to let go of the intended goal is also something Sudnow ends up making at the end of his long exploration of *Breakout*. After spending weeks attempting to master the skills necessary to win at *Breakout*, Sudnow decides that once he doesn't have to think about gameplay strategies anymore, the game offers other ways of interacting that are just as, if not more, satisfying:

> "How do you sustain a single-minded competitive interest in these things when they hold a fascination far transcending the usual primary significance of a gaming field? (...) I'll improvise along and create these patterns, forgetting the 'ideal solution' with its constraints on free visual variation. Play with the forms instead." (Sudnow 1983, 195-198)

At this point it could be argued that it is not because there is a possibility for alternate interactions with the game that these interactions offer a deeper reading of the game or anything akin to what one can experience through a multi-layered interactive artwork. The simple fact that the user becomes aware of the game after mastering it is not comparable to an artwork designed to provoke a range of reactions meant to comment on the interaction. After all the designer of *Breakout* had not predicted that Sudnow would end up using the game to create visual patterns instead of attempting to clear the bricks from the screen.

What if game designers were actually conscious of the possibility of offering an alternative outcome to their games once they had been mastered? The game industry is known for its conservative attitude and for relying on sequels and established game characters in most of the games they make. Games also tend to be designed by people who do not aim to create an experience with mind-expanding potential. Moreover, since the industry still mostly sees its main audience as teenagers, it does not really feel the need to insert a deeper layer of meaning in games. Yet sometimes it happens that a mainstream game will come along and offer an experience in which suddenly the interaction with the game reveals an insight in gameplay that can be qualified to a certain extent as metacommentary.

Prince of Persia: The Sands of Time (TSOT) (Ubisoft 2003), a game designed for the PlayStation 2 (Sony 2000), is a single-player adventure game in which the player controls the Prince, an avatar in an over-the-shoulder mode in a 3D world. At fist glance the game looks like a typical platform game with running and jumping. The game is set in a dilapidated castle that the prince has to explore in a vein quite similar to the cult-classic *ICO* (Sony 2001). *TSOT* was designed by Jordan Mechner, who designed the original 2D *Prince of Persia* (1989) which became a classic because of its smooth animation created with the then unusual technique of rotoscoping.

It is the combination of two gameplay features that make *TSOT* different from the usual 3D platform game. Firstly, at any moment during the game the Prince has the power to rewind time whenever he feels that he is in danger and about to die. Rewinding the gameplay provides the player with an interesting view of his own actions as if he was part of a movie unfolding in real time. The second feature is a design decision where the actions of the avatar in the game are stripped to essentials. British video game magazine *Edge* explains it clearly in the following excerpt:

> "*The Sands of Time* is an astonishingly simple game, lean and economical. A ten-hour trip, it pulled the player along a single line. At a time when most games are fighting to boast about their replayability, branching narratives and ample unlockables, *TSOT* said simply: Begin at the beginning, Fight to the end. (...) The mechanics are equally stripped down. You are a prince with a sword, and you move through a world of water and sand. There is nothing to collect, no complex armoury to complete." (Edge 2005)

Once the player has mastered how to control the movements of the avatar, the game becomes more an observation of the deconstruction of the movements of the avatar, jumping, running and pushing obstacles. The combination of stripped down gameplay and the ability to rewind time invites the player to really focus on the actions performed by the avatar he controls and brings into focus the mechanics of animation and the behavior of the game character. Ultimately how all the avatar's

movements blend together takes central stage, putting the goal of winning the game in the background.

This idea of a game having a two-step momentum, first mastering the skills and then allowing for a more reflexive outcome, is illustrated in an even more convincing manner in *Vib-Ribbon* (NaNaOn-Sha 1999), where this time it seems that the game was really designed from the ground-up around this two-step concept.

Japanese musician Matsuura designed *Vib-Ribbon* for the original PlayStation (Sony 1995). The game has a stripped-down graphic presentation, with a sketch of a rabbit dancing on a line in front of a black background. The player controls Vib the rabbit which has to perform specific moves in order to progress on the line as it changes shape according to the background music. First the game consists of learning to press the right combination of buttons on the gamepad which corresponds to the movements the rabbit has to make in order to react to the different deformations of the line. These combinations start out fairly simply but quickly accelerate to the point at which the player has to have internalized them and to press the button without thinking to be able to keep up with the speed of the game. Once the player feels confident enough in his skills, he can insert any audio CDs in the console and play the game with different types of music or sounds. The game then allows the player to confront his skills with any type of musical background and not only shape the atmosphere to the game but the whole structure of gameplay. This type of integration of gameplay and music is different from a game that allows players to generate their own music or sounds. In *Vib-Ribbon* the player is not offered any real open play. In order to play the game and combine visuals with music he has to have mastered and internalized the basic movements of the rabbit, he can then eventually focus on enjoying the music and the visuals he generates according to that music.

I have focused so far on the role interaction and outcome play in interactive art and games. As we mentioned earlier, another important element that interactive art is concerned with is the underlying technology behind the work. It is time now to turn our attention to the interface and the role it plays in the experience of video games, interactive art and game art.

3.3. Interface

> "What exactly is an interface anyway? In its simplest sense, the word refers to software that shapes the interaction between the user and the computer. The interface serves as a kind of translator, mediating between two parties, making one sensible to the other."
> (Johnson 1997, 14)

This definition by Steven Johnson taken from his book *Interface Culture* (1997) of the interface between a computer and a user could as it stands easily be used to define the dashboard, stick shift and wheel one uses to operate a car or the remote control needed to flip television channels. Johnson is quick to add that what makes the interface of a computer different from the one from a car or television is its ability to represent itself:

> "For the magic of the digital revolution to take place, a computer must also represent itself to the user, in a language that the user understands. (...) More often than not, this representation takes the form of a metaphor." (Johnson 1997, 14-15)

The obvious metaphor that comes to mind is the desktop metaphor that has been adopted by almost all popular operating systems in the past twenty years. It consists

of two distinct elements: as software, the *graphical user interface* (GUI) that displays on a screen the data from the computer in the manner of files and folders as if the screen was showing a virtual desktop; as hardware, the mouse needed to interact with those files and folders, and the screen to output the information.

As the above example demonstrates, a computer interface usually consists of a combination of software and hardware, needed to process the input of the user and output the reaction from the computer. Since a computer processor is only able to process on and off states, or zeros and ones, the role of the software in an interface is to translate those zeros and ones into something that a human can understand. It basically acts as a translator from a machine language to a more human language. The closer the interface is to the machine side, the more expertise the user needs to operate the computer. The desktop metaphor, which was invented in the mid-1970s was directly responsible for the widespread popularity of the personal computer because it allowed people to use computers with a minimum learning curve.

Sherry Turkle, a sociologist interested in the psychological effects of computer use, studied a wide number of computer users in the late seventies when computers where starting to gain popularity among the general population. She divided computer users into three distinct groups: the hackers, the hobbyists and the users. This is how she differentiates them: the hacker is generally a "computer-virtuoso interested in taking large, complex computer systems and pushing them to their limits." (Turkle 1995, 31). The hobbyist "preferred to work close to the computer hardware" and "enjoyed the sense of nothing standing between themselves and the 'body' of the machine." (Turkle 1995, 32). Finally, the user "is involved with the machine in a hands-on way, but is not interested in the technology except as it enables the application". (Turkle 1995, 32)

Both the hacker and the hobbyist, each in their own ways, can be said to have a more intimate knowledge of the inner workings of the computer than the user.

> "Getting close to the bare machine makes them feel in touch with what is most 'pure' in the computer. They build a computer culture around a widely shared aesthetic of simplicity, intelligibility, control, and transparency." (Turkle 1984, 182)

This desire to understand the computer by hackers and hobbyists was sometimes linked to their professions as computer scientists but more often simply something they had as an end in itself, as a curiosity and a challenge to master a complex system.

3.3.1. Software art

If we use Turkle's categories and apply them to the field of interactive art, we see that there are different ways that artists approach the computer for different purposes leading to the following four categories: (1) artists who don't have advanced hardware or software skills and use third-party software like *Adobe Photoshop* to create digital artworks; (2) artists without advanced skills who use the help of computer specialists to assist them in creating custom interfaces; (3) artists with advanced skills who develop their own custom interfaces; and finally (4) artists with advanced skills who write code as the end result.

Media theorist Erkki Huhtamo, in his essay "WEB STALKER SEEK AARON" (2003) analyses this last category, the phenomenon of *software art*:

> "For the software purist, the creation of detailed immersive environments and elaborate multi-sensory interfaces is in itself an act of mystification. Works that involve the participants both bodily and emotionally seduce them, instead of making them aware of the true nature of the system, hidden 'behind the façade'." (Huhtamo 2003, 114)

As we have seen in the previous sections, one of the major aims of interactive art is to generate metacommentary showing to users what Huhtamo calls "the true nature of the system", as well as to comment on and bring forward the act of interaction. The tension that results from such a pursuit is the need for the artist to create an interface allowing users to interact with the artwork. If the interface is counter-intuitive, users will have trouble understanding the work. The whole challenge is to find the balance between showing the cracks and the inner working of the interface while at the same time offering an intuitive experience.

Joan Heemskerk and Dirk Paesmans, a couple working as a duo under the name Jodi were among the first artists to experiment with the interface of the World Wide Web in the mid-1990s and developed some of the best examples of the then emerging field of *net art*. Jodi's early work focused on deconstructing the interface of the browser by using early web design's building blocks, HTML and JavaScript, giving in the process an almost literal representation of software art's claim of showing what is 'hidden behind the façade'.

> "The duo created aggressively technical interfaces, ignoring coherent content in favor of desultory representations of code, protocols and operating system aesthetics turned inside out." (Greene 2004, 40)

Jodi's deconstruction of the web browser was very disorienting for users to the point of often preventing them from leaving their website by disabling the back button, resize and reload features of the browser. The only option left often was to quit the browser application altogether. Even if through the process of deconstructing the browser Jodi was preventing users from interacting intuitively with the software, and in fact this was exactly the artists' goal, users were not completely thrown aback because they did not need to learn the interface at the same time as it was being deconstructed. Because the interface Jodi was working with was not a custom interface with its own rules and metaphors but the standard interface of the browser, users interacting with Jodi's work were already familiar with the interface. Commenting on standard interface allowed the artists to push the deconstruction process way further than would have been possible with custom interfaces because they could afford the luxury of not having to teach their audience how to interact with the interface, thus avoiding the tension resulting from deconstructing an interface users were in the process of learning.

A few years later, Jodi became interested in the phenomenon of game modding by pursuing their deconstruction efforts using video games. The *mod* phenomenon began in the early 1990s with the release of the first FPS (First Person Shooter) games. Id Software, the game company at the origin of the FPS wave, with games like *Wolfenstein 3D* (1992), *Doom* (1993) and *Quake* (1996), started early on to provide with its games level editors that would allow the growing number of fans to create their own maps and level designs using Id's powerful game engine. The phenomenon of modifying commercial video games benefited from the parallel growth of the World Wide Web, allowing fans to promote online their original 'mods'. Artists decided to take advantage of these level editors for their own purposes, not necessarily to create a variation of the original game but to use the game as a deconstruction tool.

> "Jodi also 'deconstructed' the original *Castle Wolfenstein* in their online game *SOD* (1999), which replaces the representational elements of the game with black, white, and grey geometrical forms and creates a new architecture that challenges both orientation and navigation. The dysfunctional elements of jodi's game effectively expose and undermine Wolfenstein's paradigms of navigation and construction of space. *SOD* also exposes and demolishes the balance between the user's and the system's control, which is an essential element of any action game." (Paul 2003, 201)

With *SOD*, Jodi used a strategy similar to what they did with the web browser, preventing players from immersing themselves in the gameplay.

For Huhtamo, this process of modifying video games constitutes an effective strategy of deconstruction and metacommentary. It allows artists to use the game code itself to generate their work, thus bypassing and commenting on the immersive and automated interaction that the player usually ends up experiencing.

> "Immersion into rapidly changing and emotionally engaging gameworlds leaves little time for reflecting on the algorithmic basis of experience. For the gamer it is as if the system leaves only the phenomenological experience of the gameworld. The appearance of a phenomenon like game patch art is interesting in that it uses programming to directly address such mechanisms of identification." (Huhtamo 2003, 114)

There is one problem though with a project like *SOD* and with the idea of preventing players from immersing themselves in the game. Even though *SOD* is effective at showing the constitutive elements of the software behind the video game *Wolfenstein 3D* and abstracting those elements to a level that draws attention to the process of navigating and the structures behind 3D level design, it almost completely neglects the game fundamentals that are the purpose of the software. By preventing users from playing the game, they are not revealing more about what the game is really about. Because their strategy is metacommentary and brings forward hidden elements of software, it is important that they take into consideration what the software is meant to do in the first place. In their previous work centered around web browsers, they were preventing users from surfing the web, thus bringing attention to the act of surfing the web. Users became aware of the tools they needed to navigate once those became non-operational. They are using the same strategy for their work with video games, neglecting the core element of gameplay and focusing solely on the technological features. Consequently, if users cannot enter the magic circle and play the game, they are not learning anything about the game aspect of the video game, only about the formal aspect of software. This shortcoming seems to me the problem of any game art project that is neglecting the idea of gameplay and the necessity of putting the player in a state of flow.

3.3.2. Direct manipulation

> "Perhaps the most exciting, well-engineered - certainly the most successful - application of direct manipulation is in the world of video games." (Shneiderman 1983, 488)

When users want to find information through a search-engine such as *Google*, they are presented in their web browser with a search field where they can enter keywords relevant to their search. Once they have entered the keywords, they presse 'return' and wait for *Google* to search through a database and return with results. This type of interaction consists of two steps, one typing an input and then receiving a result. These two steps are very clearly separated by the act of pressing the 'return' key. Conversely, if the user decides to resize the window of his browser, he will drag one of the corners by pressing the button of his mouse and moving it in a given direction. This action with the mouse is instantly translated on the screen with the browser

window being resized. In the first case, users feel that they have to ask the computer to do something for them. In the second case they are under the illusion that they can act directly upon the graphical interface. This second type of interaction is called *direct manipulation*.

In *Interface Culture*, Johnson notes an interesting paradox in direct manipulation:

> "In reality, the graphic interface had added another layer separating the user from his or her information. But the tactile immediacy of the illusion made it seem as though the information was now closer at hand, rather than farther away. You felt as though you were doing something directly with your data, rather than telling the computer to do it for you." (Johnson 1997, 21)

Both interactive art and video games though have been on the forefront of direct manipulation since their earliest beginnings. Myron Krueger's work from the late 1960s and early '70s, such as *VIDEOPLACE*, by using camera vision, was relying directly on body interaction and direct manipulation. The very first video game, *Tennis For Two* (1958), developed by Willy Higinbotham was also relying on direct feedback.

> "Featuring a blip of electronic light, this revolutionary tennis simulation was using trajectory paths on an analog computer. The team also added two control boxes, each with a knob to control the ball - likely the first implementation of a 'joystick' in an interactive game." (Burnham 2001, 28)

It seems then that direct manipulation is an important feature of interfaces both in interactive art and video games and should be worthy of investigation as a key element in all three fields of interactive art, video games and game art.

The following three examples demonstrate the importance of direct manipulation in these three fields, not simply as a side feature but as the main element of investigation:

In *Tekken Torture Tournament (TTT)* (2001) by the Los Angeles collective C-Level, based on the popular PlayStation fighting game *Tekken* (Namco 1995), two players experience carefully dosed electric shocks as punishment each time the characters they are controlling get punched or kicked by their opponents. The idea behind this project is simple: to create a close identification between players and the avatars they are controlling by giving a strong physical feedback every time their avatar gets hit. *TTT* demonstrates brilliantly how it is possible to create a metacommentary about video gameplay while having players immersed in a game. The focus of the metacommentary in *TTT* is based squarely on direct manipulation and brings forward the psychological consequences behind the reward/penalization system inherent to the video game fighting genre.

Interaction in video games has never been limited to the sole use of joysticks as input device. There have been attempts to push direct manipulation closer to a situation in which the physical action of the player is identical to the virtual action on the screen. One of the most successful and popular instances of such an attempt is the Japanese game *Dance Dance Revolution (DDR)* (Konami 2001). In *DDR*, players use their feet to press on sensors as means of input device. Because the game's goal is to trigger sensors following the correct musical rhythm provided by the computer, when players hit the sensors they feel as if they were 'dancing' to the music. There is a complete symbiosis between the action players need to perform to meet the goal of the game (hitting the sensor at the right time) and the action their avatar is performing within the on-screen game environment (dancing).

As we have seen from previous examples, camera vision is a popular technique used to provide interaction in interactive art projects. Projects like *VIDEOPLACE* from Myron Krueger and *Text Rain* from Camille Utterback and Romy Archituv provide the user with a playful and intuitive mode of interaction. With the piece *Wooden Mirror* (1999), the artist Daniel Rozin uses computer vision to explore the tensions between the immediacy and artificiality of direct manipulation. *Wooden Mirror* consists of a grid of wooden tiles connected to a video camera. The camera captures the image of the user and rotates the tiles to an angle that changes their color so that when seen from a distance the grid reflects an image of the user as if the wooden grid was a mirror.

> "*Wooden Mirror* is a comment on digital artifacts and interfaces - a comment on how computer applications reveal information and reflect their users and the process of production. The textured surface of *Wooden Mirror*, which responds so playfully to our movements, help us to understand the conventional computer screen as both a window and a mirror." (Bolter, Gromala 2003, 34)

Wooden Mirror shows the potential of camera vision technology to create effective means of reflecting on direct manipulation.

These three examples demonstrate the importance of direct manipulation as a research topic when exploring the intersections of interactive art, video games and game art. In the next section, I will give a detailed description of my interactive installation *MOVE*, and explain how I drew inspiration from projects such as *TTT*, *DDR* and *Wooden Mirror* in an attempt to further question the act of direct manipulation.

4. MOVE

> "A number of game designers have reminded me that Shigeru Miyamoto, whom many regard as the medium's first real master, designs his games around verbs, that is, around the actions that the game enables players to perform." (Jenkins 2005, 176)

MOVE is an interactive installation attempting to deconstruct direct manipulation in a game context using camera vision as an interface. In order to analyze direct manipulation, the piece focuses on the actions and gestures that players perform during gameplay.

The first thing I considered was the nature of the difference between the actions of a player when compared to the actions of the on-screen avatar.

4.1. Concept

As mentioned earlier, a game like *Prince of Persia: The Sands of Time* allows the player to understand the different actions of the avatar during gameplay thanks to the possibility of rewinding game time. The ability to repeat actions during gameplay at will reveals the way the character moves and acts and dissociates those actions from their objectives. What's interesting in this feature is that through the repetition of actions and by focusing on these actions the player gradually becomes aware of the process that leads to a state of flow, a state of immersion. As an example, if the player is guiding the avatar through a series of complicated jumps and suddenly fails to reach the next platform and falls into a ravine, he can then stop the game, rewind it and restart the same complicated series of movements. He will then repeat an automated action and stop it before 'dying' to start over. In another game, the player would simply miss the platform and 'die', whereas here if he fails he can 'rewind' his action at will. This repetition of action and gestures seems to be a valuable strategy for deconstructing gameplay without disrupting the player's state of immersion.

Because *TSOT* is a console game where players control avatars through the use of a gamepad, observations of avatar behavior are limited to what users see on the screen as results of pressing buttons on the controller. The same button can be used in different contexts, both to jump and to crouch, but there is no mimetic correlation between the physical act of pushing a button and the representation of the avatar jumping over a ravine.

In a game like *Dance Dance Revolution*, however, players get a closer relationship between their actions and the avatar dancing on the screen, allowing for greater identification and deconstruction of movements. If I wanted to deconstruct the relationship between player and avatar behavior, developing a system that would allow players to experience bodily interaction would be an effective approach. As we have seen, there is also a history of interactive art works that use the body as input device, such as *VIDEOPLACE, Text Rain* and *Wooden Mirror*.

Jonah Warren's MFA thesis, *Unencumbered Full Body Interaction in Video Games* (2003), is a detailed description of what Warren calls *gamelets*, mini-games that explore direct manipulation through bodily interaction using a camera vision setup. Warren believes that the video game industry in the past decades has focused most of its energy in pursuing realism through increasingly sophisticated graphics and physics at the expense of developing alternatives to the joystick as ways to interact

with video games. Warren believes that using the body as input device has a potential to offer a rich and varied mean of interaction.

> "Perhaps the most important advantage of computer vision games is that their interactive vocabulary is not as limited to a small predefined set of actions. The only limitation of action is that which can be performed by the human body and be recognized by the computer. If utilized effectively in a game context, this larger vocabulary of possible action can allow the user more creativity to come up with different interactive solutions to game problems." (Jonah 2003, 31)

Jonah's gamelets follow the setup of *VIDEOPLACE* and *Text Rain*, in that the player sees a projected image of his silhouette and by moving his body allows the image to interact with animated graphics on the projected screen.

This 'mirror-like' setup, even though offering direct manipulation, is still in a certain sense making use of an avatar. Even if the avatar here is not an animated character that the player controls remotely, the player's silhouette performs the function of the avatar since he needs to look at the positioning of his silhouette in relation to the graphical elements in order to interact successfully.

I was interested in pushing direct manipulation further and creating a setup where the player would interact in a more direct way with the graphical elements, without providing a silhouette to the player, and where his actions would directly affect the gameplay, thus bringing him closer to a situation where the distinction between player and avatar would be blurred.

Steward Woods, in his online essay *Loading the Dice: The Challenge of Serious Video games* (2004) talks about pre-digital simulation games in the early 1970s and their potential to address 'serious' issues such as social commentary.

> "It is apparent that educational game designers of the time had begun to see the potential of simulation games as a facilitator of social change, resulting in powerful games that generated significant 'holistic' understandings of dynamic systems and relationships. Furthermore, some of these games had demonstrated how effectively the format of a game might not only train people, but assist them in thinking critically about the culture and society in which they lived. Such games can be broadly termed social-system simulation games." (Woods 2004)

According to Woods, what distinguishes simulation games from mainstream digital games is the lack of make-believe scenarios where players embrace the role of a fictional character.

> "The relationship of player to game is primarily one wherein the engagement comes from the personal experience of the game, not from identification with an onscreen avatar. Since the player is always an active participant in the game, it can be inferred that she is less likely to project attitudes onto an avatar if such an avatar does not exist – where there is no physical onscreen representation of the player (Rouse 2001, Gard 2000). (...) If then, players cannot project attitudes onto their own avatars or characters, it is their personal interaction with the game world (...) that might provide the basis for constructing the game experience." (Woods 2004)

Woods is suggesting constructing a setup where the player is engaged directly with the interaction without the intermediary of an avatar in order to emphasize the focus on his action. Because the player is not looking at the avatar performing actions (like in *TSOT*) but enacting the action, his sense of identification is altered and his awareness of interaction does not go through a two-step interaction, first acting and then seeing the result of the screen, but through a more direct one-step interaction.

In order to avoid a mirror-like setup, *MOVE* uses a camera vision setup where both the camera and projector are located on the ceiling, facing top down. The player is standing on top of the projection and interacts with the graphics projected on the floor.

After establishing that the player would be acting directly using body gestures, the next step was to decide on the type of games she would play. The idea was that in order to deconstruct the actions of the player during gameplay, isolating each action and designing a game around a given action would help focus on the fundamentals of direct manipulation. Instead of designing one game that would have a number of different actions to perform, I decided to design a number of 'mini-games', or modules, that would each be designed around the verb that describe the single action the player would have to perform during gameplay. Nintendo's popular WarioWare franchise was an important inspiration behind *MOVE*'s concept.

WarioWare Inc.: Mega MicroGame$ (Nintendo 2003) for the Nintendo's handheld console Game Boy Advance (GBA) (2001), was released to great critical acclaim. *WarioWare*'s critical success resides in its highly unusual gameplay. The player is confronted with a succession of mini-games, each lasting no longer than 10 seconds, in which the player has to accomplish one specific task in the time allotted. Each game appears in a random order and the challenge consists of finding out in a split second what the task will be and then executing it. *WarioWare* has about 200 different mini-games, which are unlocked as the game progresses.

A variation of *WarioWare* was released a year later for the GBA. The *WarioWare Twisted!* (2004) cartridge has a built-in compass-like sensor that detects when the console is being rotated. A similar series of mini-games have to be performed but instead of pressing buttons, the rotation of the console serves as input device. *WarioWare Twisted!* is a great example of a game combining direct manipulation with isolated actions based on verbs working as an addictive, fast-paced game and at the same time providing a deconstruction and metacomentary of gameplay.

> "'It's easy to say that *WarioWare* is about breaking all the rules of game design', counters Abe, 'but it's not about destroying all the existing rules at all. It's about going back to the basics of the rules which used to apply to all video games. It may be a small, silly-looking game, but these are the fundamental rules of all games. For each mini-game we spent all our energy making it the best expression of every fundamental rule." (Edge 2005)

Despite its experimental design, *WarioWare* is a handheld game targeted towards a young audience and is built around the traditional framework of what Zimmerman and Salen call the micro and macro level. Players only have 10 seconds or less to complete each mini-game (micro level). Completing them leads to the next mini-game. Successfully completing a given number of mini-games in a level unlocks the next level. Completing all the levels is the ulterior goal of the game (macro level). Because each game has to be completed in less than 10 seconds, the designers at Nintendo gave their games a strong representational imagery so that players could identify the task ahead at a glance and have a chance to complete it in time.

Contrary to *WarioWare, MOVE* does not have the constrains of a commercial video game, thereby allowing me to forgo of the macro level, designing instead each module independently from the others, with no ulterior goal beyond individual interaction with each module. Also, I did not include a time limit, and therefore did not need a representational imagery to hook the player in a split-second. I decided instead to design a non-representational game environment, in order to prevent the players from projecting themselves within a fantasy world.

In *MOVE*, each module offers an interaction with abstracted shapes (circles, rectangles) behaving according to simplified rules of physics (collision, friction). These abstract shapes and simple physics refer to the design of early video games from the 1970s, when the limitation of the technology prohibited game designers from adding a higher level of representational detail in the games. Because the graphics were so limited, designers had to focus more on the quality of gameplay to attract players to their games. This focus on gameplay is why early games are still so popular today and retain their 'classic' value. Early video games defined a vocabulary that is still at the essence of most games today. Behind the hood of flashy graphics often lies a gameplay in a lot of ways similar to those early abstract games. Using abstract shapes and simple physics is therefore a way to get to the essence of video gameplay, go against the current tendency in mainstream video game design of focusing on realistic graphics and instead emphasize interaction over representation.

4.2. Description of the installation

MOVE is an interactive installation divided into six distinct modules, *JUMP*, *AVOID*, *CHASE*, *THROW*, *HIDE* and *COLLECT*. Each module focuses on a single-user interaction, based on a verb corresponding to the action the participant is invited to perform. Each verb corresponds to a common procedure acted out by avatars during video game play. Each module offers an interaction with abstracted shapes (circles, rectangles) behaving according to simplified rules of physics (collision, friction). Each module is color-coded with consistency, where the color red is used for the graphical element that poses the core challenge. Each module increases in difficulty in a similar linear manner, either by accelerating the speed of the opposing graphical element (*JUMP*, *AVOID*, *CHASE*, *COLLECT*), or increasing its size (*HIDE*, *THROW*).

MOVE requires a darkened room in a gallery-type setting. When visitors approach the installation, they see a projection on the floor. The projection displays *MOVE*'s 'menu', which consists of an animation that alternatively shows one of the geometrically distinct shape representing each of the modules. Each shape is 3x2 feet and fades in slowly until it reaches a middle-tone grey color, pauses for a second, and then fades out, replaced by the next module. The menu keeps animating until a visitor walks on top of the projected shape. As soon as the presence of the participant standing above the projection is detected, the shape extends to its full size (10x8 feet), turns to solid white, the other graphical elements required for the interaction appear and the interaction with the module can start. The interaction lasts as long as the participant is able to prevent collision with the opposing graphical element. If the participant loses, a distinct sound, common to all the modules, signals the end of the game, the graphical elements disappear, the shape turns from white to red, decreases back to its menu size, and the menu animation starts again, displaying the next module.

Interaction with one module does not affect in any way interaction with the other modules. There is no scoring system, and no progression from one module to the next. Since there is no way of winning, or beating the system, there is no reward except for the amount of time one is able to sustain interaction with a given module.

4.3. Technical description

MOVE uses a camera vision detection system as an interface. A black and white surveillance camera is rigged up on the ceiling of the gallery facing downward. The camera is connected to a computer, which is connected to a projector. The projector is installed on the ceiling horizontally and has a mirror in front of it at a 45-degree angle. The image is reflected from the projector on to the mirror and projected on the floor of the gallery at a 90-degree angle. An infrared light installed on the ceiling filters the light coming from the projector so that the camera does not capture the projected image but only the image of the participant.

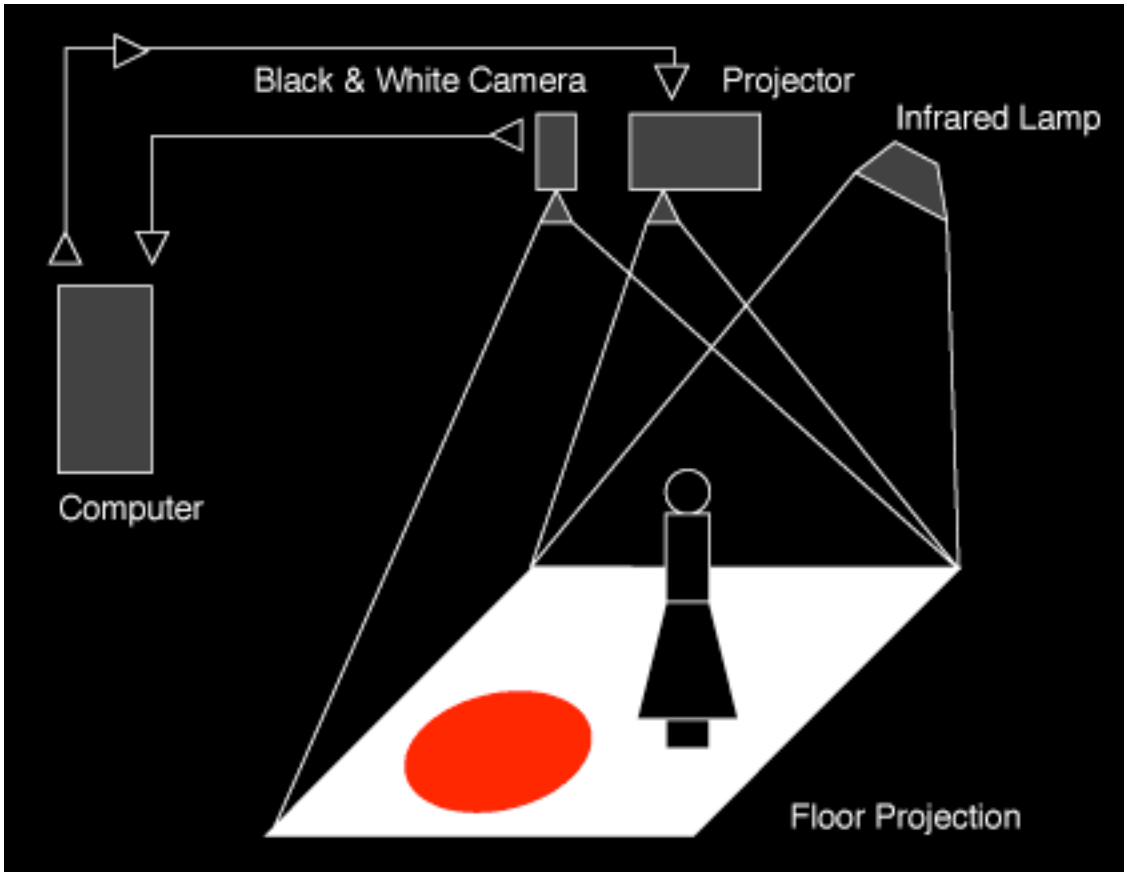

Figure 7.1: diagram of the MOVE installation

When a participant is standing above the projection, the camera vision script from the software application compares the video data it receives from the camera with a snapshot of video data taken when nobody was above the projection. The script compares the data and assumes that the color differences between the two frames correspond to the presence of a participant. That information is then processed through other algorithms that locate the center of the shape corresponding to the body of the participant as well as the length and the width of that shape. These coordinates (x and y on a 2 dimensional plane) are then run through collision detection scripts and allow for interaction between the participant and the graphical animated shapes displayed on the projected image.

The development of the software application for *MOVE* was a three-step process. In the first step, the code for the different modules was written in Java using *Processing*, a programming environment allowing for rapid prototyping specifically created for graphical applications and developed by Casey Reas and Ben Fry. I wrote the *MOVE* modules in collaboration with my assistant on the project Togo Kida. In the second step, once the modules had been tested, we rewrote the code in C++, using the OpenGL graphics library and the OpenAL sound library. This second step was necessary to insure that the application would run at a sufficiently high frame rate. Both Tatsuya Saito and Osman Khan provided me with some sample code for the camera vision libraries and algorithms. The third-step of development consisted of testing the module with the installed hardware to improve on the gameplay and correct possible new bugs.

4.4. Description of each module

4.4.1. JUMP

JUMP consists of three rectangles of 2x10 feet each evenly positioned with a small 1/2-foot gap between them. The rectangles are red, and smaller, 2x3 feet grey-colored rectangles move back and forth along them. The participant is required to jump from one rectangle/platform to the next. Each time he lands on one of them, the platform turns to white and stops moving. It then slowly fades and the participant has to jump on another platform before the previous platform fades completely. After each successful jump, the platforms fade a little faster, thereby forcing the participant to jump from platform to platform faster and faster. If the platform fades completely before the participant manages to land on the next platform, the game ends.

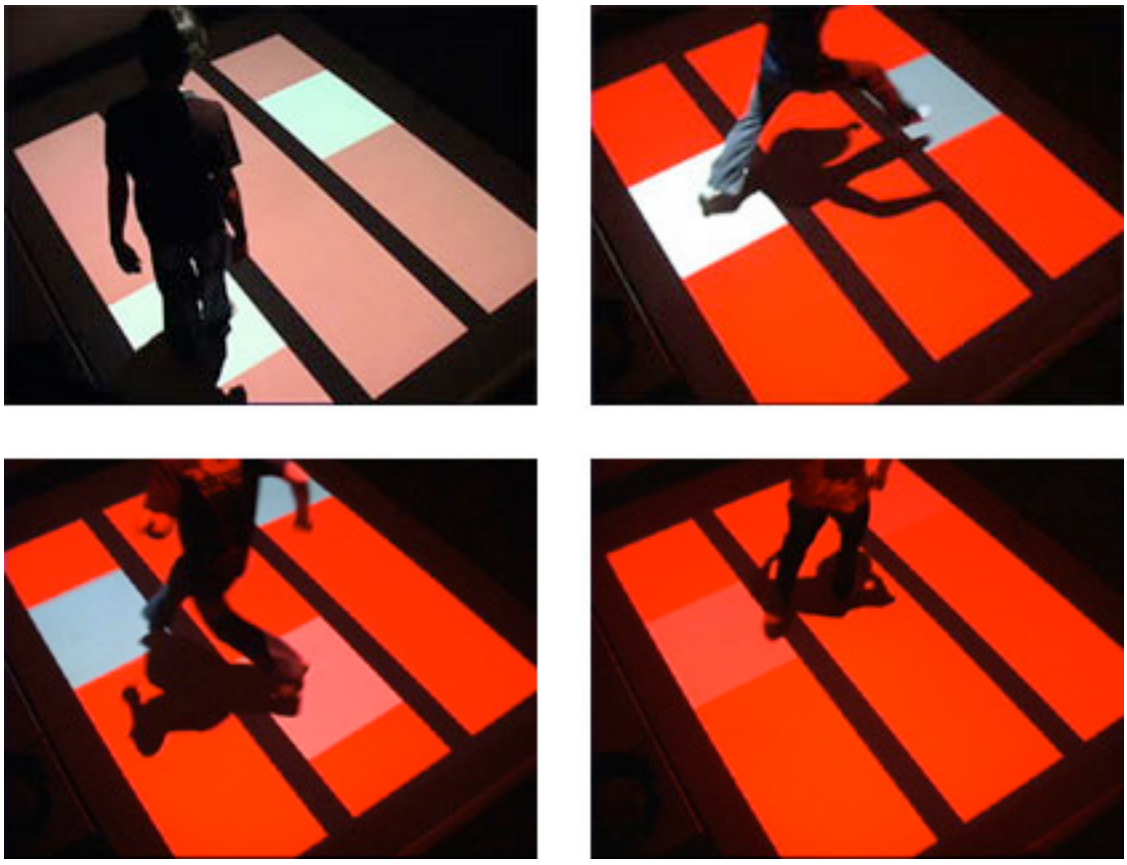

Figure 4.2: JUMP

4.4.2. AVOID

The shape in *AVOID* consists of a circle of 8x8 feet. When the participant steps into *AVOID* a grey-colored circle of 1 foot in radius positions itself underneath him. Around that small circle gravitate a number of increasingly bigger grey-colored rings. Whenever the participant moves within *AVOID*, the small circle repositions itself underneath the visitor. A small red circle (particle) is also within *AVOID* and moves at a constant speed rebounding against the borders of *AVOID*. If it hits the outer ring surrounding the participant, that ring disappears and the particle's speed increases. If the participant manages to avoid the particle for a given time, a new outer ring appears back around him. If all the rings are removed and the particle hits the central circle underneath the player, the game ends.

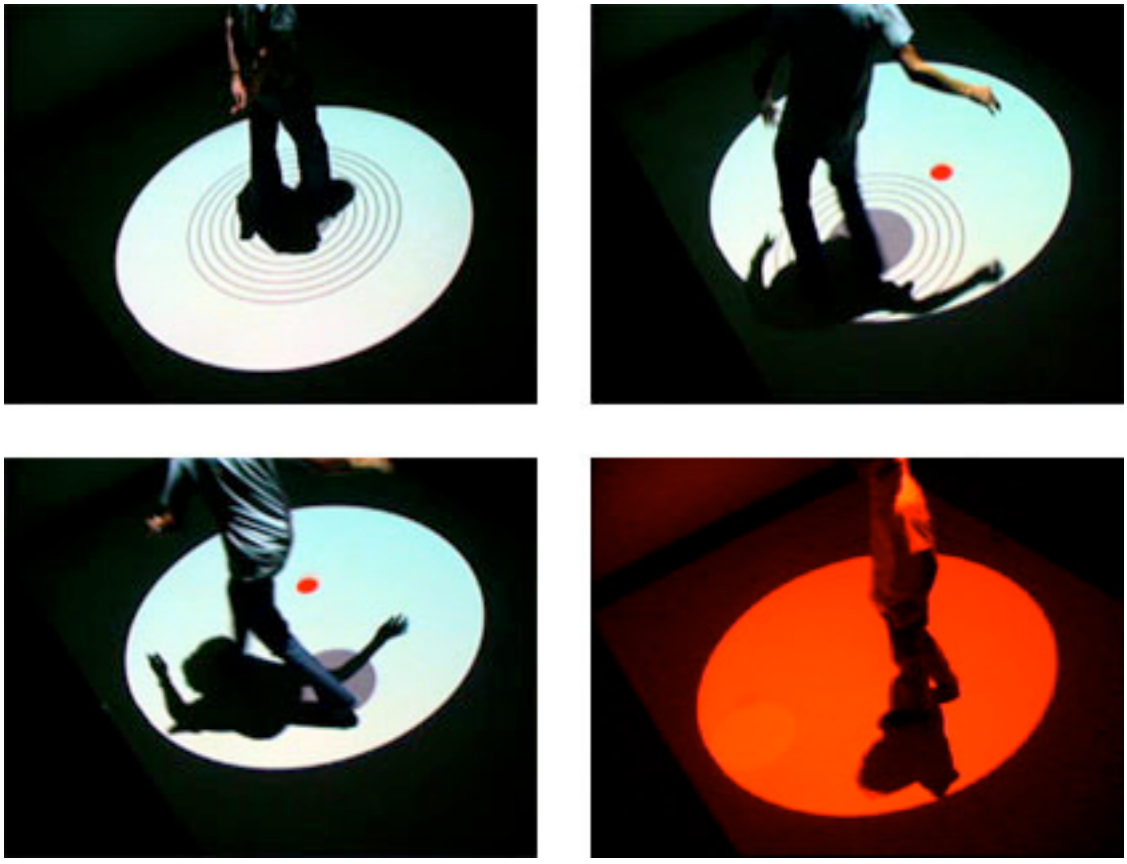

Figure 4.3: AVOID

4.4.3. CHASE

In *CHASE*, the participant finds himself in a circuit-like shape, a rectangle with rounded corners and a hollow center. Underneath the participant appears a grey colored circle with a radius of 1 foot. As the participant moves around the circuit, the circle follows him and repositions itself underneath him. In the circuit, there is another red-colored circle identical in size. The red circle is drawn towards the grey circle, and the participant has to prevent them from colliding. Since both circles are constrained to follow the shape of the circuit, the participant has to follow the path the grey circle takes and move around the circuit. The red circle always follows the shorter distance to the grey circle, and changes direction abruptly each time the shorter distance means going the other way. Each time it changes direction, its speed increases. If the red circle collides with the grey circle, the game ends.

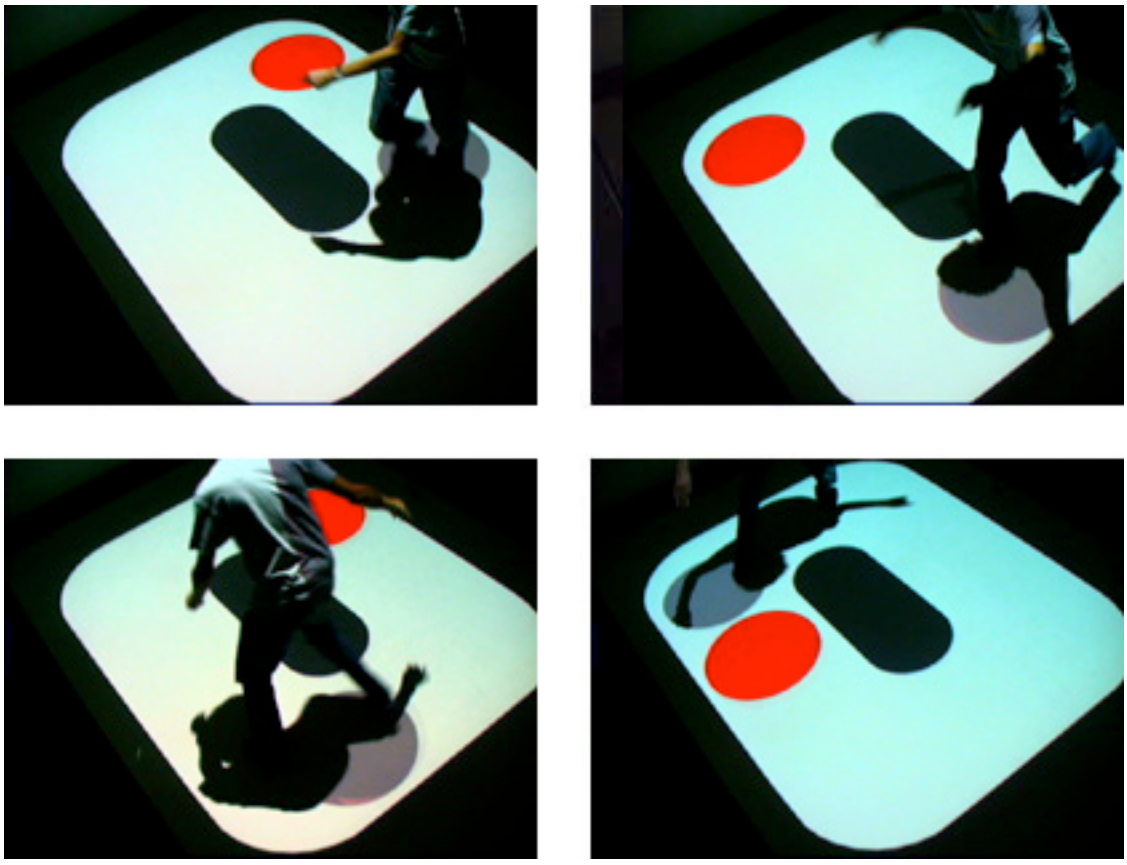

Figure 4.4: CHASE

4.4.4. THROW

THROW has a trapezoid shape. A small grey particle rebounds inside the shape and has a grey line going from the center of the particle to the center of the participant's current position. The particle does not have a constant speed but is subject to friction. If the participant spreads his arms, the particle accelerates towards him. If the visitor brings his arms back along his body the particle inverts its direction and decelerates. Starting at the narrower side of the trapezoid, a red-colored shape matching the shape of the trapezoid slowly increases in size growing towards the participant. The participant can push back the red shape by directing the particle against it. Each time the particle hits it, the red shape expands a little faster. If the red shape touches the shadow of the participant, the game ends.

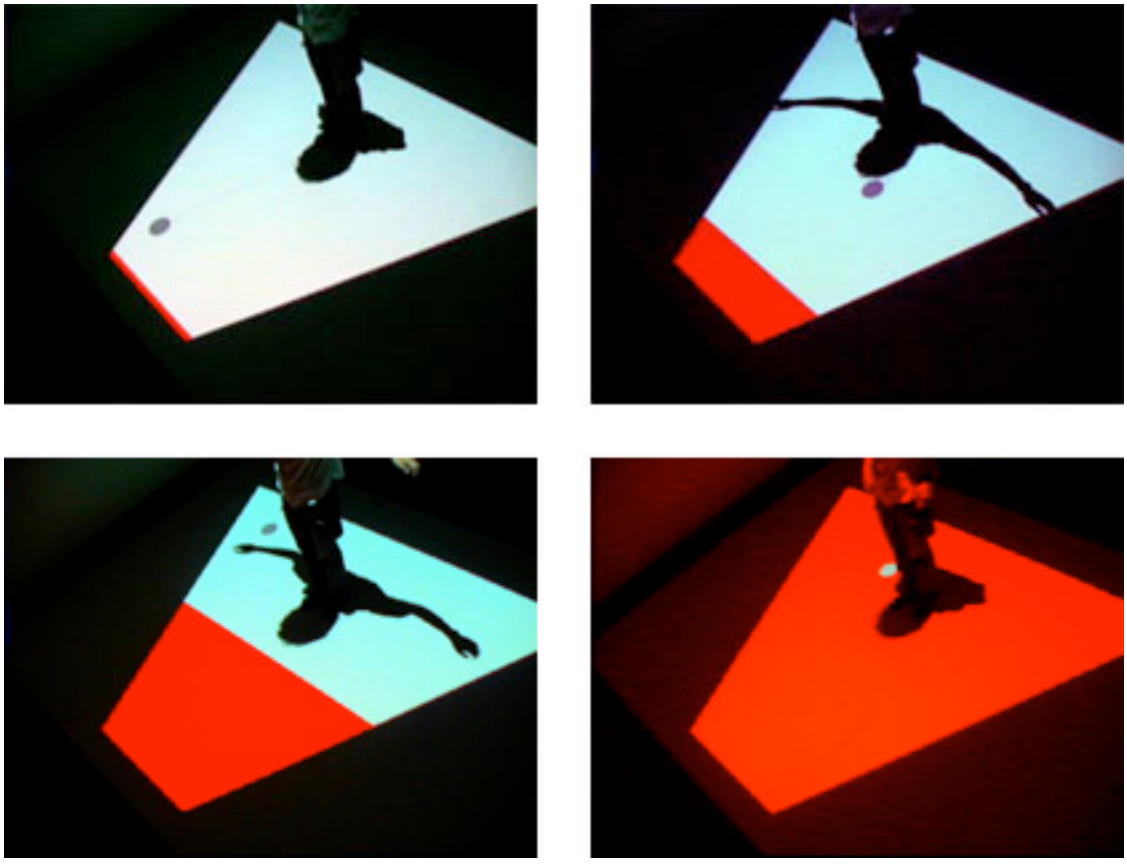

Figure 4.5: THROW

4.4.5. HIDE

In *HIDE*, the participant finds himself in a rectangle shape. A small grey-colored circle follows him. Another red-colored circle is in the rectangle moving in a non-linear and unpredictable fashion, sometimes disappearing at the edge of the rectangle and reappearing later at a different place. As the participant moves around the rectangle, attempting to prevent the grey circle from being hit by the red circle, the red circle grows in size emitting a hissing noise. If the participant stands still, the grey circle underneath him fades away and the red circle shrinks gradually back to a smaller size. As the participant attempts to stand still in order to shrink the red circle, he is constantly force to move to a different 'hiding' position, thereby having the red circle grow back again in size. If the red circle hits the grey circle, the game ends.

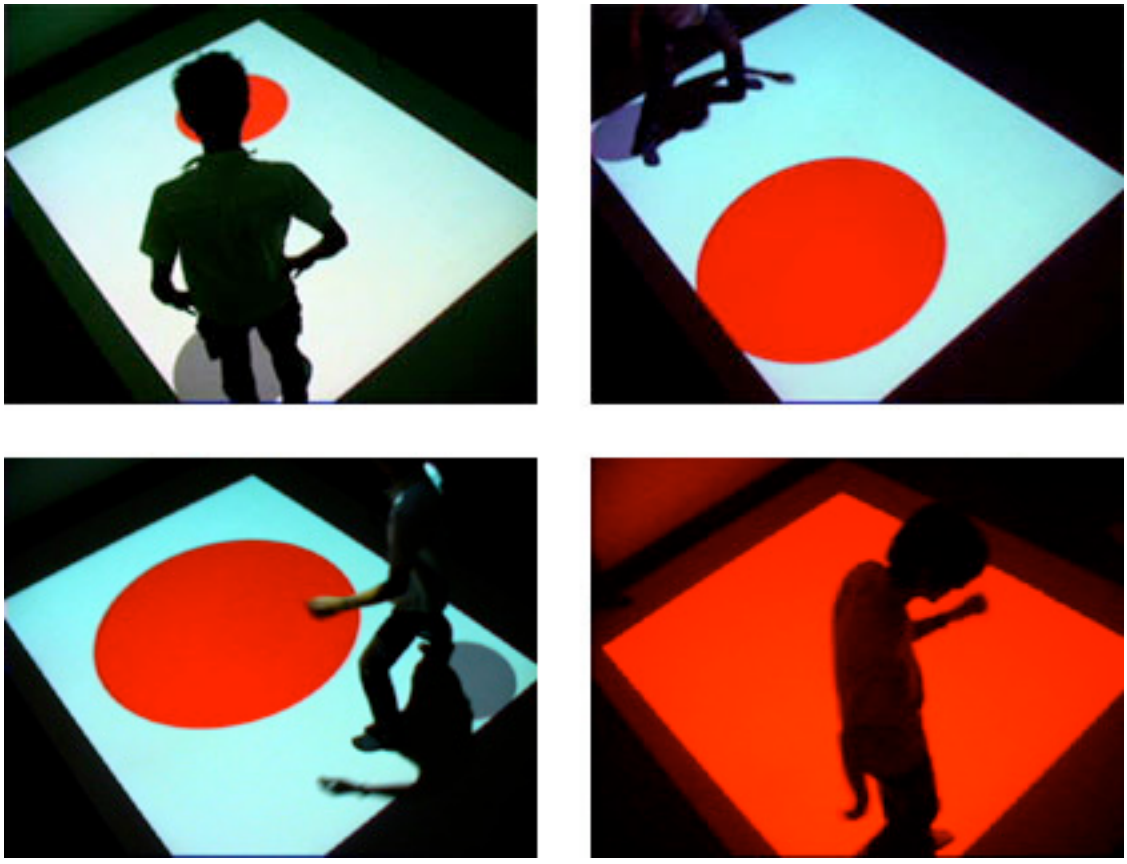

Figure 4.6: HIDE

4.4.6. COLLECT

In *COLLECT* the participant is standing in the middle of a small grey-colored octagonal shape (base) located in the center of a full-sized octagonal shape. From all sides of the bigger octagonal shape, red colored particles move towards the base on which the participant is standing. If the red particle hits the base, the game ends. To prevent it, the participant has to extend his arm above the red particle, triggering the animation of a grey colored bat shape that rotates around the center of *COLLECT* and follows the position of the participant's arm. If the bat hits the particle, the particle turns to grey and stops when hitting the outer edges of the base. Particles come from all directions and gradually increase in speed. When a red particle hits one of the grey particles accumulated around the base, both the red and the grey particle disappear. By hitting the particles with the bat, the visitor prevents the red particle from hitting his base and also 'collects' particles in order to build a protective shield around the base.

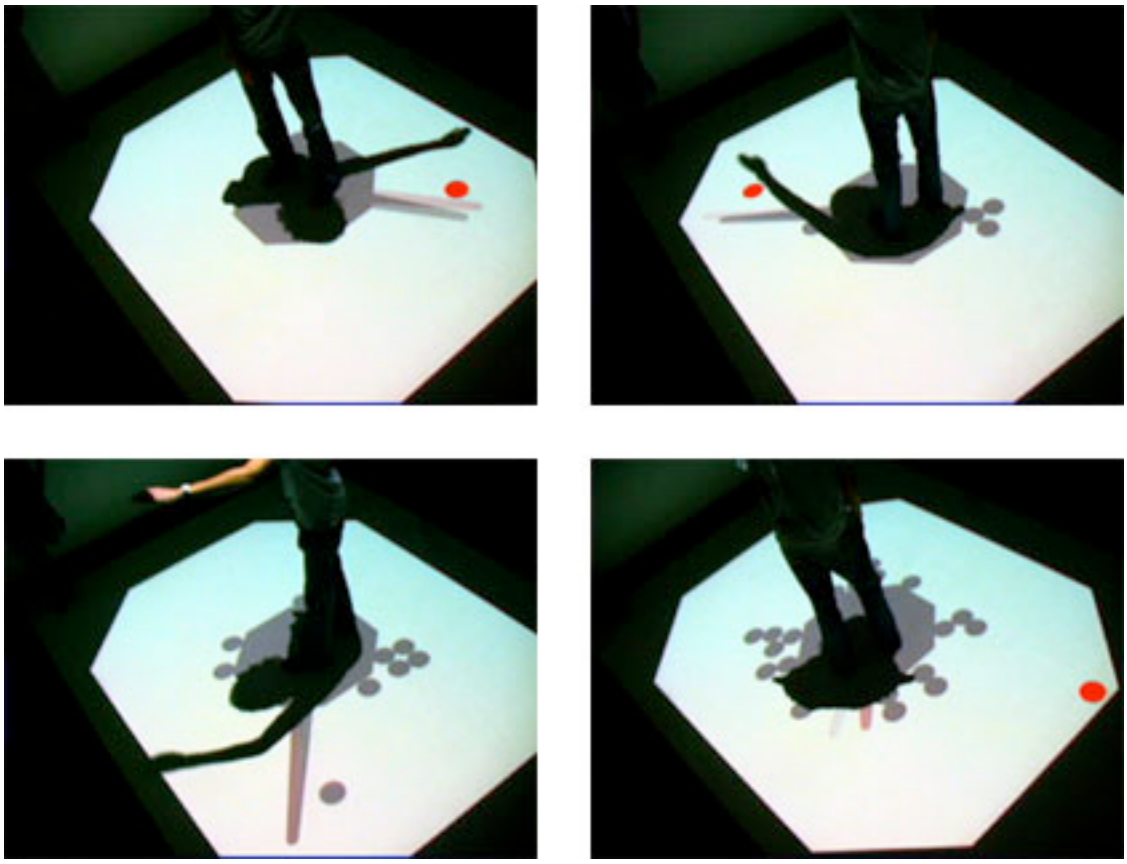

Figure 4.7: COLLECT

4.5. Playtime

In the summer of 2005, while *MOVE* was in development at UCLA, I asked high-school students to experience the installation. I brought groups of four students over to the installation room and gave them a short demonstration of each module. At the time, only three modules were ready, *JUMP*, *AVOID* and *CHASE*. After my demonstration, I invited the students to try out *MOVE*.

My assumption before showing the project was that most probably these teenagers, who were used to playing modern 3D video games would probably not appreciate the minimal aesthetics of *MOVE*. Since they grew up in the 1990s when video game graphics were becoming increasingly photorealistic, I assumed that they would expect a project referring to video games to display more representational imagery than simple geometrical shapes. As it turned out, they reacted positively to the abstract quality of *MOVE* and some students made references to early video games such as *Pong* (Atari 1972), mentioning the importance of gameplay over sophisticated imagery.

The initial reaction of the students was mixed. Some of them hesitated to interact with the installation in front of their comrades; others felt more at ease and wanted to try out the modules immediately.

Once all four students of a given group had tried out one module each, they started taking turns at trying the other modules. I thought their interest would stop there, but instead almost all of them were eager to go back and try out the modules repeatedly, attempting to last as long as possible before the modules would turn red. The students enjoyed the performative aspect of the project, cheering and laughing when their colleague would manage to last longer then expected.

In one instance, a group of teenagers, after having tried out the modules extensively, started displaying alternate behavior with the piece, to see how the system would react if they were not playing the game by the rules. For example when a student would be interacting, another one would walk in the play area to see which one of them would be detected by the camera, the game becoming suddenly more about testing the limits of the system then simply following the rules. In another case, a student stepped outside the area of *AVOID* and was only using his hand to direct the grey circle. He started shaking his hand and the grey circle followed his motions, trembling slightly. He then explained to us that the circle was afraid and that's why it was shaking. Despite the non-representational shapes in the installation, this student had anthropomorphized the circle through alternate behavior.

This behavior was generally the opposite of how an older audience reacted to the installation. When I would show the project to fellow graduate students or professors, some of them would display a more analytical approach, trying out the piece once and when realizing that the interaction was challenging, usually giving up, preferring to stay on the side and watching me demonstrate the modules, asking technical or design-related questions. Even though I was expecting them to have a more critical eye, I realized that they were also having a harder time letting go of certain inhibitions and trying to enjoy the playful qualities of the piece. They were seeing the piece as a construction, and I could feel a reluctance to try and learn to adapt to a system that offered a certain challenge. Contrary to the teenagers who saw an opportunity to have fun, they might have felt that the interaction with the system was too controlling, even manipulative.

5. CONCLUSIONS

5.1 Conclusion

The intention of this thesis was to demonstrate the need for an examination of the user experience in video game play using the setting and methods of interactive art. I argued that the experience of playing video games, although using similar computer technologies, differs fundamentally from the experience of interaction with other forms of digital media. Based on Huhtamo's definition of metacommentary, interactive art's strategy of reflecting upon interaction itself, my thesis was that one of game art's central focuses should be the investigation of the video game play experience.

As game theorist Jesper Juul comments, "one idea states that the all-important quality factor of a game is its *gameplay*, the pure interactivity of the game." (Juul 2005, 19) Taking gameplay as the core element to be deconstructed in game art, I proceeded to analyze in detail the user experience in both interactive art and video games and see if the methods and strategies of metacommentary found in successful interactive artworks could be applied to the deconstruction of gameplay.

I decided to focus on three core elements of the user experience found in both interactive art and video games: *interaction*, *outcome* and *interface*.

- *Interaction*: By comparing interaction in interactive art and video games we have seen that both experiences often required the user to figure out how to interact with the work and go through a process of *probing*, either because in the case of interactive art the artist was aiming at making the piece counter-intuitive in order to reveal the inner-workings of interaction, or in the case of video games, because the player had to figure out the rules of the game as it unfolded. The comparison also showed that contrary to interactive art, interaction in video games often challenged, penalized or rewarded players for their actions.

- *Outcome*: By successively describing the outcome in the respective fields of art, games and play, I have shown that both art and play have a tendency to give their audience/player a sense of ambiguity whereas games usually lead to what Salen and Zimmerman qualify as *quantifiable outcome*, giving the player a sense of closure by only offering the options of winning or losing. If, for this reason, media artists have usually favored the free-form structure of play when creating interactive art, I stressed that game art had to confront the seemingly opposite types of outcome of art and game if it were to attempt a deconstruction of gameplay.

- *Interface*: In writing software art, media artists have attempted to reveal the inner-workings of computer interfaces, going behind metaphors such as the familiar desktop interface. I argued that this strategy of deconstruction, when applied to video games is stripping the experience of game play to the detriment of focusing on the technological underpinnings of the video game, thereby missing the core element of gameplay. I suggested that game art could instead adopt a different deconstructive strategy by approaching the game interface through direct manipulation, emphasizing the role of the user's body and bringing video gaming closer to a physical experience.

As a side project to this paper, I developed an interactive installation entitled *MOVE* which attempts a deconstruction of video game play through direct manipulation. *MOVE* is an installation using computer vision and full body interaction allowing a participant to experience six different types of actions usually performed by avatars in video games. *MOVE* relies on four strategies in its attempt to comment on video games through its interactive art setting:

1. The participant interacts using body motions and gestures detected by camera vision, encouraging direct manipulation.

2. *MOVE* is divided into six distinct modules or mini-games, each providing a separate experience and varying in their range of intuitiveness. The rules of a module such as *CHASE* will be fairly easy to figure out, whereas the unintuitive body gestures of *THROW* will ask for more probing from the participant.

3. Because *MOVE*'s graphical elements are non-representational they do not allow for a projection in a fictional space. The combination of abstracted shapes and direct manipulation reinforces the participant's focus on the action itself - jump, avoid, chase, throw, hide or collect - instead of an ulterior goal.

4. The participants become the avatars, unlike traditional video games or other computer vision works they do not see a representation of themselves or an indirect result of their actions on a separate screen but instead interact directly with the projected graphical constituents of the game.

Because *MOVE* is attempting to recreate and reflect upon a video game play experience within a physical environment setting, there is a fine line between the instructions on how to interact with the installation and the concepts behind video game play that it tries to uncover. This fine line can become a source of confusion for an audience not prepared to deal with the inherent contradictions of interaction outcome and interface found in interactive art and video games,. Learning to walk on this line might be one of the key challenges awaiting artists attempting to create convincing game art projects.

5.2 Future directions

On September 15, 2005 at the Tokyo Game Show, Nintendo president Saturo Iwata unveiled the new controller for their upcoming next-generation video game console. There had been much speculation in the past six months about this controller after Nintendo announced that the main reason their next console was code-named *Revolution* was because of its revolutionary controller. It turns out that the controller is truly different. Instead of relying on the traditional design requiring the player to hold the controller with two hands and operate it through a combination of pressing buttons and pushing analog sticks, the new controller operates like a wireless television remote control. Thanks to built-in sensor technology, the player can move the controller around and mimic the movements of avatars on-screen, therefore getting closer to direct manipulation. Iwata argues that by offering a more intuitive controller, Nintendo is targeting the non-gaming audience which is intimidated by the complexity of more traditional controllers.

The reaction from the press was mixed, some critics thinking that the device was too experimental to be convincing. One must not forget that Nintendo is at the origin of the modern controller, the two-handed gamepad, introduced 20 years ago with its FamiCom (1983) console and replacing the then-ubiquitous joystick. Even if it is difficult to predict the impact this new controller will have on the gaming industry in the long run, it is a bold movement by a company that is seen as trying to distance itself from the ever-increasing conservative pursuit of photorealistic representation of the game industry by pursuing instead an unorthodox strategy towards intuitive gameplay.

If this new type of video game controller ends up becoming the norm in the years to come, it would demonstrate that getting closer to direct manipulation could become an important direction in interactive entertainment. What would be the implications of such a trend?

Media artist and theorist Simon Penny considers the effects of direct manipulation on users as an important, underestimated issue in interactive media theory:

> "The embodied, enacted dimension of interactive entertainment has not been adequately considered. In particular, embodied interaction with a representation, where bodily action changes the representation in a way which is analogous to, and is designed to be analogous to, human action in the world of physical objects and forces, raises scenarios which conventional critiques of representation, and those aspects of art theory that remain influenced by traditional psychology of visual perception, are not well equipped to deal with"
> (Penny 2004, 73)

Penny relates video game play to a form of training, comparing the repetition of actions in video games to any form of body training, from yoga to sports to military training. For Penny, video games are a form of simulation, and the actions one learns by playing have a direct repercussion on the player's behavior in everyday life. The debate around the effects of video game play on behaviors, especially when related to violence, is still unresolved, with no proof that there is a link between playing violent video games and displaying violent behavior. Nonetheless, if mainstream video games adopt an interface allowing for more direct manipulation, the gap between what the player does with his controller and what the avatar acts out on the screen will get closer and closer. As direct manipulation with more bodily interaction becomes the norm, there will be a growing need to reveal and deconstruct the complex interaction involved in video game play.

Using the actual form of the game itself instead of commenting on it with a different media might ultimately be the most effective strategy. Game theorist Joost Raessens believes that, contrary to the film medium, game is an ideal vector for deconstruction strategies.

> "To me, computer games are possibly more able than avant-garde films to make this deconstruction happen, and thereby more able to realize the emancipating functioning that is connected to it in an aesthetic and political sense. (...) One could consider this the ultimate revenge of low culture computer games against high culture avant-garde films."
> (Raessens 2005, 378)

According to Raessens the participatory quality of games has a strong potential to encourage a deconstructive approach, even though in practice the overwhelming majority of games are designed with an escapist agenda, and the video game audience is mostly looking at games for entertainment. In the end, one of game art's most relevant objectives might be to comment on the constantly evolving and ever-complex human-computer interaction of video games.

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