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## Game Mechanics for the "Magic Circle"

[transcript] Media Studies

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# Introduction

*Beat Suter, Mela Kocher and René Bauer*

What would the world be without rules? Would it be totally chaotic and anarchic or simply free and unbound or even boring and uninteresting? The question is rather pointless, because there is no world without rules. For the purpose of play, there are worlds that have rules and create their own rules. Subjects who enter these worlds are immediately confronted with these rules or laws (of physics). It starts with gravitation and motion – the gravitational force on the moon, for example, differs from that on earth and therefore offers different types of motion. In a fictitious world the designer defines these (basic) forces according to the needs of the world that is being developed. It continues with the topography of the landscape, its obstacles, its textures and objects, the different possibilities of movement and transportation, nutrition, shelter and so on – the rules of nature. And then, within a set of laws of physics, there are worlds whose complex rules have been created and recorded by many generations of living beings, and all who live in the catchment area of these rules (e.g. a country) sign a social contract (Rousseau 1762) and must abide by its rules – the artificial rules (of law). Of course, small parts of these rules can be changed again, but only through institutionalized processes that usually take some time. Life according to these rules seems like a playful simulation. The frame is fixed. The course of life is foreseen. However, the world of rules can always be interpreted – to a certain degree. As an (inter-) active agent in this system we can explore how far we will go to gain benefits, or we can use the rules to cooperate better with others or support them in their goals. It may also happen that we become exasperated with the rules and their strict interpretation and struggle to maintain our life simulation. Or perhaps we do not like the rules and fight them in all possible (and impossible) ways.

Once we have sounded out how to gain advantages, we can easily bend the rules. We may use the loopholes in the control system and dismiss difficult employees, or even add an additional system such as bribery and favoritism, in order to gain greater economic success and more power. The mechanics of the control system include numerous small gears, and usually work excellently for those who control the machinery. As long as we stay within the parameters of the system and use its weaknesses and, to use the above example, dismiss employees (in accordance with existing labor laws), nothing can happen to us. But as soon as we introduce an additional system such as bribery, it becomes a little trickier. This may necessitate further game mechanics: namely that of hiding and (not) being discovered. And when we are discovered, there may be the need for yet another game mechanism: that of denial and distraction. From here on, that is where things starts getting interesting for any fictitious or not so fictitious world, as we are confronted with the decisive question: who is really in control of the control system?

Games are such control systems, developed by game designers by means of motivation design. They come with virtual physical rules and artificial laws and (in-game) rules – a framework for play. The system itself is especially motivating for the player. The players may even "sign" a social contract when they commit to playing the game and to its quests. As a simple control system it represents a challenge that offers opportunities for action and events, and it also evaluates them. Assessing and evaluating means matching the rules and allocating rewards or punishment. Punishment may be harsh and could mean death of the avatar. Reward may be small and encourage more action. Each game is a unique construction that is integrated into its own structure by execution, acceptance of the rules and (if digital) processing on a computer. It becomes the actual game by enclosing the player in its "Magic Circle", a symbolic space of play (Huizinga 1938). This space of play is a world of its own, in which different rules apply to those in the real world. And this new "fictitious" world uses different motivational structures that are genre- and addressee-dependent.

## WHY DO WE PLAY GAMES?

Why do we play games and why do we play them with computers? This book takes a closer look at the core of each game, the motivational system that is the game mechanics. Generally, games are control circuits that organize the game world (according to a special social contract) with their (joint) players and establish motivations in an own space, a "Magic Circle" or a (new) game world. In this self-sufficient circle, arena or playground, players interact with each other, with NPCs and with (rigid and dynamic) objects according to the action, outcome and consequence principle. And "Game Mechanics" are constructs of sets of rules designed for these interactions of players, NPCs and different mobile and immobile objects that provide gameplay. Those rules are the basis for all the excitement and frustration we experience in games.

## GAME MECHANICS

In a videogame, game mechanics mean: jump, climb, dodge, reach, collect, fly or shoot. This is what you do as a player or let your avatar do. These "actions of play" are the core of any game: analog game, augmented game or video game. As a player you have a set of actions – special rules with conditions depending on the player – available at any time to progress through the game space. This might be a limited field like the pitch of a ball game, a linear A to B level of a platformer or an extended fictitious world like a GTA map. Your activities are crucial; they let you discover this new space, its possibilities and restrictions. You hit the ball and see where it goes; you jump and land, fall down somewhere and find out how far your jump can get you. You drive like a berserker and find out that this has consequences. You make use of the actions that you have available and get to know the rules and mechanics of the game, the laws of physics (of this particular game), the restraints and the dominant social behavior. And this gives you a better feeling for your gameplay.

This is the player's perspective. For the player, the basic gameplay defines the game. (The player's activities are central to the game.) The developer knows that a structured gameplay is necessary for the player. Thus, when the developer chooses and implements the mechanics in terms of actions like jump, shoot a ball or drive, they become structured with parameters and with rule sets. A whole system is developed in this way: the ball is not allowed to get out of bounds. The player avatar can only reach the other side of the gap with a supporting object like a spring. And the driver is not allowed to injure pedestrians or run several red lights; should that happen, police cars will start a chase. In the fictitious game world, you can easily try this out. There are also always limits to the game space you can explore at any one time. The playing field has lines, the platform works from A to B, and even the open world environment has clear boundaries, temporary and permanent ones like road blocks on bridges, an ocean or a range of mountains that cannot be surmounted.

Franz Kafka was already aware that he needed to introduce precise rules and parameters in order for his stories to function like a game. He cleverly put the reader into the story, assigned them an avatar role, played with their expectations and took more and more freedom away from them. In the tale "The Metamorphosis" Kafka creates a recognizable but not quite real world that is detailed and yet dreamlike. The avatar, formerly a human being, wakes up, discovers that he has six legs and struggles to crawl out of bed. In this new setting the rules are clearly set. The avatar is confined to his room (narrow boundary). His body morphs into a bug, his physical movements become increasingly difficult, he has to hide from his family, but he has to communicate and eat, if he wants to survive and sit out the horrific, unexplainable difficulty he is in. As the morphing progresses his troubles and the horror increase. Kafka designed the mechanics of his tale so thoroughly that they have to be "played" by his readers.

It appears that what is good for literature is good for many other areas too. In politics, game mechanics are implemented to advocate decisions and choices, elect people and express rights and wrongs. This can be illustrated by the phenomenon of fake news in politics. It does not matter whose fake news we are talking about because they are all developed with a deliberate strategy to conduct a successful game or, we might say, "to game the system". The tactics of play as rhetoric of power (cf. Sutton-Smith 1997) may be deviation, stealth approach, ploy, bluff, disguise, charade, destroying someone's reputation, eroding ethical concepts, avoiding inconvenient truths, hushing up research results or policies and so on. Game mechanics run and occupy the world in almost all imaginable areas. And "playing games" may have negative connotations in many ways.

## THE CORE OF A GAME

The subject of this book is the game mechanics of games, a somewhat neglected, but constitutive element of game design in the field of game studies. We are convinced that the heart of a game is not artistic expression, aesthetics and beautiful assets or clever programming, but mechanics as the basic mechanical system of a game that creates the possibility of a (good and challenging) gameplay for the player and provides motivation. To discuss this assumption we organized a series of conferences on game mechanics and invited international guests who had been dealing with game mechanics in theory and practice for some time. The name of the conference "GameZ & RuleZ" was deliberately programmatic. The "Z" stands for the culture of games and game designers and suggests other ways of analyzing games and rules or cracking their codes (of perception). The first part of our conference series focused on game mechanics and rules, the second part was dedicated to game mechanics and motivational design, and the third and final conference put the spotlight on motivational design for non-human play.

The outcome was a good understanding of different perspectives and methods and a continued discussion that will be fueled by further events in the future. To make the results available to the public, the participants presented their thoughts in individual essays and tried to get to the bottom of game mechanics in video games and their integration into the real world. They offered different perspectives on the topic: as player, game designer or researcher. It was essential for the conference to bring game developers and game studies scholars together in order to illuminate the core subject of game mechanics from all possible sides.

In other words, we do not only ask why we play games, we also raise the question of why we make games. In the light of the recent popularity of games, we need to ask: Why do we integrate and intertwine our games more and more with our world? And what are the consequences of gamifying our world? Is it not enough to interact playfully? Do we really need more badges, leaderboards, virtual currencies and awards for all sorts of activities? There are so many awards that each of us receives one, and so many badges that we do not notice anymore how little sense it makes to distribute badges, for example in job recruitment when badges are given to all applicants – even those who do not get the job!

## "GAMEZ AND RULEZ"

It all started with a Game Mechanics Manifesto (2013) for the first "GameZ & RuleZ" conference at the "GameZfestival" in Zurich, Switzerland. The manifesto was a short pamphlet on how game mechanics function as the core of any game. It was short yet provocative, and served its purpose by starting the discourse on game mechanics from the perspective of game designers. The participants of the conference were intrigued and brought their own views and angles to the table, illuminating important aspects of the puzzle of game mechanics. However, not all of the participants were able to contribute to this volume; they include the scholars Jesper Juul, Staffan Björk, Margarete Jahrmann, Annika Waern, Floyd Müller, Michael Cook, and other invited game designers from different studios.

The manifesto itself had to be revised thoroughly and expanded into an essay for this book, and it now provides an insight into motivational systems and the development of core elements for games. In our book's first section on "Play Motivation", René Bauer identifies the "Magic Circle" as the "Special Zone of Play" that makes different rules and laws culturally possible. From challenge to reward and punishment, motivation design is able to use all the rules in a game system to keep players busy. Bauer states that a game system consists of different game mechanics as elements of motivation and he takes us on a tour from analog games with humans assuming the role of processing units to electronic games as highly integrated control systems, and finally into rule-based reality that works with similar motivational concepts. In "Rules of Play as a Framework for the 'Magic Circle'" Beat Suter outlines a framework for playing games in which he sees play as communication between player and game. Playful action in a game world must be similarly meaningful for the subject as actions and events are in real life. The game and its rules build a dynamic system that creates not only sense, but also commitment. Furthermore he divides game mechanics into the heuristic motivation sets of macro and micro mechanics where macro mechanics establish the framework for decisions and interactions in a game and micro mechanics network with each other to establish playful experiences for the player.

Also part of the first section is Miguel Sicart's "Playing Computers". The essay steps back from the mechanics discourse and gains a better view of play culture. In letters to the reader, Sicart starts an inquiry into similarities of computation and play. Using a post-phenomenological approach he delineates their shared capacity to create worlds. This process of world-creation may be seen as re-ontologizing worlds and thus shaping human experience. For Sicart, play is a way of interfacing; it "allows us to understand how to live, and how to experience the computational world" (Sicart, in this volume).

In the second section, on "Game Mechanics", we address established theories of game mechanics. Imre Hofmann gets to the bottom of three main theories taking a philosophical perspective with a meta-theoretical approach. He evaluates the state of the art of the theories and defines the attributes of a general game mechanics theory. Furthermore, he makes the case for a clearer distinction of the following three crucial terms: game experience, gameplay and game mechanics.

Carlo Fabricatore on the other hand goes "Underneath and Beyond Mechanics" and offers a new view on meaning-making in gameplay. He focuses on an activity-theoretical perspective and points out that meaning-making is a key driver for the player experience. It is crucial for the player's comprehension and decision-making – his agency – and a primary source for motivation. Fabricatore therefore suggests exploring games as systems of meaning-making. This involves analyzing which meanings are relevant for a definition of gameplay entities, causal relationships and significance, and how exactly they are conveyed to the player.

The third section, on "Guidance Systems", offers different insights and studies on the topic of player guidance: How exactly are games built to lead, and mislead, the players on their adventures inside the "Magic Circle"? In "Design and Reception of Orientation Cues in Game Space", Hiloko Kato and René Bauer take a closer look at orientation cues in games from both the perspective of reception and game design. By analyzing player behavior and communication in Let's Plays on YouTube, Kato and Bauer focus on the central player question: "What are we actually supposed to do here?" They describe how games, by means of guiding principles, achieve the satisfactory balance between the challenge and the player's reward.

To take their interdisciplinary and Let's Play-oriented study of guiding principles a step further, Bauer and Kato also define the "The Spectacular Space" in computer games as hyperreal. By examining some early games and introducing different approaches (comparisons between the analog world and the digital game world, trial-and-error method, space appropriation model), this essay helps to understand how players learn to inhabit the hyperreal, impossible, irrational spaces in video games.

Open-world games seem to offer players complete freedom in terms of their actions and decisions. By presenting six different "Nonverbal Guidance Systems", Francine Rotzetter shows that, in contrast to that assumption, the open-world player constantly faces complex sets of signs and cues, among them some more intuitive and obtrusive ones. By analyzing different games with her "100-steps method", Rotzetter suggests combinations of guidance systems for the designer to create a more balanced game experience, thus offering an academically based, but at the same time development-oriented approach to guidance systems.

The fourth section of this book concerns itself with "Ethics". How can game designers use ethics as a means of game motivation? This is the leading question that Wolfgang Walk tries to answer in his essay on the subject of "Ethics as a Game Mechanism". He has been studying the topic over the course of several years from the perspective of a game designer and producer. After making a clear distinction between ethics and morals, and defining what an ethical game is (and isn't), Walk reveals how ethical dilemmas and the complexity of ethical decision-making can create outstanding, lasting game experiences, in order to enable other game designers to implement ethical game mechanics in a skillful way.

The following essay by Hiloko Kato and René Bauer likewise deals with meaningful decision-making and proposes the notion of "The Player as Puppet". In comparison to the reception of literary texts, the role of the player of a game surely exceeds the position of the powerless spectator – or does it? How influential and consequential are, in fact, the decisions of the player of a computer game? After addressing the notion of games as decision machines and providing examples of visualized decisions, the essay analyzes the challenge of implementing moral decisions as a significant game mechanic.

In the following collaborative essay, Wolfgang Walk and Mark L. Barrett propose a set of game design tools which they call "The Ethical Avatar". They consider the deep impact that ethical decisions can have on gameplay, but for their research, they chose a practical, applied point of view. The authors argue that their Ethical Avatar enhances the player's participation in the game world, revolutionizes storytelling for video games with better feedback loops and, in fact, impacts the game production workflow as a whole.

The fifth section "Game Spaces" deals with the interdependence of space, rules and game mechanics. In his essay on how "Rules Shape Spaces" and how "Spaces Shape Rules", Ulrich Götz draws analogies from the real world for digital game design. He describes how rules form the typologies of spaces and points out that it is essential to create controllable situations in game worlds in order to observe consequences and gradually enhance spaces, connections and motions within these spaces. Götz further explains how the extended possibility space of environmental design in games has not reached its full potential yet, but still leaves plenty of room for more innovative visual and functional designs.

Sharing post-mortem insights from intercultural games for the "ludic city" (Zurich/Hong Kong), Mela Kocher analyzes the development conditions for "Game Mechanics of Serious Urban Games". Comparing the design process of video games (mainly for entertainment purposes) with that of urban games (mainly for "serious" purposes), and drawing insights from the MDA model, Kocher defines a set of design rules and constraints that the designers (and, in fact, also the players) are faced with when they create for, or play games in, the ludic space.

The sixth and last section of this book, "NPC and Non-human Game Design", looks into recent game design trends and asks the following questions: How do design and research conditions change when the players are not human, and what effect does this trend have in general on the shaping of a game culture, which has traditionally been geared towards the human actor? Furthermore, how does the motivation design have to be re-designed in order to meet the changing demands of the new users? And last but not least: What happens if we apply game rules to society and start rediscovering ourselves as elements of a game?

In "NPC and me", Günter Hack provocatively discusses "How to become a Non-Player Character" in times when "everyday life and game mechanics converge in ever new digital media remixes" (Hack, in this volume). Drawing from the mechanics of early NPCs and their relationship to the fiction world i.e. the system, Hack ponders on the quantification and gamification of everyday life (with examples such as the Chinese "social credit system"). He debates the resulting status of people with concepts derived from cybernetics and political science: "In this all-encompassing totalitarian context, everybody has become a Pac-Man ghost or a Tamagotchi, even the President of the United States!" (Hack, in this volume).

Though the notion of non-human game elements such as NPCs is employed rather metaphorically in the preceding contribution, it surely is meant very literally in Michelle Westerlaken's article on what happens "When Game Mechanics Come Crawling out of Ant Colonies". Taking Miguel Sicart's approach to game mechanics (Sicart 2008) a step further and understanding "agents" not only as humans or artificial intelligences, but also as animals, Westerlaken investigates the design of playful artifacts and games that involve animals (specifically ants), both as players and as co-designers, thus sharing her insights from her experiments in non-speciesist game studies.

## TO BE IN THE GAME OR (NOT) TO BE

Game designers open worlds in the design process by enriching, varying and experimenting with avatars, figures, objects, motions, actions, events, mechanics, feedbacks, sounds, visuals and environments. And then they close them by reducing, optimizing and adapting elements so that the game becomes more coherent. It is an iterative optimization process that we are increasingly losing sight of. Today's games manage to cover up as perfectly as they perform. They manage to hide their complexity behind playful surfaces and, at the same time, offer a wide variety of motivational designs. Games no longer have a direct influence but rule over the abundance of decision-making possibilities and their consequences. They have become so successful in society that their power mechanisms are no longer just used in games. In fact, they are applied as much in the real world.

In an increasingly self-designed world, game mechanics have become a kind of operating system for society, its design process and ubiquitous designs. Since 2010 more than 50% of the human population live in self-designed cities. Concepts such as gamification, serious game and games for change are widespread today, and continuously implemented in society. This clearly illustrates that game mechanics have become a kind of operating system for society – if they have not always been one. We live in a time in which we have to look ever so closely at when and where game mechanics emerge or are strategically implemented and applied in a more or less creative mode, be it in the economy, architecture, healthcare, private and public transport, education, refrigerator design or cultural and social processes. There seems to be no stopping the amazing and frightening spread of game mechanics.

This book is a first step in exploring our role as people and players in this "new" overarching game world. Electronic games are the forerunners and mirrors, the playgrounds for all kind of experiments and combat zones for society. And at the same time they are leading the way for current and future technological and cultural progress. We may be able to learn from games how to design the future. But first there has to be the realization: *We do exist, when we play, but we don't solely live in the game.*

*Zürich, April 2018*

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# Play Motivation

# Rules of Play as a Framework for the "Magic Circle"

*Beat Suter*

Play is one of the oldest cultural techniques of mankind going back several thousand years. It has been practiced around the world in a great variety of ways for relaxation, diversion, entertainment or competition. To this extent, we always seem to know what the framework of playing a game is like. In general, rules of play are considered to be frame defining. They give the game a stable and identifiable structure that should provide fair conditions, which are equal for all participants. Whenever there are discussions about the rules during the game, there is an obvious comprehension problem with respect to the scope of the game. During the development process of a game, this usually means that the prerequisites for a fair competition are not completed, and that one of the players receives a slight advantage due to rules that are not fully balanced.

## THE FRAME OF A GAME

But rules alone are not enough to fully define the framework of a game. A game is always a dynamic system composed of different formal and dramatic elements combined into a working structure. In addition to clear rules, this includes the definition of the players, the goal, the processes, the conflict, the result, and in the dramatic area a story, characters and the linking of narration in a particular dramaturgical sequence. The game as a system includes all these elements and claims its own (dynamic) game world. The game world is clearly separated from the real world by implementation of its rules and other elements. This creates a clear-cut framework. Nobody has explained this as well as Johan Huizinga in his pioneering anthropologic work of play, *Homo Ludens*, which had already appeared in 1938 (Huizinga 1949). He describes the world of a game as an own realm, separated from reality, a so-called "Magic Circle", in which the players can follow their own rules and do not have to pay attention to the outside world.

> "We found that one of the most important characteristics of play was its spatial separation from ordinary life. A closed space is marked out for it, either materially or ideally, hedged off from the everyday surroundings. Inside this space the play proceeds, inside it the rules obtain." (Huizinga 1949:19)

This can go so far that certain rules of the real world are deliberately abolished or violated within the framework of the game.

> "What the 'others' do 'outside' is no concern of ours at the moment. Inside the circle of the game the laws and customs of ordinary life no longer count. We are different and do things differently." (Huizinga 1949:12)

For example, consider the Grand Theft Auto video game series (GTA IV 2008), in which the player must turn into a car hijacker, rip a driver out of his car and run away in the car. In its many missions the player is encouraged to behave as unethical as possible in order to reach a specific goal as fast as possible. To this extent, the game has a certain subversive potential, which of course has always been controversial.

Therefore, it is not surprising that playing games in the past was met with little interest from the authorities and in some locations various prohibitions were issued. For example, in the city of Zurich in 1624, Johann Jakob Breitinger, a reformed pastor, professor and politician and Zwingli's sixth successor at the Großmünster (Great Minster), put a ban on all urban games because he feared the subversive power of games. In his book "Bedencken von Comoedien oder Spilen" (Brunnschweiler 1989), he declared playing games, which ranged from marbles, dice and card games to performances at the theater, as very harmful to society because it deprived citizens of the useful daily chores and schemes and introduced dangerous new ideas or brought risky old ideas back.[1]

1 The first few paragraphs of this text were published in German as an introduction to the following essay: Suter, Beat (2013): "Boundary Breaker. Rahmenbrüche in Videogames." In: Wirth, Uwe und Veronika Sellier (hg.). *Rahmenbrüche, Rahmenwechsel*. Wege der Kulturforschung. Berlin: Kadmos Verlag, pp. 331-345.

## PLAY AS COMMUNICATION

Theatrical performance, card and board games have long been established for contemporary society. In fact, we have crossed a new threshold by comprehending games as communication. Communication between the game and the player plays an important role, especially in electronic games. The game can be understood as a counterpart to the player. The electronic game offers a multimedial interactive cybernetic world that constitutes and controls the game. The communication process between the game and the player is thus a high level of synesthetic communication that must be established and updated again and again. This way the game becomes more controllable and better comprehensible. However, clear control of games in their digital framework is only one reason for the wider acceptance of games in today's society. Electronic games as well as analog games operate similarly to today's society, which is functionally differentiated with subsystems like art, architecture, science or market economy. These subsystems are based on a cybernetic control loop with establishing variation first and next making a selection from it. This is followed by a stabilizing phase. Economic crises, in particular, indicate this trend very clearly. Games in their systemic composition work similarly. They offer variations for actions that players can take and evaluate. The evaluations then lead to a selection being discarded or stabilized. This process is the basis for the progress of the player, it is repeated and becomes a cybernetic control circuit.

According to game and interaction educator Jürgen Fritz (2004), the game consists of three different (combinable) factors or dimensions: behavioral dimension, frame dimension, and a construction dimension. While the behavioral dimension treats the game from the aspect of playful behavior, and the construction dimension defines the game as a construction of appointment and materials into a scope, we will first deal with the framework of the game that identifies the game as an own game world.

Thus, when we speak of the framing dimension of the game, we point to the already mentioned delimitation to the real world. Where does the game world stop and where does reality begin? Or where does reality cease, and where does the virtuality of the game begin? How permeable are these worlds or their frames? Finally, the question arises in digital games: What is outside the bounded game world? Can I break out of this artificial world? What are the status and setting of the limitations? Are they perhaps transparent and permeable or solid and impervious? This leads back to Jürgen Fritz, who developed an updated version of the "Magic Circle" when he stated:

"Initially the game is a process of framing, that endows a concrete event with the status that it does not have to meet the standards of the real world, but to suffice different standards. The behavior is framed as a 'game' and belongs to a game world and as long as the framing action is valid, does not belong to the real world." (Fritz 2004: 16/17)

## SCOPE OF ACTION

First and foremost, what applies to action and events in real life is likewise true for playful action in a game world: it must be meaningful for the subject. This is the framework's task. It creates not only sense, but also commitment (Goffman 1980: 376). Commitment means that you make a commitment to participate in the game, which can go as far as captivating you completely. This also creates normative expectations for the subject, which in their depth and nature can be quite different depending on the organized contexts into which they are incorporated. This applies to digital game worlds as much as to analog game worlds. Players expect a clearly defined and delimited world in which they can perform their individual actions. This means it is all about organizing space, action or an event, that corresponds as much as possible with the player's normative expectations.

Once the framework is set, the questions about structure, rules, communication and behavior within the "Magical Circle" can be asked. These questions on structure, design and effects of the rules are becoming ever more important against the background of the growing importance of game design for virtual and real-world connections, because it affects not only the game, but also technology, urban culture and the entire media communication. The investigation of these connections is to be further discussed.

## MOTIVATING SYSTEMS OF RULES

Games are specifically motivating control systems within a defined framework. By means of motivational design, game designers develop such control systems. The aim is a motivational design for the player. For the time being, we do not assume the player's perspective, but the designer's. The simplest rule system for the designer is to raise a challenge by offering opportunities for action and allowing them to be evaluated. To evaluate is to reward or punish, to give a positive or negative feedback. Each game has its own design, which, in its execution, acceptance of the rules and processing on a computer, becomes the actual game and encloses the player in the “Magic Circle”. Inside the circle, inherently different rules apply than outside the circle in the real world. Thus, reward and punishment can also be conveyed more clearly and in alternative ways.

However, the interaction between inside and outside can be influenced by both of the sides. It is also possible (today) to define the limit of the “Magic Circle” as a permeable membrane, which allows the game with its rulework to go beyond its original circle into the real world. For example in an augmented or alternate reality game, the players are confronted with parts of the regulatory structures of a city and have to adapt accordingly. It is therefore quite possible to create a new set of rules for a game as a layer on an already existing real set of rules. This new rule set connects with the existing set of rules, so it is compatible with the rules of the real world, and is in force as long as the game is running.

Conversely, a set of rules from the real world can sometimes influence a set of rules within a game. However, it may become a case of censorship when rules and formats of a game have to be changed under pressure from outside. This clearly shows that the “Magic Circle” cannot be viewed as a completely law-free space or zone. It is always exposed to the supervision and control of the real world. On the other hand, the real world’s rules simply formulate the rules of access to a game, so they frame and regulate the transfer of the subject from the real world to the magical circle of a game, but they do not interfere directly with the rules of the game.

Live Action Roleplaying (LARP) is a genre that is freer in dealing with the permeability of the real world and the virtual world. In a live role game, the player is physically present in the game as a game character. The player is allowed to freely interpret and improvise his role. It is not only the behavior of the game character that is regulated by the life-world experiences of the player, but individual rules as well. Thus the character cannot kill or hurt the opponent in a sword fight, but must simulate this as on stage in the theater, because the physical presence of the opponent is simply regulated by the laws of the real world. Where the consequences of a killing or injury do not correspond with real world life as for example in an ego-shooter video game, rules may be set differently. In any case, a LARP game is also part of the real world and therefore its “Magic Circle” is permeated with real world laws.

## GAME MECHANICS

What are game mechanics? If we ask the question about the mechanics of a game, first, we can assume that establishing a “Magical Circle” sets the framework for the game and its mechanics. Within this framework, we can now begin anew, build a new world, create our own game and create our own system. But before we actually build this world, we have to set the parameters for this world and the activities in it. That is, we create a simple set of rules for our characters and/or objects, their behaviors and their relationships. This world can be perceived as object-oriented. To this we add more mechanics with the actions the player can perform. We start with creating objects, their scene (their playing field) and their movements. What kind of physics do the objects need? How large are the objects, how do they behave, how do they relate to each other, how can the player act with them, what is the goal and how can it be achieved?

We have found that games are rule systems with special motivational mechanisms. The player needs incentives and the rule system has to provide them for example in the form of a reward with gold coins, a higher score or an extraordinary experience. The game designer develops progressing cybernetic control systems (such as *Tetris* (1989)) from motivation (such as cleanup and alignment). The most basic rule system of game mechanics is the constant challenge of the player and his avatar: the game presents the player with a clear challenge (*Tetris*: falling rocks and overflowing containers) and offers opportunities to solve the problem (*Tetris*: moving and turning the stones). Subsequently, the game evaluates the decision of the player: "right" decisions are rewarded (*Tetris*: a line disappears, positive sound, points, longer playing) and wrong decisions are punished (Tetris: blocked situation, gloomy sounds, exclusion from the game). Perfectly challenged, with dosed punishment and well rewarded, the player cruises or floats through the game. This is the experience of flow (cf. Csíkszentmihályi 1990) that captures the player and persuades him to identify with gameplay and sequencing (via his avatar). He is highly focused, progresses into a state of complete absorption and starts to believe that he is in the game himself. The immersion may become so advanced that he automatically continues to play his avatar role. Temporal concerns like time and food are ignored, the player's real self falls away, his virtual and real role merge into an avatar self and he does not want to leave the virtual "Magic Circle" anymore.

Games, however, do not only differ in short-term game mechanics (micro mechanics), but also in long-term mechanics. These macro game mechanics are the ones that motivate for hours, if not for days and weeks. Often progression strategies or intrinsic narrative strategies are used as macro mechanics, such as, in form of new (visual) worlds, additional new challenges, superordinate comparisons, and (complex) stories. For example, the game *Tearaway* (2013) is visually and narratively convincing with its unique unfolding paper world. And as player you can even push your finger via an additional touchscreen on the back-side of the mobile console PS Vita through the thin paper. The *LSD Logic Dream Simulator* (1998) amazes with a psychedelic surreal dream world that tries to act and react like a real dream. With additional new challenges, the game *Chips Challenge* (1989), gradually brings well-matched new elements into play and keeps the player busy. The challenge is growing steadily by ever-increasing level development in a game like *Ikaruga* (2001), or by consciously changing game mechanics like the Indie game *Feist* (2015), that develops from an exploration game into a fight and survival game. Superordinate comparisons are used in games that work with highscores, such as *Space Invaders* (1978), *Tetris* (1989) and *Pac-Man* (1980). Finally, challenge can also come in form of a story that you wish to fully pursue. In games like *The Witcher 3* (2015) and *The Last of Us* (2014) you strive to unravel the next plot points. In games like *Lumino City* (2014) you long for the appearance of new characters. And in *Gone Home* (2013) or *Papo & Yo* (2012) it is all about uncovering the story of a mysterious character, accessing memories and creating new relationships.

The player's interaction and commitment mean that he accepts the rules, and the computer processes these rules for him. Through interaction and commitment the game becomes magical reality. Rules can be rather unique and surprising. We have seen that only the rules of the game apply (cf. Huizinga 1949) within a "Magic Circle". Here it is possible to fly as in *REZ* (2001), to save cities from nuclear missiles as in *Missile Command* (1980), destroy worlds as in *Ikaruga* (2001) or color worlds and environments as in *Wizball* (1987) – and you can even be resurrected as in *Golden Axe* (1989).

It remains unclear though whether the player adopts the rules that are designed for him as planned and makes the intended game experience. Or whether the player may bring quite different mechanics to life – for example, in games like *LSD Logic Dream Emulator* (2001) or *GTA IV* (2008). While as in *LSD* he might try not to bump into walls or objects and extend a dream, he has the choice of not pursuing quests in *GTA*'s open world and start his own missions as for example wrecking as many cars as possible, trying to do risky stunts or killing as many pedestrians as possible or just quietly drive endlessly through the streets and obediently follow all traffic rules.

## Tetris

Choosing *Tetris* (1989) as a simple example, we are easily able to represent the entire rules of the game by means of a few bullet points. The frame is as follows: The playing field is limited; a box of 10 x 20 square fields is enclosed by two brick walls. The container is open at the top, closed at the bottom. From above, the Tetromino stones fall down slowly and must be arranged by the player. The Tetromino or Tetris Stones are the only objects of the game, seven different forms of four squares each.

If we now classify the rules according to the well-known Mechanics-Dynamics-Aesthetics (MDA) theory (cf. Hunicke et al. 2004), which attempts to formalize the consumption of games by means of analytics, and in which mechanics are the basic components or rules (possible player actions, algorithms etc.) of a game, there are five specific rules in *Tetris*.

- First of all there is a kind of gravitation that gradually drops the stones (and accelerates them according to the score).
- The score increases by one with a completed line of squares.
- The destruction or deletion of a line changes the configuration of stones above. All stones above the line slide down one unit. In case of holes they can slide further downwards.
- There is the condition that stones can fill the entire container up to the top. If a stone tower touches the upper end of the container, the game is finished.
- The determination of the next stone is random. It is triggered after the previous stone has landed. A brief display shows the player the shape of the next stone.

Directional keys are used to control the five specific rules:

- Right arrow key = move to the right.
- Left arrow = move to the left.
- Arrow down = move stone faster downwards.
- Arrow key up = rotate blocks.

The goal is to reduce as many lines as possible. As soon as a block tower touches the upper end of the playing field, the game is over (rule 4). This brings us to specific micro mechanics. If we assume according to MDA theory that the mechanics are equivalent to the possible actions by the player we can assume:

- Each stone may be accelerated when falling (control: arrow key down).
- The player may rotate each stone in 90 degrees increments (control: arrow key up).
- The player needs to complete a line in order to destroy or delete it. He gets one point for doing this.

## MICRO AND MACRO MECHANICS

After systematically dissecting the rules of *Tetris* according to the MDA theory, we turn to a simpler method and have to ask the question "What is the challenge of the game *Tetris*?" Is *Tetris* just about aligning elements? Is it about tidying up? Who would have thought that a challenge like cleaning up could be so successful and fascinating for millions of players? Players who may not like to clean their own bedroom will find cleaning up in *Tetris* is somewhat easier than cleaning up a messy room. By aligning the blocks, the player is able to get rid of individual lines by deleting all the squares in the line. It is a magical effect when the lines disappear and there is a sense of relief and immediate reward, compared with the arduous task of vacuuming a bedroom in the real world. The *Tetris* player has to tidy up the container and leave the least chaotic formations possible so that the blocks will not reach the ceiling.

It is so easy! In the beginning, the player has enough time to learn about forms and movements. After that, the gameplay becomes gradually more difficult. The player is under increasing time pressure. And after twenty rows, the player finds himself under a strong spell of the falling blocks so that he does not want to stop playing despite rather minimal and repetitive rewards. The dissolving of a completed row is underpinned by sound and feels quite liberating since it reduces chaos and frees space on the playing field. The score increases, but this appears to be a rather limited unheeded reward. The score only works if a player compares it to another player's highscore. An ambitious player rather focuses on the achievement of reaching the next level. Conversely, a block that does not fit into any gap is already a punishment if it blocks a part of the space and leaves gaps in the lower rows and makes those lower rows no longer accessible. This is also accompanied by a rather gloomy sound and contributes to the player's tension. The higher the towers or piles grow, the faster the player has to react. Shape and rotation of the next stone decide over a possible alignment and relief or pile-up and failure. The player is now under increasing time pressure, feels tense and stressed and has to hope that the next stone fits better into the remaining gaps. The steadily increasing pressure can only be alleviated by successively removing several rows. The game has no end, so the player will be punished sooner or later with a "Game Over".

*Table 1: Game Mechanics example for sorting and alignment*

| Tetris | |
|---|---|
| Macro mechanics | Align the different blocks that fall down into the container. Try to fill individual lines. Each finished line will disappear and give points. |
| Micro mechanics | You need to manipulate the shapes while they fall down, by moving each one sideways and rotating it by 90 degree units. The objective of the game is to create horizontal lines of ten units without gaps. When such a line is created, it disappears, and any block above the deleted line will fall.<br>Avoid filling up the container. A small window shows you what piece is next.<br>The game is either endless or you can reach higher levels with faster pieces. |
| Reward | Highscore, disappearing line, double lines etc., positive sound, next level, score points. |
| Punishment | High piles, less time to control, less possibilities to align, negative sound, overflowing, game over. |

## LSD Dream Emulator

The game *LSD: Dream Emulator* (1998) is different. *LSD* is a rather extraordinary, surrealistic exploration game based on a dream diary by an artist of Asmik Ace Entertainment. Through its eccentric nature the game for the Playstation 1 console was able to acquire a small cultic community. As macro mechanics, the player navigates through a psychedelic dream world. Basically he walks and explores things in a dream environment. His walk is a stroll through an unknown world that surprises with bright colors, wild textures, strange shapes and absurd objects (for example, a flying elephant, a large crystal as a mountain, a turtle decorated with flower patterns, characters with only head and feet). The environment seems to be randomly generated, open and not structured. The gameplay consists of exploring these strange worlds. While in *Tetris* the player must sort and align objects in an enclosed space and needs to progress and score points, he is unbound and free in *LSD* and moves in a mysterious unstructured and rather unrestricted world that assumes random features.

*LSD*'s macro mechanics have been sketched quickly. Micro mechanics start with the player encountering obstacles. As soon as he bounces on a wall or hits objects or crashes into another character, he is transported to another environment, that is, another dream. A specific dream can take around ten minutes. At the end of the dream, the player wakes up and is returned to the main menu. From there he can start anew and explore the next dream. In a game like *LSD*, the detailed navigation has to be considered as part of the game's micro mechanics. The player assumes a first person perspective and uses left and right buttons to look around and change direction. Up and Down buttons are used to initiate a forward or backward movement. With the upper buttons on the front of the Playstation Controller, the player is enabled to turn around completely. And with the lower buttons on the front of the Playstation Controller, he can turn right or left. By holding down the X button, he can increase his speed and run. With the square button he looks downwards and with the triangle button upwards. As soon as he falls down somewhere, he wakes up immediately. A graphic shows him his state of mind, which may then influence the next dream. Back in the main menu, it is possible to save a dream and retrieve it later.

*Table 2: Game Mechanics example for (psychedelic) exploration*

| **LSD Dream Emulator** | |
|---|---|
| Macro mechanics | The player navigates through a psychedelic dream world. The idea is simply to walk around and explore things in a dream environment. |
| Micro mechanics | If the player bumps into walls or other objects in the game or falls into a hole, he will be transported to another environment. Each dream can last up to ten minutes, after which the player will wake up and is sent back to the main menu. The player has all means to move and look around in his dream world. At the end of a dream he will wake up immediately.<br>A graphic keeps track of his state of mind; the states are upper, downer, static and dynamic, referring to the environments and the general feel of the dream the player just went through. Past states may have effects on later dreams. |
| Reward | Bizarre environments, amazing shapes, psychedelic colors and caleidoscopic patterns await to be discovered. The graphic description at the end of a dream is a dream walk achievement that can also be viewed as a reward. |
| Punishment | Bumping into obstacles or falling down ejects the player immediately from his dream. |

## Journey of a Roach

As a contrast to the two previously described games, *Journey of a Roach* (2013) is an action-adventure game that is located in an apocalyptic world and uses different main mechanics. The protagonists are two cockroach buddies, created as funny comic figures. The player has to accompany Jim and Bud on their journey to the surface of the earth and learn what it means to be a cockroach. The mechanics of *Journey of a Roach* is neither about sorting nor exploring. It is about telling a story and solving puzzles in a narrative world. Focusing on our main characters we are able to pursue the entire adventure story. The story itself employs dramatic sturcture based on the symbolism of the hero's journey by Joseph Campbell (1949). It has a narrative backbone and a distinct setting divided into segments (rooms) that lead us room-by-room through the story, down to the "Deepest Cave" and then up again until the characters reach the top, the surface of the earth. However, the world of *Journey of a Roach* is strange, ironic and humorous, the insects are anti-heroes, at times clumsy, misfortunate and comedian – and so is the course of the actions and events.

Nevertheless, the two mechanics of puzzle and exploration that we identfied in the other two games play their own parts in this game. However, the macro mechanics of *Journey of a Roach* is to find your way out of the underground world to the surface of the earth and pursue the story to its end. The story acts as macro mechanics and can be perceived as the real goal of the game. On the way to resolve the story, several different rooms have to be crossed and complex puzzles have to be solved by means of logical thinking. This takes us to the micro mechanics of the game. As in a classic adventure, the player has to pick up objects, combine them, and reuse them in the right place, so that progress in the story can be achieved. This narrative progress translates into progressing through game space (locations) as well. Most of the time solving a puzzle leads the player to a new room. This mechanic is applied repeatedly, each time with a different context and setting. The fact that the main characters in this game are cockroaches opens up new possibilities for movements: Jim and Bud are able to walk on walls and ceilings – a central idea for the game that was not so easily turned into a working gameplay. Instead of letting the roach climb vertically up the wall, the whole room gets turned 90 degrees (each time) and the roach remains at the bottom of the screen. And this innovative game mechanic leads to surprising new possibilities for the puzzle design. Overall, after solving a puzzle, the player is rewarded with narrative progress and is enabled to advance to the next location where he finds a new challenge.

*Table 3: Game Mechanics example for storytelling (as puzzle adventure)*

| Journey of a Roach | |
|---|---|
| Macro mechanics | The goal of the game is to get out of the underground world and bring the story to an end. Entering different rooms on the way to the surface of the earth, the player's logic skills are tested with increasingly complex puzzles. |
| Micro mechanics | Picking up items, combining them and using them in specific places are key to progression. The same mechanics are used repeatedly but in changing context and story settings. Being a roach opens up a new dimension of movement and lets the player crawl along walls and ceilings. This innovative game mechanics creates opportunities for an exciting new puzzle design. |
| Reward | Figuring out a puzzle is rewarded by story progress and cutscenes. Some scenes reveal references to famous movies and games. The end shows hope and a mood change in the roachs. |
| Punishment | As punishment you remain stuck in the same room. You do not progress and have to invest more time in exploring the area or figuring out the puzzle at hand. |

The three examples show how different the mechanics of games can be. As macro mechanics of those games we have recognized sorting, exploring and storytelling. Often storytelling may be accompanied by a second macro mechanic such as exploring that is key for setting up sets of supporting micro mechanics. It has to be noted that narration is often used as a purposeful game mechanic. However, many developers don't identify storytelling as only a game mechanic, they see it as a method to structure games in plot sequences and a means to purvey meaning. Meaning however can be purveyed as well by motivational game mechanics (cf. Fabricatore, in this volume).

The pragmatic division into macro and micro mechanics is based on the fact that the simplest game mechanic is a game loop, a cybernetic control loop of challenges, event and plot options, decisions, actions and the resulting rewards and punishments. This is also what the Zurich Game Manifesto (cf. The Game Mechanics 2013) stated and René Bauer discusses in the following article "Games as a Special Zone". If macro mechanics establish the framework for the decisions and interactions of a game, individual micro mechanics are implemented within this framework to intertwine or network with each other and establish playful and purposeful paths and experiences for the player. These micro mechanics, on the other hand, can provide a framework for nano mechanics, which in turn, interlock and network within micro mechanics. Insofar, this pragmatic model may be regarded as a recursively-structured model for game mechanics.

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# Games as a Special Zone

## Motivation Mechanics of Games

*René Bauer*

### PLAY AS POSSIBILITY SPACE

In games, sheep might speak, mountains fly, spaces move, moons disappear and faces morph; men can shrink, avatars can be moved, time rewound or frogs blown up. What would be regarded as delusional laws, imaginations and crazy ideas in other areas, as described for example in Dr. Daniel Schreber's 1903 book "Denkwürdigkeiten eines Nervenkranken" (Memories of a Neuropath), is a tangible and interactive reality in many games.

It is the special zone in which games operate that makes these divergent rules and laws culturally possible. Huizinga identified a number of playful special zones such as arenas, card tables, "Magic Circles", stages or temples. They are all playgrounds.

> "The arena, the card-table, the magic circle, the temple, the stage, the screen, the tennis court, the court of justice, etc, are all in form and function play-grounds, i.e. forbidden spots, isolated, hedged round, hallowed, within which special rules obtain. All are temporary worlds within the ordinary world, dedicated to the performance of an act apart." (Huizinga 1955: 5)

Thus, games (temporarily) position themselves against the 'analog' world with its fixed continuous rules that are based on atoms and their properties. The analog space surrounding us is bijective and continuous. It comes with three spatial dimensions, a continuous time and various resulting 'laws'. The same applies to social and cultural conditions, which can also override or subvert games. This analog space and its rules become a complex, special set of rules in the much more powerful possibility space of the games – or in other words: the analog space turns into another one of many game systems.

## GAME SYSTEMS – SYMBOLIC ORDERS

A game is established when the participants accept its rules and process them (board games, street games) or hook up to the game (in electronic games). A running game system is created and establishes an interior and an exterior realm for the game (Endo/Exo) or in other words: a "Magic Circle". This creates its own system of meaning in which its own rules and its (potentially) own value system are processed (Kocher/Bauer/Suter 2009). Game systems thus form their own symbolic orders and extend these all the way into the rules of visual and auditory displays. There, they generate similarities that have a meaning in the set of rules and are not just arbitrary signs as in our analog world. In principle – and this is ultimately their cultural privilege – games only have to 'make sense' within their own "Magic Circle", i.e. obey their own rules. But even that is not absolutely necessary.

## GAME SYSTEMS – SYSTEMS OF MEANING AND UTOPIAS

Games bring meaning into a world that has become meaningless. This applies more radically to electronic single-player games where the notion of meaning refers to all areas from graphics and setting to the game mechanics. This is why the game also functions as a kind of last utopia of society: where things are clear, concise, accountable and predictable. Everyone gets the same chance. Under the protection of the "Magic Circle" everyone can start again from the beginning without any consequences. Many electronic single-player games have a motivational design where performance is rewarded. Thus they are the pure opposite of a social reality whose complexity is not transparent and in which effort is not necessarily worthwhile despite good performance.

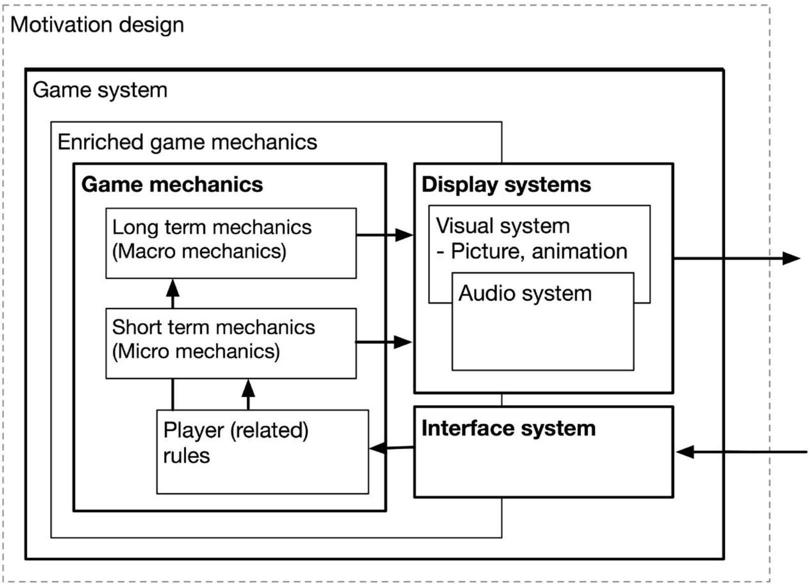
Of course, our socialization and knowledge of the "Magic Circles" ensure that we do not demand the same in the analog social world. These short temporary experimental zones of play are always part of the dispositive of power: playful opium for the people. The small systems of meaning prevent us from dealing with the mechanics of our society – true to the motto of the book "Society of the Spectacle" (Debord 1968). Accordingly, Jürgen Fritz described (virtual) games as a kind of (social) fairy tale in the chapter "Fairy tale worlds and virtual game worlds" in his book "Das Spiel verstehen" (Understanding games) (Fritz 2004).

## MOTIVATION DESIGN – BIGGER THAN THE GAME

Game systems motivate people by involving and engaging them as players. For this purpose they have a motivational design. In principle, the motivation design is greater than the game itself. This is because it includes everything concerning the game: with external motivational strands that lead to a game, like game culture, fan art, marketing and advertising, on one side, and the motivations within the game that attract, keep and satisfy players, on the other side. And then, there are motivations that transgress the "Magic Circle" such as in games of chance (gambling), art games, game art, meaningful games, serious games and more. (cf. Kato and Bauer, Hansel and Gretel, on decisions, in this volume)

Motivation design is able to use all the rules and consequences in a game system to keep players busy, from challenge to reward to punishment.

*Figure 1: A game system consists of different game mechanics which function as elements of motivation.*




Source: Bauer

In games, game mechanics are mainly used to create motivations (Figure 1). A game mechanic is a minimal unit for engagement and involvement, respectively for creating motivation. In most cases a game system consists of a considerable number of individual game mechanic units.

These units can be hierarchical (one mechanic dominates), competitive (several mechanics simultaneously) or mixed (cf. Suter, in this volume). Usually there are Short Term Game Mechanics (lasting seconds and minutes) and Long Term Mechanics (lasting a quarter of an hour or several hours or even days). In most cases, these micro and macro mechanics are designed as cybernetic circuits or control systems.

## GAME MECHANICS – A CYBERNETIC CONTROL CIRCUIT

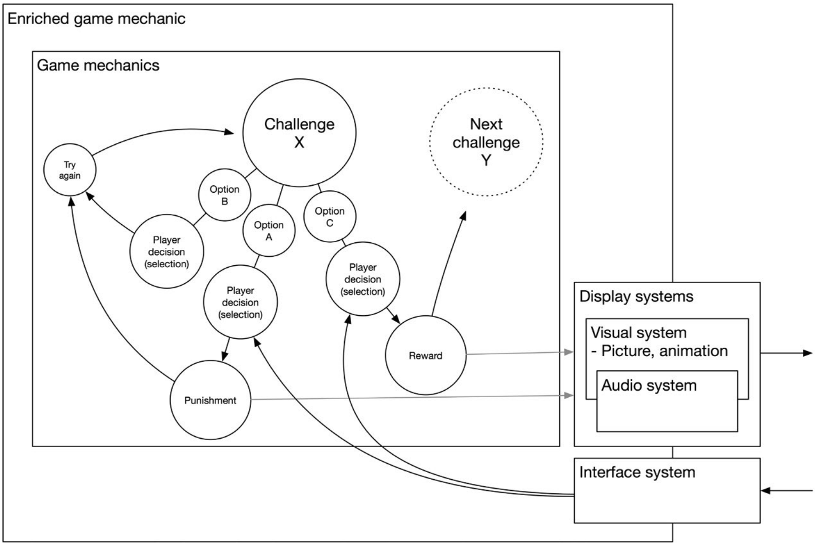
Game mechanics are often constructed in the following way: there is a challenge, the game provides options or possibilities to solve this task, and the players can decide or in other words: *act*. Players usually get stuck in this cycle until they solve the task. The game rewards or punishes their decisions. The players communicate via the interface system and are able to “act” via player (related) rules in the game. These rules include, for example, the avatar's space and range of possibilities. The McLuhan concept of extension (McLuhan 1964: 259) can be applied here: people expand into the game as players and begin to act and feel as this extension, in the form of an avatar.

In game mechanics (Figure 2), the players usually receive points or progress as reward for a solution or, but in the event of misconduct they face death as a result. In an enriched game-mechanic framework practically everything is available to the game system: texts, sounds, graphics, pictures, animations, story bits, social media friends. Game mechanics use the systems of display to increase motivation. Classical narrative structures like stories, radio plays or films can also be read or designed from this perspective as simple linear cybernetic game mechanisms and motivation designs.

The challenges of game mechanism can range from a simple competition of a body-controlled game, for instance long jump or steering an idle spaceship in space (gaining control), to solving any kind of puzzle.

Motivation design is designed in such a way that the game keeps the players increasingly more engaged and makes the exo game world, with its problems, fade into the background. Gradually an experience of flow takes over. Flow means perfect balance of motivation design and use of the game mechanics, so that the players remain committed, active and voluntarily caught between mental underload and overload. Hence, level design is the use of enriched game mechanics over time.

*Figure 2: A game mechanic is a cybernetic circuit with set elements.*




Source: Bauer

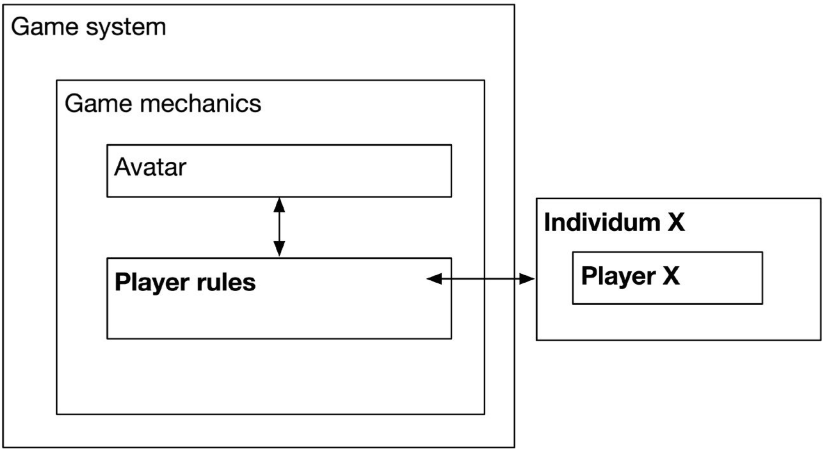
## TRANSFORMATION INTO A PLAYER

When people commit to a game, they become players and thus part of the game. In doing so, they comply with the rules of the game and fill the provided space of rules, i.e. the player rules (Kocher/Bauer/Suter 2009). The players act within the *Player's Space of Possibility* that is provided for them in the rules of the game and they control the avatar in the game via the *Player Rules* (Figure 3).

Jean Baudrillard described the radicality of abandoning oneself to these player rules as follows:

"Gaming does not liberate us from constraints (since we accept the far stricter constraint of the rules), but it delivers us from freedom. We lose freedom if we live it merely as reality." (Baudrillard 2001: 66)

*Figure 3: Players communicate with the game mechanics via the Player Rules*




Source: Bauer

Often only players who allow themselves to be socialized by the games and share or emulate the values of a game and act accordingly can win. In return, the player is naturally rewarded with the possibilities of the games, from the symbolic win over competitors (in analog games) and score systems with points to rolled out stories (mostly in electronic games). It is therefore no coincidence that electronic single-player games function as a kind of assessment of the player (cf. Bauer and Kato 2011).

## GAME INFRASTRUCTURE

The possibilities of a game depend on the medium in which it is played. The two best known media are the analog and digital worlds. Depending on the medium, a game can use different game mechanics, challenges, options, types of decision making and rewards or punishments for its motivation design. The differences will be identified in the following paragraphs. It is clear, however, that mixed forms like Augmented Reality based games try to integrate the best of both systems. (cf. Kocher, in this volume)

### Analog games: analog infrastructure and people as processors

Classic board, party or street games often use the analog world or elements thereofas infrastructure. However, in addition to elements specially created for the game (such as a playing field or a token), real space is often converted or transformed and culturally 'overwritten' by the game. But the analog infrastructure also has its limits. For example, free-flying elements in three-dimensional space may only be displayed and simulated to a limited extent in a game. However, this did not prevent the game designers from trying out everything and anything in the analog dispositif.

Most nonelectronic games are processed based on humans. Games and their rules are able to use the entire range of the culture and socialization of people for their purposes, from hide-and-seek to chess, football, Les loups-garous de Thiercelieux (2001), Dixit (2010) or Icon Poetry (2011). The rules of the game are (mostly) open and visible to everybody, since they are read out aloud at the start of the game or available to be read individually by the participants.

People process the game (for example when they are dealing cards) and play it at the same time (when they are deciding the next move). This division is often forgotten, since particularly in turn-based games players manage the game (by processing the game mechanics) and play (by processing the rules of the game) in one turn. Nevertheless, there are games that delegate the rules of processing the game, for example, to a Game Master or to one of the players who has to take on an additional task, such as the management of the rules of the bank as in Monopoly (1935).

Alan Turing's invention of a rule-based automatic fellow player or Game Master has led to an unparalleled expansion of the game.

### Electronic games: digital infrastructure for self-running games

The idea of the game was radicalized with the development of the concept for a universal machine and its manifestation in the form of computers. Turing's universal machine is nothing more than a control processing machine. The machine itself consists of rules shaped by a simple language, and can thus control itself.

> "To ensure that all algorithms are translated in a uniform language, Turing defines a machine that consists of only a few essential language elements. The machine reads characters from an input device and writes characters to one output medium – and only a finite number, since the algorithm is finite." (Betz 2003: 10)

A kind of entry level ‘office worker’ or clerk (“equipped with paper, pencil and eraser”) serves as a metaphor:

> “‘Computations’, he [Turing] noted […], ‘are usually executed in such a way that certain symbols are written on a sheet of paper’. This is why, Turing continues, one can also declare the composite of a ‘human, equipped with paper, pencil and eraser’ – labeled paper machine –, as a ‘universal machine’ [...]” (Dotzler 2007: 301)

This cybernetic machine can now take over the management of the game (e.g. the bank) and therefore make completely different types of games possible: for example, games that do not wait for execution by humans but can create their own worlds to which we as players can hook up.

## Electronic games: highly integrated worlds of control

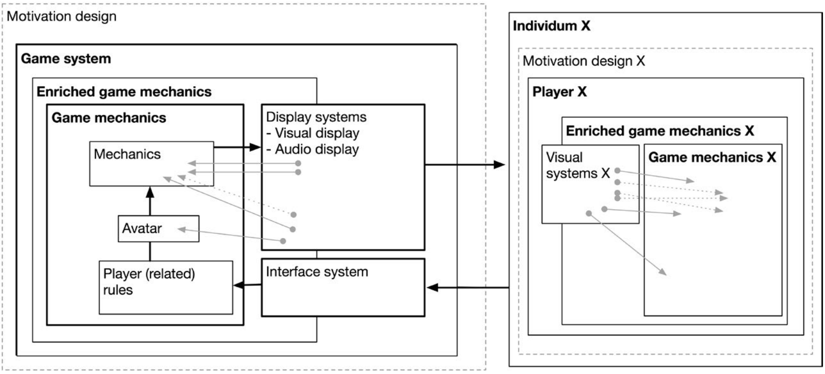
Instead of real-world analog rules, as in analog games, computer games start as a kind of tabula rasa, with all the possibilities of the respective computer. This space may be defined, modified and shaped with rules. This way, the possibility space of games is being realized through a machine, suggesting that almost anything is possible. Everything in this possibility space of electronic games has to be programmed, but everything is a rule and therefore can also be controlled. This computer-generated space is also called cybernetic space or for short, cyberspace, because of its characteristics. It includes everything that computer algorithms can process and control – therefore, not only classic representation with 2D- and 3D-architecture but also time, databases, communication, various sensors and so on.

In almost all areas of the game, electronic games need to simulate a game world using rules. This starts with the simulation of time (How does it work? On a regular basis or turn based, is it possible to rewind or even forward time?), continues with the visual game mechanics rules (the anchoring of game mechanics in the visual display – see Figure 4), the simulation of space (representation, visual display), and the way one can move in space (model of space) and concludes with the behavior of objects in gravity or in collisions (physic's engine). (Cf. Bauer and Kato, The Spectacular Space, in this volume)

The rules of the game are no longer processed manually; they are processed automatically in the background and are therefore no longer accessible to everyone. Players of electronic games in cyberspace no longer have direct access to the control system of a program and therefore of games per se. More than ever, electronic games are forced to anchor the game mechanics to the perceptible surface of a game such as graphics, sound and animations. This makes the games legible. Be it through concrete rules or only through rules by way of similarities and color concepts, the result of these integrations and closures of gaps in the game system are highly integrated and highly artificial products.

Games convey game mechanics to players and players interact (optionally) with an interface (via inputs by keyboard, mouse, controller etc.) instead of intervening directly.

*Figure 4: Electronic games are complex integrated systems. Players develop their own (often different) constructions of game mechanics.*




Source: Bauer

This gives the software the ability to control the output, and the games are able to control the semiosis process or the output of that process. Players can then adopt a game using the "Trial and Error" method and create their own model of the rule system in the process (Figure 4). This method allows them to find out how the game works. The adequacy of their decisions determines their ability to act in the game (Kocher/Bauer/Suter 2009). Thereby the player's model can differ greatly from the original game mechanics. Not every AI is as clever as planned and not every control and guidance system was actually designed that way.

Electronic games become a new kind of environment for the players, to which they hook up, become a part of and actively socialize in (as long as they abide by the rules). This is not much different from the socialization process in real-world society.

## ANALOG LIFE IN GAME MECHANICS

Computer games have playfully accompanied, inspired and asserted the transformation of our (economically oriented) society into a digital cybernetic and rule-based society.

In electronic games, abstract concepts such as cybernetics, systems theory or radical constructivism – once used for analysis – have become interactive reality. Some time ago Marshall McLuhan described the social role of games as follows:

> "Both games and technologies are counter-irritants or ways of adjusting to the stress of the specialized actions that occur in any social group. As extensions of the popular response to the workaday stress, games become faithful models of a culture. They incorporate both the action and the reaction of whole populations in a single dynamic image." (McLuhan 1964, 259).

Therefore, electronic games are a kind of tangible concrete philosophy of a cybernetic-capitalist society. Their emphasis is not only on topics and settings, but also on applied techniques, possibilities of interaction, types of motivation, enriched game mechanics with challenges, options, rewards and punishments, and the values and models conveyed by them.

Society increasingly resembles a game. The cybernetic game mechanics are competitors in society and as such they are very much involved in the market's motivation design. They form a pre-defined framework with a scope for development in which anything permitted becomes possible. And like in a game system, discourses offer prefabricated options for action as choices, to which the social system reacts with prefabricated reward and punishment systems. In a best case scenario, this pays off in the value or currency of the respective subgame system. In the process, individuals increasingly become parlor players, for whom game mechanics take precedence over everything and who have 'playfully' abandoned any moral and social concerns some time ago in order to become capable of acting. It seems the world has turned into a simple control system that is predictable and quantifiable. The simplification of socio-cultural complexity is potentially similar to oversimplification in games, and equally works with clichés, standard profiles, data classification, liking and grading, reduction and omission.

Thus, in all conceivable analog, digital and "social" games, players expand into simple and reduced models. Instead of reading complex answers of one's own composition, players like to choose from predefined answers. Instead of moving player bodies in complex ways across space, they use a mini joystick to move virtual giants. Instead of learning to operate each device, they use a single button to operate them all.

Avatars meet NPCs (Non Player Characters) and AIs that act autonomously based on rules. These modern digital slaves of fun rush players through the (game) world. As a reward they are consistently eaten, hit, slaughtered, crushed or simply destroyed. The irony is that NPCs and AIs are not managed much differently in terms of the code and rule system than the players themselves.

It is no coincidence that this is reminiscent of all the rule-based devices which increasingly keep our hands and brains busy, motivate us day in and out and playfully control us. Ultimately, we may have to face the cultural question: where do we still play, if we play everywhere?

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# Play Computers

*Miguel Sicart*

### Dear Reader,

I know you may be expecting an essay on game mechanics and videogames, here in this book, surrounded by such great company, what else would you be expecting? And yet, I don't want to write about game mechanics. Instead, I want to ask a simpler question: why do we play with computers?

Think about it: computers are commercialized as machines of productivity, as instruments and tools that improve our work, our daily life, and even our leisure. In the Western world, rare is the day in which we don't interact with a computer, or are at least engaged in a situation where a computer is playing a particular role. So, let me start my inquiry on the relationship between play and computers with a modest argument: the ubiquitous success and cultural impact of computing has been largely fueled by the inherently playful nature of computation and its machines.

I am not saying that computation equal play, but that one of the characteristics of computation, as a human-machine hybrid form of interaction, is its ludic nature. Apple's success happened when they made those grey boxes less grey, and more playful. Our smartphone interfaces make the metal and glass feel like an expensive toy. Remember Clippy! When we look closer, a playful attitude is essential to modulating our relationship with computers. Why?

In this chapter I want to appropriate the philosophy of technology (Verbeek 2005; Floridi 2013) and play theory (Huizinga 1992; Caillois 2001; Henricks 2015) to present one argument that helps answer this question. I will start by arguing that the point of encounter between play and computation can be found in their shared capacity to create worlds. I will use games to illustrate this point.

I will then situate this argument within a double philosophical tradition: on the one hand, I will apply postphenomenology (Ihde 1990) to understand world-making as a form of technologically-mediated orientation of experience (Rosenberger 2009). I will analyze closely the technological mediation using the Philosophy of Information concept of re-ontologization (Floridi 2010, 2013). This will lead to the main contribution of this chapter: play and computation are related because they both are re-ontologizing activities. The rest of the chapter will expand the implications of this perspective.

Understanding the relationship between play and computation is crucial. Not only are we seeing a radical societal impact in the use of computers as labor monitoring and surveillance machines, but also as the privileged medium of entertainment and communication. Computers can be understood as instruments for playful production and consumption. User interfaces, feedback systems, and entertainment forms based on play are taking over the computing machine to envelop its powers in a friendly, playful discourse. Understanding computers from the perspective of play provides us with an original insight on computational culture.

So dear reader, I hope you are ready to take a break from games and mechanics and think about play and computers.

## MAKING WORLDS

### Dear Reader,

I have promised you that I would stay away from games and mechanics, but here I am, ready to start talking about games. This is not, to try once again to confirm that games are interesting cultural objects, or that we need game studies. Games are important because they are the dominant technology of play, the instruments that humans have designed to mediate the activity of play. If we want to understand play, games are the right place to start.

My argument in this section is simple: games create worlds. Contemporary theories of play (Sicart 2014; Henricks 2015) are typically derived from Huizinga's idea that play is at the heart of culture: "The fact that play and culture are actually interwoven with one another was neither observed nor expressed, whereas for us the whole point is to show that genuine, pure play is one of the main bases of civilization." (Huizinga 1992: 5). Play creates forms of order, and that order creates forms of culture. Order structures experience, directs our attention to a way of perceiving our being and what is around us. Playing is a mode of being in the world that operates as a focus of experience through the creation of order: "Inside the play-ground an absolute and peculiar order reigns. Here we come across another, very positive feature of play: it creates order, is order" (Huizinga 1992: 10).

Games, the privileged technology of play, create order by providing formal, agreed-upon boundaries and meaningful actions for players to collectively engage in play-based interactions (Goffman 1961). When we talk about game mechanics, game rules, and all other formal elements of games, we are describing the instruments that games have to suggest an order in our actions, to propose goals to our activity. With these instruments, play creates new orders in the shape of the temporary worlds of games.

These arguments need some empirical evidence, so let's start by looking at a sport: football. Not the high stakes game played by professionals, but the game played with friends for the pleasure of playing, with no other goal than to play the game together. The game is designed around a very simple challenge: trying to make a ball go into a goal using only our legs/feet or head. This rule creates a handicap, the handicap creates a challenge, and the challenge is bound in time and space so that it is identifiable: we play in a football pitch for the amount of time we all agree to play.

When we enter the football pitch and start playing thus we enter a new world. It is a world in which our skills and stamina determine what we can do and how we do it. A world in which the goal focuses our attention, where our teammates are our comrades and a world structured around challenges that only exist because we voluntarily accept these handicaps. The limited actions that are meaningful in this encapsulated new world are afforded by the game mechanics as interpreted in the act of play. The world of the game of football only exists when we play football.

In the case of video games, the world creation process is somewhat similar. A game like *World of Warcraft* (2004) creates the world of Azeroth for us to play in. Computational media is used to give an audiovisual identity and presence in the world of Azeroth, as well as to mediate our interactions with and in that world. The process is similar to the game of football: players engage with the video game in order to experience play, and they play in that world using the mediating instruments that the game provides them with.

Let's return to the concept of world: what do I mean by play creating worlds? When we play, we orient our experience to the exploration and appropriation of the world in order to achieve some form of pleasure. This orientation of experience happens through the creation of order in the world. The technologies we create to play are mediating instruments that facilitate world creation, structure it, and give consistence to that created world. The props for play, like balls, or cards or keyboards, help us focus our experience and interact with the encapsulated world of play. At the same time, our voluntary yet negotiated intention of playing within that world makes us want to uphold the experience of the world we share and create alone, and with others.

World creation is not the exclusive domain of play. Many other human activities structure our experience and create encapsulated worlds, sometimes with the aid of mediating technologies. Work, usually and falsely considered the antithesis of play, is the structuring of labor through technologies, rules, and rewards. Other activities like learning or loving, are adept at creating these worlds, with or without the use of technologies of mediation.

In this chapter I want to make an exceptionalist argument about mediation, play, and computers. Computers are not just mediating technologies: they are world-making technologies that affect human experience (Rosenberger 2009). Computers are mediators and creators, engines and vehicles that create these worlds. If we want to understand the impact computers have had in our culture, we need to see them as creators of worlds.

The world-creation capacities of computers require to be programmed with an image of the world they are being inserted in. For computers to become agents in the world, we need to give them a sense of what they are, what to do, and how to do it (Bøgh Andersen 1997). Even the most advanced machine learning programs need to have a sense of what data they require in order to learn. Computers need a bounded vision of a bounded world so they can be a part of that world. That bounding happens through programming, and their bounded agency is the consequence of algorithms (Agre 1997).

But once a computer becomes an agent in the world and is a part of the world, that world for all other agents is changed. On a macroscopic level, you can probably see this phenomenon as Amazon and other online retailers that have gentrified the web and emptied main street. On a smaller scale, the world is now interfaced through smartphones that calculate your steps, pulse, and habits so they can be neatly packaged in apps that provide appetizing data for marketers and governments (Dourish 2007; Manovich 2013).

When computers are given agency in the world, the world changes. It becomes an “infosphere”, an environment in which informational beings, some human, some not, exchange information and cohabit in a complicated ecological equilibrium (Floridi 1999). Some of these agents are your neighbors, some are your household appliances, but they all inhabit this world in which computers and their processes have a role defining what *is* and how that actually is. This is because computers *re-ontologize* the world.

*Re-ontologization* is a philosophical concept coined by Luciano Floridi, who uses it to explain how computational technologies transform the nature of the infosphere itself because they are information machines: "the ontology of the information technologies available (…) is the same as (and hence fully compatible with) the ontology of their objects, the raw data being manipulated" (*ibid*: 7). Floridi addresses the ethical problems of the Information Age based on this observation, as he argues that re-ontologization is the "source of some of the most profound transformations and challenging problems that we will experience in the near future, as far as technology is concerned" (*ibid*: 6-7).

Let's describe this in less abstruse terms: banking used to be a more or less painful interaction amongst humans who on occasion needed the support of calculation tools. Then, computers arrived, and quickly took over the transfer and manipulation of capital on a large scale. Still, for many of us, until recently banking was a human affair. Prior to online banking and banking apps, customer-facing bank operations were a human-machine assemblage (De Landa 2006), with humans interfacing the complex system of finance. But now banks embrace how computers can turn most services into digitally mediated *self*-services, displacing the human interface and delegating its specialized labor to the customer. We pay for the comfort and the right to perform the labor that banks did, because computers have changed how we understand and perform banking and finance.

In the stock market the re-ontologization process has been even more radical. For example, high frequency trading (Lange, Lenglet, & Seyfert 2016) is a game of speed between algorithms racing each other while shaping the behavior of the stock market. Algorithms afford calculation speed and big data processing, and the actions they autonomously take based on those rules, change not only the results of the trading, but also the actions possible to all agents in the infosphere, human or not.

The radical redefinitions of the world only happen if the computers are programmed with a specific *model* of an infosphere (Dodic-Crnenovic 2010). Their agency is a result of a particular interpretation of the world they are inserted in as agents (Floridi and Sanders 2004). Algorithms are not magical beings: they are sets of instructions based on formal rules that allow computers to perform actions in the infosphere (Hill 2015). Re-ontologization is then the radical redefinition of the infosphere by computers programmed with a model of the infosphere in which their agency is possible.

I propose to treat infospheres as "worlds", consistent environments of structured experience. This allows me to consider play as a re-ontologizing process that creates a world within this world. Let's return to the example of games: through the design of challenges and mechanics, we create a gameworld that gives meaning and consistency to those actions. A game also gives agency to non-human agents, from AI agents to the humble (foot) ball. A game gives meaning to agency, it gives players the possibility to voluntarily accept constraints so that they can inhabit and enjoy that world.

Similarly, a computer creates a world where agents have to acknowledge and accept its existence in order to be able to interact with it. That world is created as the computational implementation of the relevant aspects of the world in which the computational agent is inserted, and that encapsulated world where computers with agency become an infosphere.

So why do we play with computers? The answer is deceptively simple: we play with computers because playing is a way of making sense of the world-making capacities of computers. We humans recognize in computers world-making machines, and we use one of our ways of creating worlds to engage with them.

But this is too simple of an analysis. We need to know what reontologization means, and how it can be used to connect play and computation together. Philosophy can help us. If play and computation share the capacity to create worlds, we need to understand how we experience the world, and how *experience* is related to technologies. It is time to return to the things themselves.

## TO THE GAMES!

### Dear Reader,

By now you must be tired of reading my argument about play creating worlds, and how computers also do it But this is the most important, if not the only contribution of my chapter. And in order to explain why it is so important, I need to remind you that technology directs our experience and creates worlds and subjectivities. In this section I will expand upon this argument by applying the method of experimental postphenomenology (Ihde 2012).

Postphenomenology is a contemporary interpretation of Husserl and Heidegger's phenomenological work, focused on inquiring about the mediating role of technology in shaping our experience of the world (Verbeek 2005). In brief, postphenomenology has developed a methodological approach that allows for identifying and questioning the role that a particular technology has in the experience of the world. Postphenomenology is a particularly interesting methodological tool as it allows us to analyze technologies, while keeping in focus an interest in human experience.

Let's start with a simple postphenomenological analysis. The first step will be the analysis of the experience of a video game. I will then move on to the analysis of the experience of a playful running application, and conclude with the analysis of a conventional running application. The goal of these analyses is to argue and illustrate how the experience of the world mediated by digital technologies has an inherent play element.

In this beginning, let there be *EA FIFA (2017)*. I am an avid player of this game, skilled and knowledgeable about its in-and-outs. I have turned on the TV and PS4 console. I have navigated to *FIFA's* in-game menu, using the controller, so that I can choose a team. I select Borussia Dortmund, as I often do, and press a button so that the computer finds me an online opponent. The game hasn't caught my total attention yet: I check Twitter on my phone. I have started the *game*, but I am not *in play* yet. But now it starts and as the game loads I am presented with a view of the virtual football field through a camera that simulates a television broadcast.

I hold my controller. My left thumb is on the left thumbstick. My right thumb hovers over the 4 buttons (square, triangle, cross, circle) on the right side of the controller. My right index finger hovers over the right trigger buttons, closer to the R1 button. My left index finger is firmly set on the L1 button. The match begins.

A flick of my left thumb makes me pass the ball to a teammate, or shoot. I sprint with my right index finger and my left thumb. With a tap of my left index finger, I jump from avatar to avatar, controlling different players and their positions, keeping my defensive stance, making runs to the open spaces.

But it is only when I reflect upon the game and watch a video of my playing that I'm aware of my actions. While I am playing, I am controlling the entire team, I *am* all players in that space, I *am* the patterns I can trigger and the actions I command. The controller is not present, the game demands all attention because all my world is onscreen, reading patterns and reacting to the opponents' actions. I am immersed in the world of *FIFA (2017)*. An AI helps me play, and I read how it behaves as if it was a teammate. I read how the opponents move, how they are aided by the AI, how the game unfolds in its choreographed logic of movements and goals.

When playing *FIFA*, the world is that of the game. The controller does not exist. I am in that world, a nexus within a distributed set of agents (my players, the opponent's), another human player, and different AI systems competing with each other.

The world, as experienced by me while playing, is composed of those technological assemblages (DeLanda 2006). While I'm playing, all that makes sense are the actions afforded by the controller and what I see on screen. My *experienced* world is that created and mediated by the game. My whole experience is limited, during my time of play, to the bounds of the game of *FIFA*, freely accepted and mediated by the technological devices I am holding and peering into. I am the controller, the team, the players, the AI's teammate, in the world of *FIFA*.

I am also holding a technological device in my hand when I am physically running in the "real" world with *Zombies, Run! (2012)*. However, I am not looking at a screen, I am listening. I am interested in the story I am part of. I want to run, but I also want to be a survivor of the zombie apocalypse. This application combines my interest in running with the capacity to be transported to a new world.

When I run outside, the world around me is different. The routes I choose to run are selected for their asphalt quality or scenic views. If I run to my furthest destination it is always to a scenic view – a reward for having run so far. Running changes the world.

But running with *Zombies, Run!* (2012) is a different experience. I put on my headphones, and the story starts. The story, a classic survivalist dream of the end of the world, makes me a survivor in a world overrun by zombies. I have to run to survive, to collect items, to complete the stories.

When I run with this app, the world changes by the rules of the game. It is the story being told, my capacity to interact with it, both creates the world around me, and gives sense to my movement. The story changes the world around me. It is through the lens of that narrative that I configure my activity. I act on its demands. The app changes the real world by mediating my activity, both by tracking my movement and by telling a game-like story.

What happens if we remove the story from the experience? I used to run using the Nike+ service, using an iPod (never forget!) to listen to running data and feedback. For me, one of the key points of that service was its capacity to give me live updates on my progress. Before running, I would schedule the length of the run, and then I would start running. The device disappeared from my horizon while running. I was listening to audiobooks while looking at the world and focusing on my running, pace and timing. At my halfway point, a voice would alert me of my milestone and the device would come back to my experiential horizon, but just briefly. Soon the physical activity engaged me once again.

400 meters prior to my stated goal, the voice returned and so did the device into my experience. It reminded me every 100 meters that I was close to the end. When I reached the end I was congratulated. When I got home, I uploaded the data and saw a map of my run. I correlated the data with the data from Google Maps. I had run more than I thought. Or less. There is always a discrepancy between the data. But I always ran whatever Nike+ told me is right. I did not run 5

or 10 kilometers. I ran what my phone calculated to be 5 or 10 kilometers. I run in the world, my phone understands. Or better, I run in the world my phone created. No need for a game. The way the sensors of this computing machine are calibrated to interact with the world, and the mediation of my experience of that world through that machine, have reconfigured the world. Nike+ creates a new world for my experience, one in which a machine dictates the distance, and thus my own experience of running.

My experience of the world is always mediated by technology, which shapes my intentionality, helps construct my subjectivity, and outlines the world as I experience it. In other words, technology shapes the world I experience, shapes my experience itself, and my subjectivity.

This process is one of world-construction: our experience is that of creating and being in a world where our experience and our subjectivity *become*. Games are devices explicitly designed to construct that world by constraining agency and creating obstacles that focus our experience. The other technologies I have briefly analyzed have different operational processes to reach the same result. One scaffolds our experience through games, but also by making use of computing technology. The example of Nike+ shows how we don't need games to create a world. Computers create worlds in which our experience and subjectivity is affected by their mediation and agency.

Much like games, computers have the capacity to organize our experience based on rules, limiting our action but also enhancing it, giving it new potential meaning: running away from zombies, becoming healthier one run at a time. Computational technologies perform an operation in our experience that modifies our experience of the world. I insist: they create worlds, much like play does.

Postphenomenology allows us to see how computing technologies and play arrange our experience in similar ways. However, postphenomenology does not allow us to analyze how these worlds are created in detail, what the meaning of artificial agency is, or, more importantly, what the role of play would be as an experiential orientation in a world created by computers. These questions need to be addressed more granularly. The purpose of this section was to illustrate how games and computers create worlds that affect our experience. In the next section I will introduce a concept that will allow me to explain this process in depth, while also providing the foundational argument that connects play and computation.

## RE-ONTOLOGIZATION

### Dear Reader,

So far, we have played games, and we have thought about computers. I have explained to you that the way we experience the world is unavoidably mediated by technology, and that computers are an exceptional type of machinery because they are afforded agency in the world thereby changing the ontology of the world. Computers create new worlds, much like play does. Those are the worlds we experience. Now I am going to go deeper into that world-creation process, presenting the concept of re-ontologization to put experience and ontology in the same conceptual space. Caution: philosophy ahead.

Postphenomenology as a conceptual approach allowed us to describe what happens when we interact with technology in the world, and when we play. The mediating similarities between play and computation have to do with their shared capacity to structure experience and direct intentionality through rules that constitute a *world as experienced* (Ihde 2012). However, postphenomenology does not allow us to properly look beyond the experiences of individuals. If play is really at the heart of computational culture, we need to be able to analyze the shared elements between play and computation from a broader perspective, looking at them not only as constitutive of individual experiences and worlds, but also as operating within the larger network of society.

To properly make the argument that play and computation are related – and this relationship has effects in shaping the cultures, technologies, and social arrangements of the information age – let's look at this world from the perspective of re-ontologization (Floridi 2013: 6-8). How do computers transform the world? Computers can store and process data very quickly. For doing that, they need to be fed data; they need to be given models that are logically consistent and formal enough so that computers can perform calculations with them. An important part of computer programming is precisely that: to design the formal ways of "defining" the world so a computer can store them as data and perform calculations on them (Agre 1997). Modern machines can perceive the world around them. Computers have arrays of sensors that can directly translate the world surrounding them to data that they can act upon, provided they have been given adequate formal tools to process the data streams. And finally, by being networked, computers can be entry points to a vast network, effectively re-weaving the world into a mesh of infrastructures and routines that are interconnected (Galloway 2004).

Essentially, when programming a computer to perform a task, programmers translate the task into computable instructions. There are material limits to the computations a machine can perform (Agre 1997). Therefore the model of the problem is the program given to the computer to execute, it is a translation to computable problems of a particular understanding of the world. It is also the result of a process of abstraction, which factors in the processing time available for a specific machine to perform its calculations. Computer programs are models (of the world) limited by what can be realistically computed by *actual* machines.

This process of creating a world for the computer is the first step towards re-ontologization, because programming gives consistency to the infosphere where a computer is given a degree of agency. Once we program the computer so it can understand the world and act in it, that world is also changed for human experience. An infosphere is created, with hybrid human-computational presence. The world in which that infosphere is instantiated is re-ontologized.

Let's make this concrete with some examples. Thanks to the widespread presence of ubiquitous mobile computation and the development of encryption and security technologies like blockchain, cash is an endangered species. If we want to be a part of computationally augmented banking, we need to renounce money as a material thing, adapting our behavior to be citizens of this infosphere. In the infosphere, cash is a throwback to the materiality of what never was anything more than a network of agreements only now these are computationally stored, verified, and communicated. Money has finally surrendered to its true nature, and become an informational transaction token.

Physical money is dying because it is more convenient, and perhaps ontologically more accurate, to use computers as agents for transactions. This death is the consequence of applying formal rules that change degrees of agency and the nature of being in the domain of monetary transactions: computers become agents in the world of economics. The formal rules these computers enact, effectively give them agency and re-ontologize the world: the nature of money has changed.

Another good example of this process comes from videogames. A game is a set of rules that structure agency, space, time, and for some scholars studying games, meaning (Juul 2005). The rules of a game define what is and what is not possible within the boundaries of the experience. Games are technologies designed to give meaning and purpose to actions taken in pursue of a goal defined by the game itself but agreed upon by the community of players (Suits 2005). Videogames are games in which those rules are part of a system of computational agency. The rules themselves have been designed so they can be computed within the given technical requirements of platform. The experience of players is that of the rules created and upheld at runtime by a computer agent, and the ontological consistence of the videogame world is coherent with the process of creating a world that is re-ontologized through a computer. It is a re-ontologized world because the world of the videogame, in the experience of the player, is broader than the world the computer agent can create. But what is presented as meaningful for the experience of the player is limited to that which can be computationally presented to them. Players don't play a videogame, they play a re-ontologized instance of the abstract, platonic ideal contained in the videogame technical object.

It is precisely this connection with play, and how computers help us create the worlds in which we play in the form of videogames, that allows me to propose the argument that play is a privileged form of interacting with computers. Let's summarize the argument so far: when we play, we use rules to create a world. We inhabit that world through the experiential lens of play. The actions we take while playing, as well as the identities we may perform, are all related to the world created by the activity of play itself.

Computation performs a similar operation of world-creation. In order to become agents in an infosphere, computers need to be given clear instructions as to how to compute the data they work with. They also need to be able to operate with other information agents, situating them within their network. And they need to be open for those agents to interact with them, to provide input and receive feedback. To do so, computers become a part of a world that has to adapt to the particular ways in which they have agency. When introducing computational agents in an environment, the world is changed. These agents appropriate the world, and we need to live by the rules that allow us, and them, to interact.

Play and computation share the capacity to create worlds in which agency is redefined. Play sometimes takes over, and leverages computation to create worlds, like in videogames. On the other hand, play is sometimes used as a way of understanding how computational worlds operate, and why we should care about them. It is the world we live in, and in the western world it is already an infosphere, a world created by and for computers. Play gives us the possibility of understanding and redefining our agency with that informational world. In the next section I will explore this possibility in detail, focusing on how play is an interface to the world created and facilitated by computers, and how that interfacing allows us to shape our experiences of the world.

## PLAYING, WITH COMPUTERS

### Dear Reader,

By now, I hope your initial skepticism about my claims regarding play and computation has dissipated (I also hope you were skeptical regarding my claims – what a waste of arguments if you weren't!). There is not much left for me to argue about in this chapter. I have already presented my main argument. What I have left to say is perhaps the most important thing: what is at stake? Why does it matter that play and computation are related? This brief section will provide (even more!) arguments that apply the concepts presented so far to explain why this way of seeing play and computers is so important.

Play and computation are related because they both create worlds that shape human experience. We use play to create worlds, and we use computers to create worlds. This answers the question I posed in this chapter: why do we play with computers? World-creation, as re-ontologization that shapes human experience, explains the relationship between play and computation. There is of course much more work to be done, but we have now the keystone that allows me to question the play experience of computational worlds, and the computational experience of play worlds.

However before finishing, I need to explain how this idea might work as applied to future studies of play and games. Because there is a key problem with the re-ontologization argument: we already know that play can create worlds. At the same time, we know that part of what fuels the information revolution is our capacity to program computers to act in the world, and to envelope the world so that computers can be a part of it. So why is this so special? Why is it that re-ontologization explains *everything* (or almost everything)?

Let's start from the beginning. The most important aspect of the information revolution is that most of our experience of the world is now being mediated by computers: computers running the databases that manage our banks, computers we carry in our pockets, computers that allow us to do new jobs. We live in a world where it is complicated not to see the mediation of computers. This is what classic postphenomenology has not covered: we cannot opt-in to a world of computation, since the world is already informational. The world is already an infosphere, and living in it means taking for granted the computational layer of experience.

However, postphenomenology allows us to look at how human experience takes place in this world, and how we construct our subjectivities and how technologies play a role in the shaping of these technologies. We start with the assumption there is always a technology present in the shaping of our experience, and that this technology is likely to be a computer.

We need to challenge and extend postphenomenology by inquiring into the human intention towards this technology (Rosenberger 2014). Classic postphenomenology does not think about intentionality, which is melted in the way the experience is shaped by the technology. I want to challenge this assumption, since an important part of having human agency is the capacity, often limited but still relevant, to direct our intentionality towards mediating technologies.

Some of our experiences of the world are mediated by computers. We *know* that running with an app has a computational element, and we *know* that in order to experience the kind of fitness experience we want to enjoy thanks to the app, we need to establish a relationship to the computer. Similarly, banks and other trading institutions need to acknowledge the material principles of computation (processing time, data transmission rates) if they want to benefit from high frequency trading algorithms. And we need to put some trust somewhere in the sociotechnical network that provides us with news and updates about the world through websites and social media "shares". All of these examples show that there can be a conscious or unconscious acknowledgement of the presence of a computer having a measure of agency in the world we are experiencing (Floridi & Sanders 2004). We *can know* we are in an infosphere, we *can know* that, like in a videogame, there are computational agents having a role in shaping our experience. This knowledge is key in the way we shape our intentionality in the experience of the world.

Play is a mode of organizing human experience. It is based on an appropriative take of the world that creates a world with its own purposes, an *autotelic world* in the world. Playing is organizing our experience of the world by allowing agents to freely define their goals and constraints, to adjust to them, to stop the activity of play when they wish. Play is a way of structuring human experience around pleasures, but also around the paradoxes of appropriating the world and reinterpreting it without other purpose or goal than to experience the world in a playful way.

Human experience in the information age happens in an infosphere, a world in which computation has agency. Play, as a way of appropriating that world to give an orientation to human experience, can be used as a way of making sense of that agency, of constructing a world with the already re-ontologized world.

There are two strategies that play opens up for this making sense: we can either inhabit this computationally re-ontologized world as we do when we play videogames, accepting that computational agents also have agency in this world and we have limited agency so that they can coexist with us. This is a strategy of *playful submission*, surrendering to the benefits of engaging with a computational world, being in the world with computers as if the actions they allow us, the activities we can perform thanks to them, are somehow related to the game mechanics that we experience in games. In this approach, we play *in* the computational world.

And so, we run the kilometers our fitness app wants us to run, even if those are just the calculation that a networked computer can perform based on the imperfect data of their sensors. Or we accumulate "likes" and hearts in social networks, to prove that people care. Play, through the language of videogames, allows us to live the computational world through the lens of the submission to computer-based agency.

The other orientation of experience that play affords is that of resisting the re-ontologized world. Instead of living in the world computers live in – by the rules computers need to be in the world – play can be used as a strategy to create a world in which the very presence of computation is a prop for play.

In this approach, we play *with* the computational world. We draw penises thanks to the tracking abilities of running applications, like Claire Wyckoff's Running Drawing (http://runningdrawing.tumblr.com). We remove numbers from Facebook so our experience of the network is not based on competition, but on whatever else it might be, as Ben Grosser's Facebook Demetricator (http://bengrosser.com/projects/facebook-demetricator/) art project proposes. We poke fun at these computers everywhere, because we can play with them. They are not agents anymore, but toys, in the deeply aesthetic assertion that we too can create worlds, and play in them. This is the play of resistance, the re-ontologization of a world *in* the world of computation.

Because play is also a re-ontologizing way of being in the world, it has a predominant role in understanding and shaping our experience of the computational world, which in itself is the result of a process of re-ontologization. Play is an interface for re-ontologized worlds. Interface not in the sense of HCI and UX, but in the experiential mode of a point of contact between technologies and humans, as a node in the network of experience. Play allows us to interface with the computational world, to understand its requirements and to live by, or against its rules. In videogames, the interface of play allows us to experience agency through mechanics, and express ourselves through them. In the computational world, play allows us to interface with the re-ontologizing processes that give computation agency in the world. Play is an experiential interface to the world of computation (Flusser 2013).

This is why it is so important to ask why we play with computers. As we drift towards a world in which computation is not only ubiquitous, but also indispensable for our lives, we need to understand the ways in which computers shape our experience of the world. Play has a role in interfacing with these worlds-with-machines. Play is a way of interfacing that draws on the history of the technologies we built for play, like games and toys, but has to deal with the radical new worlds created by computers and their agency. Play allows us to understand how to live, and how to experience the computational world.

## CONCLUSIONS

### Dear Reader,

Why does it matter to know why we play with computers? After all, play is this childish activity, a structured series of whimsical attempts to find pleasure! Sure, we humans are defined by being playful, putting us together in a natural continuum with the animal world, and also challenging functionality as a driving force for evolution. But besides that, what has play ever done for us?

Except, of course, help us define the way we engage with the culture of the computation age. We make sense of these computational worlds by playing, we see the limited actions that we perform so that computers can be a part of the world through the lens of play, as rules we follow or bend, as goals we need to achieve. The re-ontologization of the world by computers has made it more possible to experience the world through the lens of play.

This is not necessarily a positive thing. Play tends to have this almost magical positive quality in our culture, as something that is fun, life affirming, creative and beautiful. But these are the consequences of orderly forms of play. Play can also be destructive, unruly and chaotic (Henricks 2009). Play can harm and hurt and wreak havoc in the world (Schechner 1988). For every creative use of play with computers, we will have trolls lurking on the sides, playing their dark play games. And if we do not understand that computation, in its very nature, facilitates play, we will never be able to address the multiple problems of living the world playfully. We will keep on feeding the trolls, consuming fake news, grieving, cheating and even inventing new ways of harming others through darker forms of play.

We play with computers because they create a world for us, just like play does. They create a world for us to be agents in, with strict rules and processes and ways of being there. We cannot avoid being in that world. But we can take responsibility for the worlds we create when we play with computers. Because this is my only (not) conclusion: we play with computers because they are machines *of/for* play. In the information age, play is a privileged interface with computers. And that might be as close as I can get to something resembling a conclusion – for now.

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# Game Mechanics

# Requirements for a General Game Mechanics Framework

*Imre Hofmann*

In this article I will apply a meta-theoretical approach to the question of how a game mechanics framework has to be designed in order to fulfil its task of adequately depicting or modeling the reality of game mechanics. I had two aims in mind when starting my research. I studied existing game theories and three game mechanics theories in particular in order to evaluate the state of the art of game mechanics theory. (Descriptive aim) The second aim followed on from these studies. With the results of my research I wanted to define the attributes a comprehensive and general game mechanics theory might or – rather – needed to have. What are the general properties that such a theory should display? (Normative aim)

In my opinion the underlying mechanics of a game may be regarded in some way as its centerpiece. The reasons for this shall become clear over the course of this article.

To begin with, I would like to make two terminological clarifications. First, I am not going to examine different game mechanics and typologies or categories of game mechanics. Instead, I will take a theoretical step backwards, so to speak, on the meta-level by analyzing and comparing different theories of game mechanics (which themselves suggest categories and typologies). Secondly, I will use the expressions "game mechanics theory" "(game mechanics) framework" and "(game mechanics) model" synonymously.

In my research I focused mainly on the following three key theories of game mechanics:

1. Carlo Fabricatore's *Gameplay and Game Mechanics Design* (2007)
2. Miguel Sicart's *Defining Game Mechanics* (2008)
3. Ernest Adams' and Joris Dormans' *Game Mechanics. Advanced Game Design* (2012)

Before I undertook my study – in 2015 – these had the reputation of being the most elaborate theories of game mechanics.

As a first finding of this comparison it became evident that all three frameworks share the idea that the mechanics of a game cybernetically organize the changes of a game's states through rule-based interaction and causal relationships. This means that all games are rule-based and that these rules organize the causal relationships between the interactions of the different agents in a game. On this level of formal abstraction all games are comparable with each other.

Apart from this common ground, however, the different frameworks vary widely. Because of their considerable differences I needed to identify further general criteria and requirements such a framework would have to meet in order for it to be comprehensive. Therefore, at an early stage of my research the normative considerations became a key factor. To obtain such a broader understanding of what a game mechanics framework should accomplish, I was mostly reflecting on conceptual and terminological distinctions. This is why my argument follows a pure top-down approach which could almost be considered a case of apriori reasoning.[1] This essay will therefore be based on the following structure:

1. I will start with an examination of technical terms.
2. After that I will draw conclusions about the normative requirements of game mechanics frameworks.
3. Then I will compare the three theories mentioned above.
4. Finally, I will present further conclusions with regard to future research goals.

## THREE CONCEPTS DISTINGUISHED: GAME EXPERIENCE, GAMEPLAY AND GAME MECHANICS

There are three crucial terms which closely correlate with one another, but in my opinion need to be distinguished more clearly:

1. Game experience
2. Gameplay
3. Game mechanics

1 I suppose that it would be worth considering complementing this approach with a bottom-up study examining existing and tried and tested categorical differentiations used by bigger game studios in there production process.

All of these terms are often used in discussions of game mechanics theory. I would argue that if they are not sharply distinguished, the project of designing a general conceptual game mechanics framework is doomed to failure by definition. On the other hand, I believe that by using and defining these terms boldly some fundamental conceptual decisions can be reached which will improve the theoretical discourse around game mechanics and its framework.

So what do these terms actually mean? Or: How should they be defined so as to avoid confusion?

I consider "game experience" and "game mechanics" to be the two conceptual cornerstones that define the field of game mechanics: on one side, "game experience" stands for the *subjective experience* ("I feel excited playing this."), whereas on the other side, "game mechanics" stands for the *objective mechanics of a game* ("The inner, causal architecture of this game looks like that.").

## The subjective perspective: game experience

What is game experience? I define "game experience" as the mental and therefore subjective experience that is created by a particular game. This premise has far-reaching implications. As game experience is a mental and subjective process ("first-person perspective/accessibility") it is not methodologically directly observable with the third-person perspective of science. (Psychological) science achieves no immediate access to it but has to interview the player. Despite its subjective ontological nature, game experience can be described as an epistemologically objective property of a game (e.g. "The game experience of this game is more exciting than the experience of that other game.") Why is game experience relevant in the discussion about game mechanics? The main reason is that the experience is the purpose of playing or developing games. This becomes obvious when we look at the vocabulary that belongs to the game experience. It contains all the motivational words that explain why we play ("fun", "immersion", "flow", "thrill", etc.) and why we consider some games as good and others as bad. But while a (good) game experience is the ultimate goal of a game and what game designers aim at, it can only be accomplished indirectly. As this cannot be immediately observed scientifically there is no immediate control of the game experience by the game designer.

Scientists and producers must therefore focus on what is at their disposal. For game designers it is the game itself that creates the game experience. And I would suggest that of the many different factors that influence game experience, game mechanics is one of the most important ones.

I would argue that game mechanics is one, if not the central *objective cause* of game experience (others might be the semantic-narrative layer and the aesthetic-atmospheric layer). For game designers it is therefore crucial to understand how specific mechanics evoke specific experiences. Game mechanics and game experience are two very different things: the latter can only be perceived subjectively; the former can be observed and produced objectively. But they causally correlate with each other.

## The objective perspective: game mechanics

So what do I mean by game mechanics? Let us start with the afore-mentioned shared common ground of the different frameworks and loosely define "game mechanics" as "the objective structures and properties of a game that cybernetically organize the changes of a game's states through rule-based interaction and causal relationships." The catch in this definition is that it is by far too abstract and formal. One would expect that game mechanics contain properties that contribute to a distinctive definition of games. But the definition of game mechanics given above could also describe nearly any (computer) program (if "game" is replaced with "program"). So, while this definition might be helpful as a starting point it will need to be narrowed down in order to become a sound foundation for a theoretical reflection. As a first step towards such a more precise definition, I will clarify the issue of rules or actions.

### *Rules or actions?*

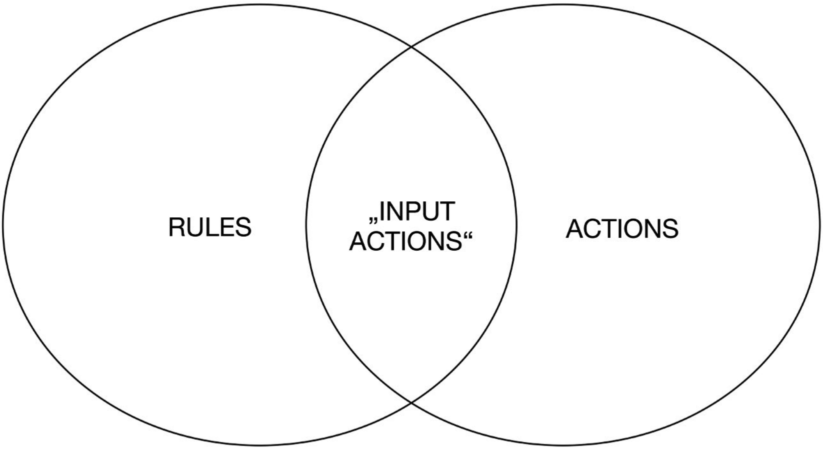
There seems to be some disagreement regarding the question of whether game mechanics encompass the formal rules and structures of the game or "the actions afforded to players by those rules" (Sicart 2008), or indeed both. I would argue that the former must be the case: since game mechanics should describe the cybernetic system as a comprehensive whole it cannot exclude but must contain the rules. Any description that limits the scope of examination to the actions "afforded to players" neglects essential properties of the game and therefore results in a reduced perception of its mechanics. I would further argue that the restriction of the field of game mechanics to the actions of the players is the consequence of a misguided conceptualization that takes its starting point from gameplay and its player focus[2]. I would counter such an approach by emphasiz-

2 I will use the term "focus" here instead of "perspective" in order to distinguish it from the use of "perspective" denoting the ontological difference between "subjective" ver-

ing that when talking about game mechanics one should start from the game as such and therefore maintain a holistic focus. It also raises the question of what term we should then use for the other elements underlying the game if we restrict the mechanics to the actions.

As illustrated by the following diagram (figure 1), I would suggest that some rules are identical with actions. These are the rules that define what I call "input actions". Input actions (such as "press button") are actions that are observable on the input-level of the game whereas other actions of a more complex scale, such as strategies, cannot be observed (but only derived) from the game. Therefore, I would suggest to exclude holistic long- term activities from a game mechanics framework and to consider small-scale "input activities" as part of the rule set of a game.

*Figure 1: "Input actions" are also rules*




Source: Hofmann

## The interface: gameplay

How do game mechanics create game experience? They need an interface: gameplay. All of the authors mentioned in this article talk about "gameplay" rather than "game experience". A common phrase might sound like this: "Game mechanics create gameplay" (Adams and Dormans 2012: xi).

sus "objective" perspective. The term "focus" might also be more accurate insofar as it is concerned with the object and not with the subject of observation.

The term "gameplay" seems to be some kind of a hybrid: Fabricatore defines it as "the set of activities that can be performed by the player during the ludic experience […]". (Fabricatore 2007: 4)

So, according to this definition, gameplay is on the one hand concerned with activities (which are factual and objective properties of the game), but on the other hand only player-related activities are considered. This player relatedness is not exactly the same as the subjectivity of the experience mentioned above; it is rather a form of perspectivity. Gameplay is player-focused in its perspective. If we consider gameplay as "the set of activities that can be performed by the player during the ludic experience […]" (ibid), gameplay can be defined as a player-focused subset of all possible interactions in a game.[3] Some authors add to this the aspect of challenge(s) posed by the game.[4] The available actions serve to master these challenges.

We have now made the necessary terminological differentiations that allow us to distinguish between the notion of gameplay and the notion of game mechanics. And if we distinguish "between the rules of the game and the actions afforded to players by those rules" (Sicart 2008) we then can call the former "game mechanics" whereas the latter could be labeled "gameplay". Gameplay therefore is the tangible interface between player experience and game mechanics. This causal connection is illustrated in figure 2:

3 Likewise Craig Lindley: "[…] gameplay gestalt, understood as a pattern of interaction with the game system." ("A gestalt may be understood as a configuration or pattern of elements so unified as a whole that it cannot be described merely as a sum of its parts."); "[…] In general, [game play gestalt] is a particular way of thinking about the game state from the perspective of a player, together with a pattern of repetitive perceptual, cognitive, and motor operations. A particular gameplay gestalt could be unique to a person, a game, or even a playing occasion. Unique gameplay gestalts can also be identified across games, game genres, and players." (Lindley 2004: 183-194). See also Salen and Zimmerman (2004): "Game play is the formalized interaction that occurs when players follow the rules of a game and experience its system through play."

4 For example Adams and Dormans: "We define *gameplay* as the challenges that a game poses to a player and the actions the player can perform in the game. Most actions enable the player to overcome challenges [...]. The actions that *are* related to challenges are governed by the game mechanics." (Adams and Dormans 2012: 43)

*Figure 2: Game mechanics create the game experience via gameplay.*


Source: Hofmann

The clear conceptual distinction between gameplay and game mechanics should also have implications for the design process. Game designers have to distinguish between (at least) two different levels of design:

1. Gameplay design: this could be regarded as "motivation design" *for the player*, taking into consideration the perspective of the player.
2. Game mechanics design: this would contain the programmable "visceral construction" *of the architecture of the game* which manifests itself on the level of the program code or an abstraction of it, such as Unified Modeling Language (UML).

Of course, both levels are intertwined. If we take into account that the ultimate goal of game design is to achieve a great game experience we can conclude that the design process will start with the gameplay and end with game mechanics.
We now can distinguish between

1. Game experience (subjective, player-focused *experience*)
2. Gameplay (objective, player-focused *actions*)
3. Game mechanics (objective, game-focused *rules*).

## Brief digression: the MDA framework

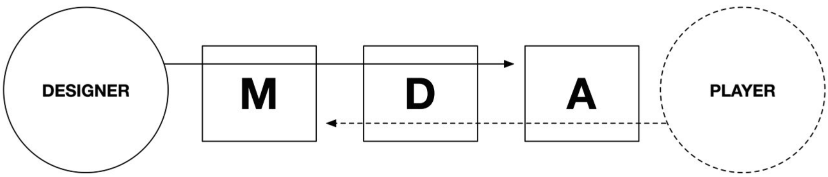
The MDA framework by Hunicke, LeBlanc and Zubek (2004) proposes a categorical distinction that at first sight seems to correspond with the distinction explained above (see also figure 3). One might be tempted to correlate the terms in the following manner:

1. Game experience (subjective, player-focused experience) > *Aesthetics*
2. Gameplay (objective, player-focused actions) > *Dynamics*
3. Game mechanics (objective, game-focused rules) > *Mechanics*

But in my opinion the MDA framework is conceptually and ontologically inconsistent. This follows on from my definition of the game experience as ontologically subjective, which implies a sharp division between game experience and game mechanics whereas the MDA framework seems to suggest some kind of continuum. The authors of the MDA framework also tend to think of the "aesthetics" component as player-oriented and subjective when they label it with the term "fun". But when they further explain the aesthetics component they end up using a taxonomy of "sensation", "fantasy", "narrative", "challenge", "fellowship", "discovery", "expression" and "submission". It is obvious that some of these concepts can be seen as describing a subjective player's experience (i.e. "sensation") while others rather refer to objective features that describe either the gameplay (i.e. "challenge", "discovery") or even the game itself, such as the "narrative". It would be misleading to think that the game can be regarded as identical with the game mechanics. A game as such also consists at the very least of a semantic narrative (the "story") and something like the designed aesthetics of the game's world. But while these features also play a role in creating the game experience they themselves are part of the game itself.

There are similar concerns regarding the "dynamics" component. If this concept describes "the run-time behavior of the mechanics" (ibid) it is essentially just another description of the mechanics. The "dynamics" component could therefore only be identified with gameplay if by "the run-time behavior" one meant nothing but the player-focused behavior. I therefore recommend that the terminology of the MDA framework should be avoided for its lack of conceptual accuracy and consistency.

*Figure 3: The MDA framework. The arrow beginning with the "designer" shows the causal connection between mechanics, dynamics and aesthetics.*




Source: Hofmann

## THE NECESSARY REQUIREMENTS OF A GAME MECHANICS FRAMEWORK

What conclusions can be drawn from this for our draft of a comprehensive and general game mechanics theory? I believe that our deliberations thus far allow us to deduce a normative matrix of necessary requirements for a game mechanics framework.

If one of the crucial distinctions between game mechanics and gameplay is that the latter is player-focused[5] and if we agree to use the term "game mechanics" for the systemic whole of a game, we can deduce a first and crucial normative requirement for a game mechanics framework: non-player focusing (criterion: "player-focusing"). In order to adequately describe the whole of a game's mechanics, its perspective must not be player-focused (but game-focused). A player-focused perspective is by definition too narrow to encompass the whole of a game's changes of states and causal relationships.

I further contend that we can at least partially deduce three additional requirements from this first one. If a theoretical game mechanics framework is expected to be not player-focused but *game-focused* then it has to describe the systemic whole of a game and not only its particular mechanics (criterion: "holisticism"). And if we omit the player in these considerations it becomes obvious that game mechanics is about rules, not the actions of the player or other agents (criterion: "rule focusing"). However, as I have mentioned before, some rules can be considered as "input actions". Therefore if a game mechanics framework describes interactions, it has to do so on the level of quantitative input/output values and not on the level of complex activities or abstract strategies (criterion: "interaction resolution").

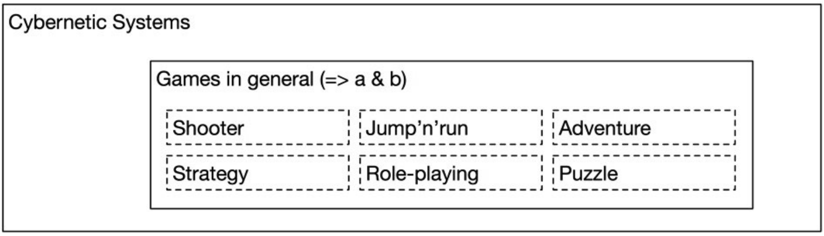
I would suggest adding one more requirement that follows on from the need for definitional accuracy. A sound game mechanics theory has to meet two complementary logical requirements at the same time:

a) It has to be sufficiently abstract and formal *to be applicable to all sorts of (video?) games*, and not just a subclass (i.e. "shooters").
b) It has to be as definite as possible in order *to distinguish (video?) games clearly and precisely from any other possible rule-based cybernetic system*.

5 Notice that I use the term "focused" synonymously as other authors (i.e. Fabricatore) use the term "centered".

Therefore an ideal game mechanics framework needs a certain degree of formal abstraction that contains all possible games without containing other elements, such as cybernetic systems (criterion: “formal abstraction”, see table 1).

*Table 1: The definition of “games” must distinguish them from other cybernetic systems and simultaneously contain all sorts of games.*




Source: Hofmann

The resulting matrix with the five normative requirements (required value highlighted) looks like this (table 2):

*Table 2: Five requirements of a game mechanics framework.*

| CRITERIA | MINIMUM | MAXIMUM |
|---|---|---|
| player focusing | **not player-focused** | player-focused |
| holisticism | partial mechanics | **systems mechanics** |
| rule focusing | actions | **rules** |
| interaction resolution | **input/output** | strategies |
| formal abstraction | genre specific | **for all games** |

It should be clear that the criteria denote gradual transitions that leave a lot of space between the extremes. And it has to be added that even though the requirements tend to emphasize the end points of the continuum, these define just the necessary minimal requirements of a game mechanics framework. Once such a framework has established a holistic, formal, rule-based and not player-focused model of game mechanics, it would obviously be desirable if it were also able to switch to a player-focused perspective and depict complex interactions or partial mechanics.

There might be some confusion about the seemingly opposed “directions” of the criteria of “holisticism” and “interaction resolution”. Whereas the criterion of holisticism requires that the game is considered as a complex system as a whole, the criterion of interaction resolution calls for the description of elementary small level units. I would argue that this opposition does not constitute a contradiction but rather spans the cornerstones of the fields of observation and analysis.

With this set of normative requirements at hand I will now examine the existing game mechanics models with regard to their ability to fulfil these requirements.

## 1. FRAMEWORK: FABRICATORE

In his work *Gameplay and Mechanics Design: A Key to Quality in Videogames*, Carlo Fabricatore (2007) takes a decidedly player-focused stance – or "player-centered", as he would say – since he focuses on the design goal of player satisfaction. He therefore gives a lot of thought to game experience and gameplay and his deliberations often remain in the realm of mental concepts (i.e. motivation, learning and reward).

In his view, game mechanics seem to be the correlating rule set counterpart to gameplay.

Fabricatore defines game mechanics as "proper tools for gameplay, atomic rule-based interactive subsystems capable of receiving an input and reacting by producing an output. Such output translates into a state change of the mechanics itself and/or into the triggering of new interactions with other game mechanics." (Fabricatore 2007: 5) He offers as examples of such singular mechanics the mechanics of a door or an alarm.

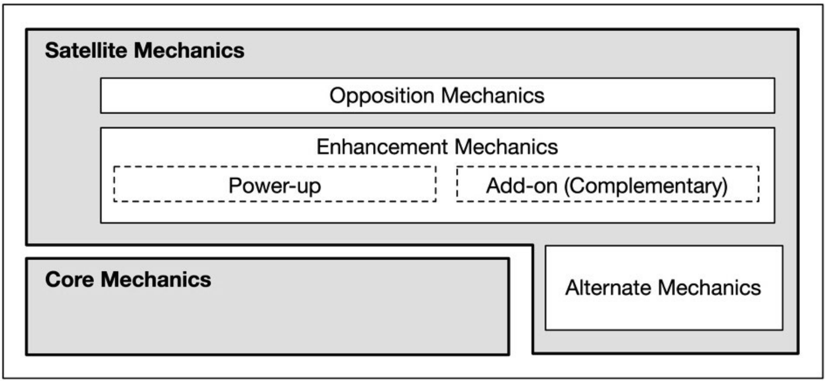
It is worth mentioning that Fabricatore uses the term "game mechanics" only for the mechanics of individual "toys" (ibid: 4) that can be interacted with by the player, but almost never for the game system as a whole. Even though the use of the term "subsystem" in the quote above implies the presupposed existence of a main system, Fabricatore doesn't ponder on the game as a whole. His concerns about game mechanics refer to the player's perspective and experience. This is the case for instance when he explains how the player's goals of challenge, mastery and reward correspond with "mechanic-related activities" (ibid: 6), such as learning and using the mechanics for different goals. This allows him to arrive at some guidelines for the design of game mechanics.[6] Once again, it is obvious

6 These guidelines are: "1) Estimate the learning time for each feature of a specific mechanics, and make sure that the time to learn is proportional to player's perceived

that his reflections on game mechanics are solely oriented towards gameplay and/or game experiences.

His focus on gameplay leads Fabricatore to distinguish different kinds of gameplay and the corresponding mechanics in respect to their relevance to the player. These are: 1. "Core gameplay", 2. "Core meta-gameplay", 3. "Satellite Mechanics", and 4. "Peripheral gameplay" (ibid: 11)

*Table 3: Fabricatore's architectural model of game mechanics.*




Source: Hofmann

He defines "core gameplay as the set of activities that the player will undertake more frequently during the game experience, and which are indispensable to win the game. The game mechanics which allow carrying out the core gameplay activities are called 'core mechanics', and are, consequently, the most important in the game" (ibid: 11).

He then delineates an architectural model of different types of mechanics and their relations (see table 3).

As can be seen the term "architectural" might be misleading because the building structure Fabricatore refers to is not that of a game but rather one of dependencies between different categories of game mechanics.

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complexity and relevance of the feature itself. 2) In order to avoid burnout, design the game to allow players using game mechanics as gameplay tools as soon as they feel they've learned them. 3) To further decrease the possibility of burnout, and increase the perceived appeal and relevance of the mechanics, ensure that players will have enough opportunities to use game mechanics' features enhanced through the influence of external factors, achieving otherwise unattainable goals." (Fabricatore 2007: 10)

We can now conclude that since Fabricatore's proposal is geared towards game experience and gameplay and since it lacks the perspective on the game as such and as a whole, it does not fulfil the requirement of not being player-focused. It is only apt for considering questions concerning gameplay (motivation) design (see table 4).

*Table 4: Positioning of Fabricatore's framework within the matrix*

| CRITERIA | MINIMUM | MAXIMUM |
|---|---|---|
| player focusing | not player-focused | **player-focused** |
| holisticism | **partial mechanics** | systems mechanics |
| rule focusing | actions | **rules** |
| interaction resolution | **input/output** | strategies |
| formal abstraction | genre specific | **for all games** |

## 2. FRAMEWORK: SICART

Miguel Sicart defines game mechanics in his article *Defining Game Mechanics* (2008) "in relation to rules and challenges. Game mechanics are methods invoked by agents for interacting with the game world." (Sicart 2008). "I define game mechanics, using concepts from object-oriented programing, as methods invoked by agents, designed for interaction with the game state." (ibid) It is obvious that he seems to define game mechanics in a similar way to Fabricatore as player-focused and tied to gameplay. But there are some crucial differences between the two frameworks.

This definition is

1. formal (because it can be used to "describe, and interrelate game mechanics in any given game" (ibid). His framework therefore implies a formal universality since it is applicable to all games and implies a transferability between different levels of description (without identifying them): from player to game and from design to analysis. The use of the programing concept of "method" allows the framework to be translated into UML. By this means the mechanics of a game can be formally designed (production) as well as analyzed (reception);

2. agency-focused, but not just player-focused, because any interacting entity can be an agent. This consideration of all kinds of virtual agents (or "objects") makes it possible to decouple the description of in-game agency from the player focus. Therefore the focus of the framework is somewhat broader than Fabricatore's approach. Nevertheless, player focus remains a dominant concern when he claims that his approach helps "mapping mechanics to input procedures and player emotions" (ibid);
3. more action-focused and less rule-focused.

It seems to be a significant advantage of this framework that it relies on "concepts from object-oriented programing". Yet, by defining game mechanics as the "methods invoked by agents for interacting with the game world", by understanding methods as "the actions or behaviors available to a class" (ibid) and by affirming that methods can best be described by verbs, Sicart clearly distinguishes between the rules of a game and the actions allowed by these rules. He also argues that the mechanics only consist of the actions (methods) of an object whereas the rules are defined by the limiting properties of an object: "All of these [verbs] are methods for agency within the game world, actions the player can take within the space of possibility created by the rules." (Ibid)

I have already made it clear that I would challenge the terminological restriction to possible actions because it raises the question of what term we should then use for the other elements underlying a game. In other words: Once the concept of agency is opened to any virtual agent why still limit the game mechanics framework to methods, why not also encompass all classes and properties of the game as a complex cybernetic system?[7] This restriction of the concept of game mechanics to "interactions" seems to me to be the biggest flaw in

7 To a certain degree Sicart seems to admit this when he explains the correlation of rules and actions: "In this object oriented framework, rules could be considered general or particular properties of the game system and its agents. All objects in games have properties. These properties are often either rules or determined by rules. These rules are evaluated by a game loop, an algorithm that relates the current state of the game and the properties of the objects with a number of conditions that consequently can modify the game state. For example, the winning condition, the losing condition and the effects of action in the player's avatar health are calculated when running the game loop. This algorithm relates rules with mechanics, exemplifying the applicability of an ontological distinction between rules and mechanics." (Sicart 2008) It remains unclear why there is an ontological distinction between rules and actions and why just the latter shall be identified with the mechanics of a game.

Sicart's framework because it hinders an adequate description of the game as a whole.

This goes together with another deficit in his model, which is the lack of a holistic approach. Like Fabricatore he moves away from the common use of the term "game mechanics" that describes game behavior as individual actions, such as jumping or shooting. And Sicart also offers a distinction of core, primary and secondary mechanics. The only instance where he goes beyond Fabricatore's perspective is when he introduces the concept of "compound game mechanic" (ibid):

> "[A] compound game mechanic is a set of related game mechanics that function together within one delimited agent interaction mode. These modes are defined by the interaction of these different modalities: as such, the driving compound mechanic is composed by a set of mechanics interrelated to provide a relatively accurate model of driving. When playing, and, on occasion, when analyzing, it is useful to think about these compound mechanics as a whole and not as a collection of formally differentiated mechanics." (Ibid)

The concept of compound mechanics makes it possible to turn the focus away from singular and elementary methods, towards complex systems and therefore also towards the game as a systemic whole.

This consideration of more complex units of interaction can be linked to the concept of challenge. Sicart relates game mechanics to the concept of challenge because they offer the "actions afforded to agents to overcome challenges" (ibid). In his examination of the concept of challenge Sicart mentions a necessary supplement to my primary definition of game mechanics. A challenge implies a success condition, and if we take each game as a whole, its challenge involves a starting and a winning condition, a property that other programs do not need.

We can now conclude that Sicart's game mechanics theory is positioned as follows within our matrix (table 5):

*Table 5: Positioning of Sicart's framework within the matrix.*

| CRITERIA | MINIMUM | MAXIMUM |
|---|---|---|
| player focusing | **not player-focused** | player-focused |
| interaction resolution | **input/output** | strategies |
| holisticism | **partial mechanics** | **systems mechanics** |
| rule focusing | **actions** | rules |
| formal abstraction | genre specific | **for all games** |

Even though Sicart's formalization can be regarded as a step in the right direction, the focus on actions and partial mechanics still disqualifies his proposition as a general game mechanics framework.

Concerning "player focusing" and "interaction resolution" Sicart takes an intermediate position that is open towards a holistic description of a game.

## 3. FRAMEWORK: ADAMS AND DORMANS

With their book *Game Mechanics. Advanced Game Design*, Ernest Adams and Joris Dormans (2012) have very practical intentions. Its aim is to answer the question "How to design a game?", and therefore the authors do not bother much about technical definitions. Yet, it is evident that they also understand games as rule-based cybernetic systems ("state machines"). For them, the mechanics of a game encompass all the concrete details that contain but also go beyond a general rule.[8]

Adams and Dormans propose a categorization of five different types (or rather layers) of game mechanics. Since they do not burden themselves with the explanation of how they arrived at these categories one cannot help but get the impression that they lack a theoretical foundation (ibid: 6-7):

8 "Rules and mechanics are related concepts, but mechanics are more detailed and concrete. For example, the rules of *Monopoly* consists of only a few pages, but the mechanics of *Monopoly* include prices of all the properties and the text of all the Chance and Community Chest cards – in other words, everything that affects the operation of the game." (Adams and Dormans 2012: 3-4)

1. Physics (the physical laws of the virtual world. How can one move in space and time, what happens if one uses certain forces?)
2. Internal economy (laws of production and distribution of elementary value units, like money, health or competence. These units can be produced, collected, traded or consumed.)
3. Progression (level design vs. cybernetic emergence. What is the design of each single level, what are the conditions of progress, which processes tend to result from cybernetic feedback governed by rules?)
4. Tactical maneuvering (strategic distribution of game units, in particular with respect to combat)
5. Social interaction (rules, techniques and processes that allow and define interaction between players)

The authors show that these categories allow us to illuminate the differences between the different genres of games. For example, it is obvious that the mechanics of economy and progression are predominant in a role play whereas physics has a much bigger impact in action games.

Even though their categories can claim some intuitive plausibility[9] and practical usability they do not convey the impression of a coherent and holistic theoretical framework. Rather, they introduce a different kind of fragmentation, in this case one where the whole of the game is not divided into smaller units of interaction but rather into overlapping simultaneous layers of description.

It is the mechanics of an "internal economy" that provides a promising outlook for a systemic and holistic description. The concept involves every countable resource that can become relevant for the progression of the game, and for many games economic factors are decisive in respect of winning or losing. Because of this holistic perspective the paradigm of an internal economy seems to be an appropriate approach to adequately map the cybernetic complexity of the game as a whole. That might be one of the reasons why Adams and Dormans have formulated their *Machinations Framework* as an economic feedback system. By its ability to formalize and simulate economic relations in a game, and by doing so at different levels of interaction resolution from basic elements on to complex subsystems, the *Machinations Framework* seems to be a very promising and powerful tool for developing or analyzing a game.

9 There is no doubt that the duality of narrowly scripted "games of progression" versus cybernetically evolving "games of emergence" highlights a cardinal point of the debate between narratologists and ludologists.

On the other hand, I wonder whether all games can be described properly by the economic paradigm. Some games such as action and sports games depend more on additional factors such as dexterity that can hardly be translated into an internal economy. This means that a purely economic description ignores crucial features of the mechanics of these games. I therefore doubt the universal usability of the *Machinations Framework* because it is built on the premise that the internal economy is an adequate means to comprehensively map the mechanics of every game.

The model by Adams and Dormans can be considered as one that refrains from taking a player-focused perspective, and this at least implicitly entails a holistic analysis. Within the *Machinations Framework* various levels of interaction resolution can be described, starting with basic elements. This allows us to conclude that their framework covers many of the requirements expected from a universal game mechanics framework (see table 6). Yet, the lack of theoretical coherence and the fact that the economic formalization is probably not universally applicable cast a negative light on the theory.

*Table 6: Positioning of Adams and Dormans' framework within the matrix.*

| CRITERIA | MINIMUM | MAXIMUM |
|---|---|---|
| player focusing | **not player-focused** | player-focused |
| interaction resolution | **input/output** | strategies |
| holisticism | **partial mechanics** | **systems mechanics** |
| rule focusing | actions | **rules** |
| formal abstraction | **genre specific** | **for all games** |

Based on the distinction between games of progression and games of emergence, my earlier definition of "game mechanics" as "the objective structures and properties of a game that cybernetically organize the changes of a game's states through rule-based interaction and causal relationships" can now be narrowed down. The "ludic emergence" of an enormous and complex probability space through the use of a relatively small set of rules can be considered as the distinguishing feature of games in comparison with other cultural products, such as films or literature.

## 4. HOW FAR HAVE WE GOT SO FAR?

My terminological deliberations have led me to conclude that a sound comprehensive and general game mechanics theory would at least need to

1. be focused on the game and not the player;
2. have a high interaction resolution describing interactions at the input/output level;
3. offer a holistic description of system mechanics of the game as a whole;
4. focus on rules (and input/output activities) and not on actions;
5. be formally sufficiently abstract to be applicable to any game, but only to games.

In my opinion, none of the proposals I discussed were able to fulfil all of these requirements, with most of them lacking a decisive holistic approach and exhibiting conceptual limitations. This means that we are still in need of a sound framework and further theoretical work needs to be done. I would argue that the requirements mentioned above prepare the ground for this further research. Yet, at the same time the comparative analysis revealed the limitations of the normative matrix of necessary requirements I suggested. It is too simple in itself to comprehensively capture the particular characteristics of the different existing game mechanics frameworks. It might fulfil its task to give an overview of the qualifications of existing game mechanics theories but it would probably also need further elaboration in order to become the theoretical foundation for the construction of a sound game mechanics framework.

With regard to my initial definition of the concept of game mechanics, the examination of the three frameworks offered two more specifications. I initially defined "game mechanics" as "the objective structures and properties of a game that cybernetically organize the changes of a game's states through rule-based interaction and causal relationships" and stated that we still need to identify the defining properties which distinguish games in general from other programs. We can now make this definition more specific by introducing the following features:

Games and their mechanics

1. offer a challenge that implies a starting and a winning condition (Sicart) and
2. they tend to evolve a ludic emergence of an enormous probability space (Adams and Dormans).

It must be added, though, that these features cannot serve as sufficient or necessary conditions of a game. It is not unusual that a game can do without a winning condition, and the distinction between a game and a theater play is also a very fine one.

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# Underneath and Beyond Mechanics

## An activity-theoretical Perspective on Meaning-making in Gameplay

*Carlo Fabricatore*

## INTRODUCTION

The idea that when players engage in a game they enter a "magic circle" (Huizinga 1949) is, in my view, a romantic and yet accurate portrayal of the player's experience seen from a systemic perspective. When players play they enter a more or less complex fictional game space, secluded in a well-defined spatiotemporal dimension. In this game space players voluntarily suspend rational disbelief and accept as "real" a dimension, which is actually defined by "artificial" meanings, purposes, values, roles and norms. This space is in fact a system of elements that are related by causal rules as much as by deeper meanings. Players interact with these elements in order to pursue game goals that they have accepted as meaningful and worth overcoming the challenges that the game presents to them.

The reasons that make players decide to enter and stay within the "magic circle", the nature of play and games, and the impacts that games can have on players have been studied for a long time. In particular, the mechanisms that define game systems and the player experience have been investigated and theorized through different perspectives, with the emergence of what I believe are two core trends in the study of game mechanics. One is strongly focused on the structural analysis of game systems, and how the causal mechanics that regulate game system dynamics afford and constrain player-game interactions through defining gameplay action possibilities and rules (cf. Sicart 2008; Larsen/Schoenau-Fog 2016). The other trend focuses on the psychological factors that may drive players to engage in a game, and consequently examines game features that may represent motivational drivers capable of triggering and sustaining player engagement (cf. Przybylski/Rigby/Ryan 2010; Boyle et al. 2012). Both perspectives are useful, and have originated relevant contributions to support the study of games and the gameplay activity (e.g. Sicart 2008; Przybylski/Rigby/Ryan 2010; Adams/Dormans 2012). However, both have limitations and associated risks for the study of games.

On the one hand, structuralist approaches focused on the game system can provide interesting mechanistic models to investigate gameplay procedures in terms of "what" players can do and "how" they can do it (cf. Sicart 2008). This, however, may lead to overemphasizing the importance of "what" and "how". Gameplay is more than "procedure", and the gameplay experience is defined by more than mechanistic aspects of a game system. Players play because something motivates them, because there is a "why" supporting the "what" and "how". The "why" in the end determines players' choices (cf. Bedny/Karwowski 2006), and it cannot be fully explained in terms of abstract mechanistic relationships between game entities. Purely mechanistic models are therefore insufficient to investigate and explain the reasons why players pursue game goals embracing challenges and leveraging affordances presented by the game.

Approaches focused on players' motivational levers, on the other hand, are clearly centered on the "subjective why" of the player experience. Studies embracing this focus have produced interesting taxonomies of motivational affordances, identifying psychological needs that drive human activities, and abstract game features that may satisfy these needs and consequently motivate players (e.g. Przybylski/Rigby/Ryan 2010; Weiser et al. 2015). These studies, however, may lead to overemphasizing the importance of isolated game features and the related motivational drivers. When it comes to motivation, one plus one may equal two, four, zero or even minus one: the effects of motivational drivers are systemic, rather than additive. Motivation is the outcome of the interplay of different psychological needs, which are in turn affected by the interplay of different conditions defining people's activities and their environments (cf. Ryan/Deci 2000). Hence, identifying isolated motivational affordances in games may not be sufficient to explain how their interplay may foster (or in fact even hamper) player engagement.

Thus, I believe that the discourse on game mechanics can benefit from perspectives allowing the focus on both the game system and the player in an integrative way. Meaning-making processes involved in gameplay are pivotal in this sense. If we accept that games can be regarded as systems, then we should also regard players as system thinkers who play through making sense of things, consciously and subconsciously interpreting meanings and establishing relationships to understand what has happened in the past, what is happening in the present, and predict what could happen in the future. This represents a meaning-making process that is core to the gameplay experience. Meaning-making is the source of rational understandings required to purposefully interact with the environment (cf. Bedny/Karwowski 2006). At the same time, making sense of the external world is a preliminary step required to attribute personal significance to it, and consequently form personal motivations to act within it (cf. Leontiev 1978; Ryan/Deci 2000; Bedny/Karwowski 2006). The analysis of games and gameplay should therefore account for the importance of meaning-making in games, exploring how it unfolds, and which aspects of a game system may influence the comprehension of mechanistic aspects as well as “designed” meanings underpinning and orienting the player’s activities. For this, analytical approaches suitable to interpret human activity as a meaning-making-driven process are required. Activity theory (henceforth referred to as AT) is one such approach.

AT is a theoretical framework that conceptualizes human activity as purposeful interaction between subjects and their environment, driven by meaning-making that integrates cognitive, behavioral and affective processes to motivate, orient and drive conscious human acts. AT originated in the Soviet Union during the 1920s and 1930s, pioneered by the leading Soviet psychologists L. Vygotsky, A. N. Leontiev and S. L. Rubinstein. From the 1980s AT has undergone significant developments in Western Europe as well, primarily thanks to the Scandinavian strand of AT spearheaded by Y. Engeström (cf. Wertsch 1981; Bedny/Karwowski 2006; Kaptelinin/Nardi 2006). Since the 1990s AT has been broadly adopted for the study of Human-Computer Interaction, because of the unsuitability of cognitivist information-processing approaches to fully account for the influence of motivational processes and real-world contexts in computer-mediated human activity (cf. Kuutti 1996; Kaptelinin/Nardi 2006).

In this chapter I will discuss the nature and importance of meaning-making in games from an activity-theoretical perspective. Based on AT I will model key aspects of games and explore their implications for meaning-making processes in gameplay, with a special focus on a key meaning-making device in games: the game context. Accordingly, I will highlight the importance of game feedback, and propose a framework of guidelines to support the analysis of game feedback accounting for its potential influences on meaning-making.

For starters, how can the gameplay activity be conceptualized through an activity-theoretical perspective?

## ACTIVITY AS OBJECT-ORIENTED, PURPOSEFUL TRANSFORMATIVE PROCESS

AT regards human activity as a purposeful process of interaction between a subject and the world, through which the subject attempts to transform objects in the world into desired outcomes (Kaptelinin/Nardi 2006). Thus, all human activity is object-oriented, in that it is directed at transforming objects of the external world (cf. Leontiev 1978; Kaptelinin 2005; Engeström 1987).

An external object of activity is a system of heterogeneous and interrelated elements that can be shared by the activity participants and subjected to material and/or conceptual transformations (Leontiev 1978; Bedny/Karwowski 2006; Engeström 1987). For example, an external object of activity could be: a material system (e.g. food, to be cooked by a cook in order to eat); capabilities of the acting subject (e.g. musical skills, to be developed by the apprentice in order to play an instrument); or a legislative framework (e.g. fiscal regulations, to be modified by a parliamentary committee in order to improve the distribution of wealth).

The desirable outcome of the object transformation process represents an overarching activity end goal (Bedny/Karwowski 2006). In order to attain this goal, the subject transforms relevant properties of the activity object, modifies relationships between the object and other elements of its context, and/or creates an entirely new object. The activity terminates when its end goal is achieved.

In the case of games, it is easy to conceive gameplay as an object-oriented activity consisting in purposeful transformations of the environment. Players normally play in order to attain desirable objectives, which therefore can be considered activity goals. For this purpose, they interact with their environment transforming its state. The "objects" that players transform in this process can be viewed as systems of game entities of varying complexity, ranging from simple blocks to be arranged in desirable ways, to complex geopolitical systems to be created and maintained.

Then, what does "meaning-making" exactly mean, and what is its role in gameplay?

## THE CENTRAL ROLE OF GOAL-ORIENTED MEANING-MAKING IN (GAMEPLAY) ACTIVITY

According to AT, a subject acts driven by psychological needs that can be satisfied through achieving an activity end goal (Leontiev 1978). This can be viewed as the subject's mental representation of a desirable future state of affairs to attain through transforming reality (Bedny/Karwowski 2006). The possibility of satisfying psychological needs makes an activity personally significant and motivating to the subject (cf. Bedny/Karwowski 2006; Kaptelinin/Nardi 2006). Oriented by the end goal and driven by her motives, the subject interacts with the environment, iteratively interpreting and transforming it. In this process the subject construes meanings in order to explore and pursue possibilities to attain her goals. Meaning-making thus enfolds activity as it unfolds through it, and is core to all forms of conscious and purposeful human activity, games included.

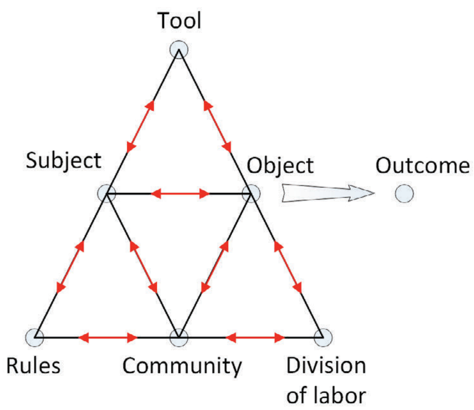
Through meaning-making a subject integrates analysis and synthesis processes to form and adjust mental representations of reality, which then guide her interactions with the external world (cf. Leontiev 1978; Bedny/Karwowski/Jeng 2004). These representations are based on the subject's perception of the situation she is tackling. They reflect her comprehension of objective properties and relationships of relevant entities (e.g. physical, chemical and biological features of objects, and cause-effect relationships), as well as their socio-cultural valorization (e.g. ethical significance and socially-accepted uses of things) (cf. Leontiev 1978; Kaptelinin/Nardi 2006). Mental representations also reflect motivational connotations that the subject may attribute to relevant aspects of reality, influenced by personal psychological factors including needs, desires, inclinations and self-perception of capabilities (cf. Leontiev 1978; Bandura 1997; Ryan/Deci 2000). Last but not least, an acting subject forms mental representations relying on her previous knowledge of the world (cf. Bedny/Karwowski/Jeng 2004). Through meaning-making the subject processes mental representations in order to project possible future states to attain and organize her actions accordingly. As action and meaning-making unfold, the subject adjusts mental representations based on environmental feedback (cf. Leontiev 1978; Bedny/Karwowski 2006).

Meaning-making thus allows people to understand "what", "how" and "why" things "are" and events "happen", comprehending what is technically feasible as well as culturally meaningful. In turn, this comprehension allows people to attribute personal significance to things, events, and their own activities in the external world, based on their personal backgrounds and psychological factors. Gameplay is no exception. In order to pursue game goals, players need meaning-making to make sense of cause-effect interactions between game entities, understanding "what" entities interact, "how" they interact, and "why" actions and interactions happen the way they do. In this sense, meaning-making is central to formulate rational understandings required to support effective and efficient interaction with the game world. At the same time, players need meaning-making to understand "what" is accepted and valued in the game space, "how", and "why". This is central for players to comprehend what is deemed meaningful within the game and, by extension, the "objective" meaningfulness of their acts in the context of the game. Thanks to this, players can then form a sense of what matters to them, attributing personal significance to their gameplay activities and embracing game goals and the challenges that their pursuits entail. Finally, meaning-making is not the product of mere observation of reality. Rather, it stems from active exploration of the external world (cf. Leontiev 1978; Bedny/Karwowski/Jeng 2004). Meaning-making is therefore bound by the possibilities that the game offers to actively explore things, interactions and events. Then, what exactly do players make sense of? What information, which "meanings" feed their meaning-making processes, and what originates them?

## CORE CONSTITUENTS OF THE GAMEPLAY ACTIVITY: INFLUENCING COMPONENTS AND CORE SCHEMAS

From an AT perspective activity can be regarded as process that unfolds within and through a system of interacting components that can directly influence it, either positively or negatively (fig. 1). These elements, their interactions and the way they can affect the subject's acts represent the most direct sources of meaning that the subject has to process.

*Figure 1. Model of an activity system based on Engeström's (1987) conceptualization*




Source: Fabricatore

AT emphasizes that all human activity is tool-mediated (cf. Leontiev 1978; Engeström 1987; Bedny/Karwowski 2006). Tools can be regarded as conceptual, material or digital artifacts that enable mental activity, communication with other activity participants, and the practical transformation of material objects.

Activity can be either individual or collective, in which case the subject interacts with a community in order to attain a common purpose (cf. Leontiev, 1978; Engeström 1987; Bedny/Karwowski 2006). Collective tasks are organized according to division of labor schemas. Thanks to rules and division of labor schemas the community functions as an activity enabler, since cooperation between subject and community allows achievements otherwise unattainable by the subject alone.

Besides enablers, activity can also be influenced by "resistances", which may interfere with the player's acts (cf. Bedny/Karwowski 2006; Kaptelinin/Nardi 2006). These could be regarded as hindrances, elements of the activity system that hamper the attainment of activity goals.

Based on these ideas, games can be straightforwardly conceptualized as activity systems. Video games can be generally viewed as dynamic systems composed of interoperating components, in which players pursue desirable objectives through engaging in gameplay activities (Fabricatore 2007; Fabricatore/López 2012, 2014). While pursuing game goals players interact with and/or transform digital artifacts. Depending on the context of the game, these may be user interface elements (e.g. a timer), non-volitional entities (e.g. a vehicle), and volitional entities (e.g. a creature). Still depending on the context, they may enable or hinder the player's activities.

The player's interactions with the game are always mediated by artifacts that function as tools. Without hardware input/output devices (I/O) the player would not be able to send control signals to the game system, and receive acoustic/visual/haptic feedback from the game. Without at least one digital tool the player would have no means to transform her practical inputs into meaningful interactions with the rest of the game system. Hence, she would not be able to have a presence and exert agency within the digital world. Even though I/O artifacts are essential tools, for the remainder of this discussion I will focus on digital gameplay tools, i.e. digital artifacts that the player can purposefully leverage to define, execute and evaluate gameplay acts. Then, digital gameplay tools can be elements of the game scene (e.g. an avatar controlled by the player), components of the visual user interface (e.g. a health bar), or aural artifacts whose source has no objective visual embodiment (e.g. a background speech narrating events). Digital gameplay tools can mediate the player's acts by providing information (e.g. a status bar) and/or enhancing the player's possibilities to transform other entities in the environment (e.g. a weapon).

Besides tools, the gameplay activity is influenced by hindrances. These are usually represented by non-volitional entities (e.g. environmental objects), and virtual agents controlled by artificial intelligence (e.g. adversaries, enemies and hostile creatures). Hindrances in games could either function as mechanistic barriers to the activity process (e.g. traps and obstacles) or, in the case of agents, operate intentionally as opponents (e.g. adversaries and enemies). This conceptualization likewise covers the case of competitive multi-player video games, whose presence would likely be represented by an in-game agent.

Finally, many games involve a "community", intended as a group of volitional agents that can somehow interact with the player, functioning as aiders to facilitate her progression. Human players constitute an enabling community in multi-player cooperative games. Virtual agents can also serve as aiders, as in the case of non-player characters in a role-playing game.

Within the game environment interactions between game entities are governed, to a large extent, by designed core schemas. Core schemas can be seen as patterns that define how specific types of interactions can change the state of the involved elements, under what conditions, and with what indirect implications for the rest of the game system. Hence, core schemas define the player's possibilities to transform elements of the game space, either directly or indirectly.

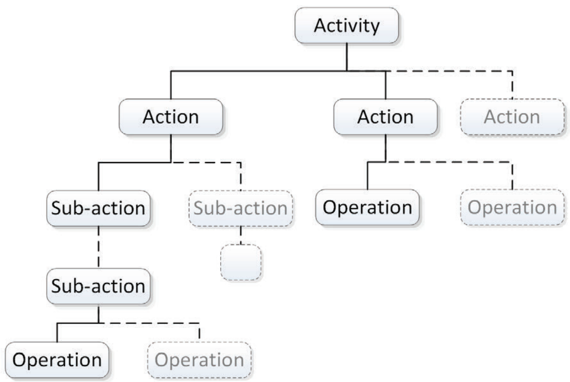
Some core schemas define interactions between game entities merely in terms of cause-effect mechanistic rules. These causal-mechanistic schemas may govern player acts as well as other external physical environmental (e.g. meteorological) events. Other core schemas define interactions within the community, between player and community, and among different social groups in the game, based on cause-effect rules as well as deeper socio-cultural meanings involved in the game. Thus, depending on the context, these in-game socio-cultural schemas can function as division of labor patterns (e.g. roles, responsibilities in a team involving AI aiders) and social norms (e.g. deprecation of aggressive behaviors in demilitarized zones by means of player-ban, or specific AI behaviors triggered by an incident). Core schemas may also define interactions and occurrence of events altering the game environment regardless of the intervention of the player (e.g. seasonal environmental changes).

From the perspective of meaning-making, comprehending causal-mechanistic and socio-cultural schemas is therefore key for the player to make sense of "what" things can happen "how" and "why", and consequently embrace game goals and decide how to best pursue them. Causal-mechanistic and socio-cultural schemas, however, are by themselves not sufficient to understand how and why gameplay can unfold in a game system, given that in video games progression possibilities are usually bound by designed hierarchies of objectives. Then, how is the gameplay activity generally articulated, and how can this affect meaning-making?

## THE HIERARCHICAL STRUCTURE OF THE GAMEPLAY PROCESS

According to AT, activity is structured in a three-layer hierarchical system (Leontiev 1978). The highest level of the hierarchy is represented by the whole activity, driven by its overarching end goal, and the target object system to be transformed in order to achieve it. Then, an activity is carried out in practice through a hierarchical system of actions. These are processes that the subject consciously plans and executes to attain sub-goals of the end goal (cf. Leontiev 1978; Bedny/Karwowski 2006; Kaptelinin/Nardi 2006). Actions are therefore a means to an end, "building blocks" for the whole activity. An action consists of a hierarchy of sub-actions when its goal can be subdivided into sub-goals requiring conscious planning and execution. Otherwise, an action is merely composed by operations. These are well-known routines that the subject uses subconsciously to adjust her behavior in reaction to specific conditions (Kaptelinin/Nardi 2006). Progression through an action hierarchy may be more or less linear, depending on the overarching activity end goal and the possibilities of action offered by the environment.

*Figure 2. Articulation of an activity system*




Source: Fabricatore

The structure of an activity may change depending on the development of the subject's mastery (cf. Leontiev 1978; Kaptelinin/Nardi 2006). For example, learning how and when to execute a specific action could eventually allow the subject to carry that action out subconsciously. The action would then become an operation. Conversely, specific circumstances such as the onset of a problem might require the subject to consciously plan and carry out a process that would have otherwise been a subconscious operation. As the subject develops her mastery, more actions will be operationalized. This, in turn, will allow the subject to perform more complex higher-level actions. Thus, the development of mastery will at the same time facilitate the execution of activities and expand the subject's possibilities to engage in new and more complex activities (Engeström 1987).

The gameplay activity is generally structured mirroring the hierarchical model proposed by AT. For the purpose of this discussion I will assume that canonical games can be differentiated from other types of playful activities because they are organized based on objectives to attain and rules that regulate player actions (cf. Caillois 1961; Salen/Zimmerman 2003). Hence, a game can be generally regarded as a whole activity, with an overarching end goal to attain, corresponding to a desirable game state to achieve (e.g. imprisoning a tyrant) or to maintain (e.g. keeping possession of a flag).

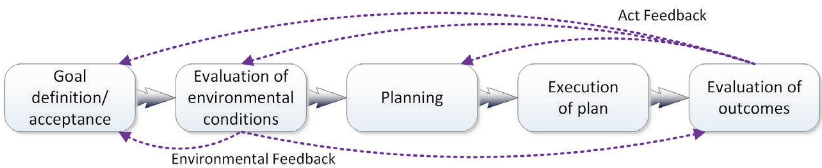
Attempting to achieve a game end goal may require the performance of a single, one-off action (e.g. pulling the lever of a slot machine). However, gameplay activity is usually articulated in stages requiring the player to transform transitional target objects in order to achieve sub-goals (e.g. a platformer game requiring to collect treasures in a network of underground caves; a quest-based game requiring to defeat enemies until the opportunity comes to finally imprison a tyrant). In these cases, gameplay is organized in hierarchical structures of tasks and sub-tasks, which can be analogized to AT actions and sub-actions (e.g. levels and checkpoints; quests and sub-quests). The simplest forms of gameplay tasks are gameplay acts that produce small progress-relevant transformations in the game state (e.g. shooting at an opponent; collecting an item). These can be executed either consciously or sub-consciously, depending on the players' expertise and the context of performance (e.g. depending on the circumstances, shooting at a target may be a subconscious reaction to the appearance of the target, or may require conscious aiming and timing of the shot).

Progression through a hierarchy of game tasks is always regulated to some extent by designed workflow schemas. These define dependencies between game (sub-)goals, therefore determining how the player will be granted or denied access to different game stages. Workflow schemas implement more or less linear progression possibilities, consequently providing to the player some flexibility to choose tasks to tackle and methods of performance (cf. Salen/Zimmerman 2003; Fabricatore 2007). Workflow schemas may depend on logical relationships between game (sub-) goals (e.g. in a quest-based game, a quest aimed at defeating an opponent might be accessible only after successfully completing another quest aimed at obtaining a weapon). Otherwise, progression through game stages may be regulated by abstract sequencing rules (e.g. in an arcade game where all the pellets presented in a labyrinth should be collected in order to access "another" labyrinth). In any case, workflow schemas define to some extent what the player could/should achieve in order to progress through the game, when, where and why. Thus, understanding workflow schemas is a further important purpose of meaning-making in games.

## GAMEPLAY AS AN ITERATIVE, FEEDBACK-DRIVEN PROCESS

As previously discussed, AT regards activity as an iterative process of interactions with reality driven by environmental feedback. Integrating leading perspectives from AT and organizational theory (cf. Argyris/Schön 1978; Bedny/Karwowski 2006), I propose that human activity can be conceptualized as a multiple loop process through which a subject: self-defines or accepts externally defined goals; evaluates environmental conditions in which she operates; plans a courses of action to attain the goals, accounting for the evaluated conditions; executes the plan; and evaluates (provisional) results. Feedback loops from the evaluation of conditions and results of action may lead to the re-formulation of goals and plans, or the re-evaluation of conditions and outcomes (fig. 3).

*Figure 3. Activity as a multi-looped iterative process*

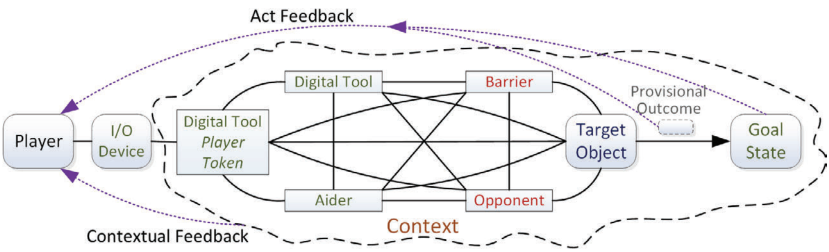



Source: Fabricatore

Goal definition/acceptance, planning and execution of actions, and evaluations of environmental conditions and task outcomes are sub-processes that might be carried out somewhat simultaneously (Bedny/Karwowski 2006). Planning and evaluation processes may happen through simple mental operations carried out subconsciously, leading to very quick decision-making and assessment of activity (Bedny/Karwowski/Jeng 2004).

Based on this multi-looped model of activity, I propose that gameplay can be conceptualized as a system of iterative tasks, each one of which can be modeled as an interaction network involving the target object to be transformed, enablers (tools and aiders) and hindrances (barriers and opponents), and driven by feedback loops from outcomes of action and from the context in which the task unfolds (fig. 4).

*Figure 4. Model of video game tasks as multi-looped interaction network*




Source: Fabricatore

As the player acts to perform a task, she iteratively attempts to transform a system of game entities (the target object) in order to achieve a desirable goal state. Through this process, the player interprets the situation she faces, evaluating target object, enablers, hindrances and other relevant contextual conditions. Accordingly, she identifies possibilities to act and plan her interactions. As the player executes planned interactions she evaluates (provisional) outcomes, adjusting her plan and modifying the corresponding interaction network as needed. For example, a contextual puzzle game might require the player to build a contraption with parts available in the environment, whilst dealing with environmental hazards. In this case, the desired state would be a specific configuration of parts. To achieve this the player would likely explore and evaluate contextual conditions relevant to plan her strategies (e.g. position of parts in the scene; distribution of tools, such as trolleys to move parts; position of hindrances, such as live electrical wires; etc.). These evaluations would then allow the player to iteratively plan how to build the contraption (e.g. how and when to move parts avoiding dangers, and how to connect them in the right order). Planning would guide the player's practical attempts to position and connect the parts in the right way. Throughout the puzzle-solving process, the player would evaluate relevant environmental changes (e.g. activation/deactivation of hazards) as well as progression towards the target configuration of the contraption (e.g. which parts are missing). The results of these evaluations would then drive further iterations of the activity.

In terms of meaning-making, conceptualizing gameplay as a system of contextualized and iterative tasks stresses the importance of the availability of relevant game feedback on a timely and ongoing basis. Through iterative gameplay loops players continuously perceive and process relevant aspects of the game space, formulating, developing and updating meanings accordingly. Therefore, their meaning-making processes unfold iteratively as well, fostered by the availability of environmental feedback, or hampered by the lack of it.

Feedback should also be contextualized. According to AT, activity only exists as a contextualized process: no one acts if not in specific circumstances, and it is only by comprehending circumstances that a subject can fully make sense of her activity (cf. Nardi 1996; Bedny/Karwowski 2006). Gameplay is always situated in specific contexts comprising key environmental conditions that players need to interpret in order to define their tasks, and to fully understand the results and implications of their acts. Then, what defines the context of a game? Which elements of a game context are key to influence meaning-making, and how?

## THE ROLE OF CONTEXT IN GAMEPLAY ACTIVITY

For the purpose of this discussion, I will consider context as a system of interrelated conditions defining circumstances in which the player's activity happens. All video games can be regarded as contextualized systems of activities, albeit not all game contexts are equally rich.

In simple games the context is fully defined by entities and interactions that the player can closely perceive and influence. In these cases, in order to perform game tasks players only need to understand the game goals, and the causal-mechanistic and workflow schemas that govern interactions between target objects to be transformed, enablers and hindrances. For example, in a simple game the context might be fully defined by a paddle, a ball, an array of bricks framed by three walls, and schemas that govern interactions between paddle, ball, bricks and walls. Then, in order to play the game, the player would only need to understand that: all bricks have to be destroyed to progress to a new level; the player can move the paddle horizontally; the paddle can hit and direct the ball towards the bricks; the ball can hit and destroy a brick; the ball bounces off the walls;

missing an incoming ball eventually leads to the end of the game. Goals, causal-mechanistic and workflow progression schemas would be all that matters.

In simple games as much as in complex ones enabling and hindering functions of game entities may be context-related. In such cases, understanding contextual conditions may be important to interpret possible functions of an entity and decide how to interact with it. For example, in a platform game, pits might at the same time function as obstacles to be avoided and as tools to entrap opponents, depending on the circumstances (e.g. escaping enemies vs. ambushing them).

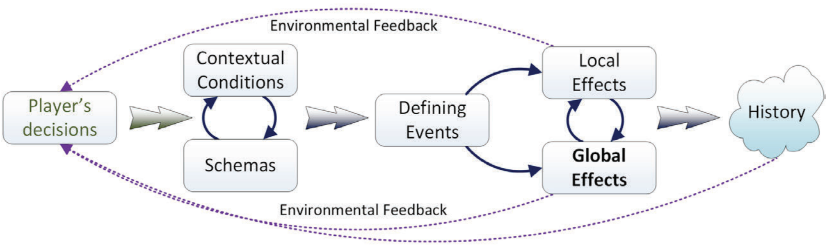
In complex games, the "world" is "larger" and "deeper" than what the player can directly perceive and consciously influence. In these games physical, socio-cultural and historical background conditions define the game environment and the schemas that govern it. Background conditions are integrated in comprehensive fictional contexts defined by settings, storylines and overarching aims. Settings define key aspects of the time and place in which gameplay activities happen (e.g. natural environment, social communities, cultures, political systems and historical backdrops defining a feudal country governed by a tyrant). Storylines can be viewed as narrative articulations of events related to the end game goals and the player's role (e.g. background events that compelled the player character to rise up against the tyrant; unfolding stages of a plot that the player character devised to topple the tyrant). Explicit game aims reflect the in-game socio-cultural valorization of game goals, and hence justify "by design" the necessity to achieve them (e.g. imprisoning the tyrant – end game goal – to liberate the country from her oppression – designed game aim).

Contexts in complex games are deeply dynamic. Schemas and background conditions originate defining events, which, in turn, may modify background conditions. Some of these events are a direct result of the player's deeds. Some others, however, are not. Some defining events may happen as an indirect and unplanned consequence of the player's acts (e.g. support spontaneously offered to the player character by a neighboring country after news of her successes against the tyrant's troops). Others may be originated regardless of the player's acts (e.g. a drought affecting the populace of the country). In any case, defining events usually correspond to game state changes that directly or indirectly affect the player's role. Furthermore, they may reflect the socio-cultural significance of her achievements, as these are valued "by design" within the game world (e.g. vigilante groups organized by the populace to support the player character).

All accounted for, game contexts foster meaning-making through relating things and events within a specific spatiotemporal dimension, defined by socio-cultural, physical and historical environmental conditions. Contextual conditions allow the player to wholly understand the schemas that define and regulate interactions between entities, and comprehend the significance of these interactions as defined "by design". Interpreting schemas in context allows making sense of game entities, the possibilities to transform them to achieve game goals, and the enabling and hindering functions that they may have in the process. Interpreting background conditions allows for comprehension of the immediate causes and effects of defining events as they happen in the game space, as well as the way these are valorized in the game world.

Further to all this, contextual conditions define deep and broad meanings, which transcend what the player is closely surrounded by, what is "immediate" to her. Game contexts influence meaning-making by situating things and events across spatiotemporal borders. The player is constantly involved in local contexts that she can directly perceive and influence. However, she can also influence and be influenced by global contextual conditions originated by the interaction of local contexts and the implications that defining events may have across space and time (fig. 5).

*Figure 5. Influence loops of local and global contextual conditions*

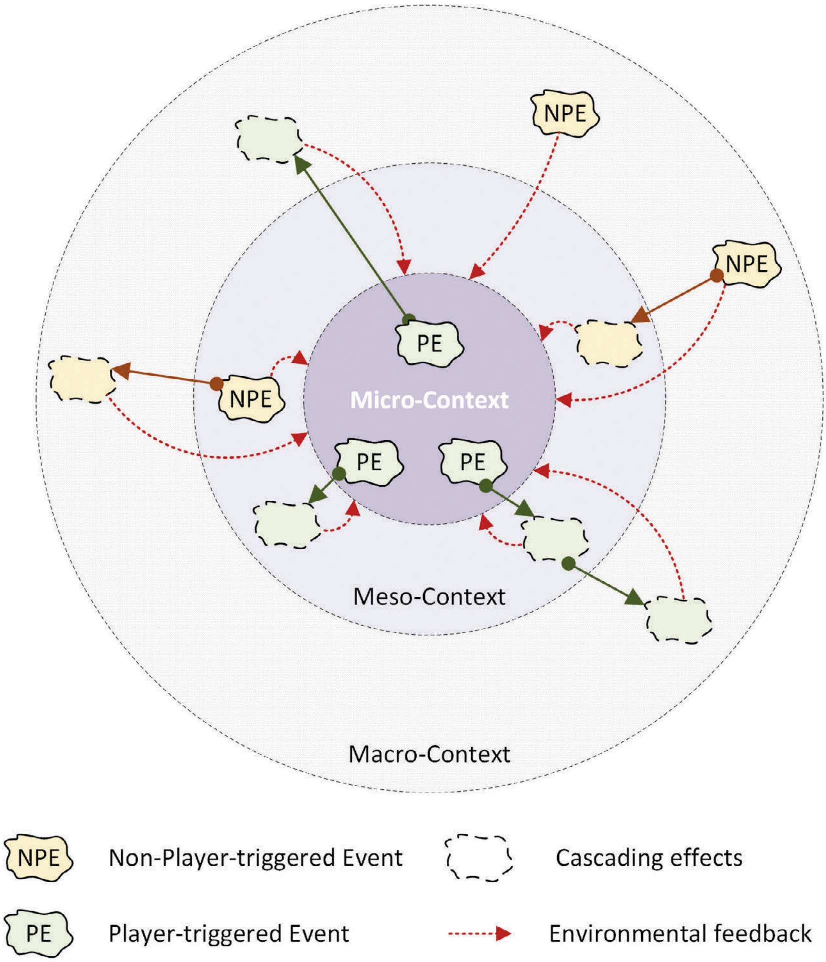



Source: Fabricatore

Defining events may generate broad and remote game state changes related to the player's actions even though the player might not be able to directly experience them (e.g. an insurrection in a remote country inspired by news of the player character's deeds). By extension, defining events generate a history of game state changes crucial for meaning-making processes, even if the player cannot directly interact with all of it (e.g. the historical events that led the tyrant to seize the power).

The interplay between local and global aspects of the game context ultimately defines the player's ability to wholly understand the in-game "present" through making sense of the "past", and consequently have meaningful expectations regarding the "future" and the role that she may play in it. In order to explore this interplay and its potential influence on meaning-making, I suggest that a game context can be modeled as a hierarchical system integrating a micro-, a meso- and a macro- level (fig. 6).

*Figure 6. Hierarchical model of the game context*




Source: Fabricatore

The micro-context comprises game elements that the player perceives as directly influential on the task she is currently performing. When it comes to meaning-making, the elements and events involved in the micro-context are the player's primary focus of attention. The micro-context obviously involves all the elements of the current interaction network, as per figure 4 (e.g. enablers and hindrances involved in a covert attack to blow up an enemy outpost – the outpost being the target object). The micro-context may also involve other environmental elements that the player perceives as influential to define the state of the elements of the interaction network, and/or to make sense of their interactions (e.g. ambient light affecting visibility nearby the outpost; marketplace setting occasioning constraints in routes to and from the outpost).

The meso-context comprises elements that the player can directly perceive without interrupting her current task, which are not involved in the current task, but may become relevant to develop the current task or initiate a new task. Thus, in terms of meaning-making the meso-context naturally represents the player's secondary focus of attention. Meso-contextual elements relevant for an ongoing task might be potential enablers or hindrances that the player discovers as her current task unfolds. These elements may suggest alternative ways to perform the current task, possibly leading the player to modify the current task's plan and the related interaction network (e.g. an alternative route to the outpost; more manageable opponents to tackle). The exploration of the meso-context might also reveal new potential target objects associated to different goals. This may lead the player to initiate a concurrent task (e.g. collecting materials found on the route to the outpost). The discovery of new target objects might also induce the player to temporarily suspend her current task to perform an ancillary task (e.g. building a new tool to improve performance in the current task, using the new materials found), or to entirely change task (e.g. aborting an infiltration task to opt for an open combat approach, due to new weapons found). Even though the meso-context is not directly involved in the player's current interaction network, its state might be changed as a direct consequence of the player's acts (e.g. blowing up an enemy outpost – task goal, and related target object involved in the micro-context – could lead to mass arrests of innocent people in the adjacent village – elements of the meso-context).

Based on this conceptualization, I suggest that the player can (and likely will) directly and immediately try to make sense of entities, interactions and relevant game state changes happening within the micro-context. The player can also perceive things and events within the meso-context, and consequently relate them with the micro-context through broader meaning-making processes. This, however, requires broadening her focus of attention from the current task (and interaction network), through some deliberate exploration of the environment. The macro-context is a whole different story.

In complex games the macro-context represents the "big picture" of the world. Its state reflects large-scale effects of defining events as they happen. By extension, it also reflects the history that defined the current state of the game space. The player cannot directly interact with the macro-context. She can, however, influence it through indirect effects of her achievements within the micro-context, which may then propagate through the meso-context. Furthermore, comprehension of salient aspects of the macro-context may be key for the player to understand the immediate implications and broader transcendence of defining events, grasp the impacts and significance of her acts and role, and plan future tasks accordingly.

The hierarchical nature of the game context stresses that meaning-making in games requires a variety of information that transcends the scope of what the player can directly perceive and interact with. Players need to comprehend the meaning of causal-mechanistic, socio-cultural and workflow schemas, the origins and implications of defining events, and the valorization of things and events, at local and global levels, across time and space. This, in turn, emphasizes the importance for the player to rely on game feedback loops conveying contextualized and integrative information spanning across all levels of the game context, and covering its history as appropriate.

The game space should somehow "speak" to the player to tell its own stories and reasons to be. Game feedback should then be the "voice" that helps the player to make sense of what underpins and fully explains things and happenings in the game space, and to put events in perspectives useful to understand the meaningfulness of her role in the game world. Hence, based on what discussed thus far I will propose in the next section some guidelines to support the analysis of game feedback in relation to its potential impacts on the player's meaning-making processes.

## GUIDELINES FOR THE ANALYSIS OF GAME FEEDBACK IN RELATION TO MEANING-MAKING

First and foremost, game feedback should be analyzed taking into account that all purposeful human activity is shaped by the interpretation of reality, and that all artifacts involved in human activity convey information reflecting the meanings underpinning their design (cf. Leontiev 1978; Kazmierczak 2003; Bedny/Karwowski/Jeng 2004). Accordingly, I suggest that games should be treated as systems of meanings in order to investigate game feedback in relation to meaning-making. Games are artifacts created to actively engage players in enjoyable experiences. For this purpose, they are designed as systems of entities that interact to generate compelling situations, in which players are expected to pursue game goals by transforming the game environment. No matter how simple or complex games are, these situations are defined by schemas and background contextual conditions designed to ultimately determine what the game entities represent, what their relationships are, how they interact and why. Depending on the complexity of the game, the "designed why" may reflect cause-effect relationships between entities as well as valorizations of things and events rooted in socio-cultural and historical backdrops that may underpin the game. Furthermore, gameplay situations and the involved goals, entities, schemas and background conditions are designed to suggest to the player opportunities to exert agency over the game space and change it in meaningful ways. Thus, it can be argued that games are wholly designed to reflect meanings that should in the end trigger and sustain the player's engagement. Treating games as systems of meanings therefore means accepting that all the game elements that the player can perceive will contribute to convey some meaning to her. Hence, treating games as systems of meaning requires analyzing all game contents in order to identify which meanings are pivotal to understand properties and interactions of game entities, and the role of the player within the game space. Game contents should consequently be explored to identify which perceivable game elements contribute to conveying these meanings through game feedback loops, how and why.

Hence, game feedback should be analyzed considering that information in games may be implicit or explicit, conveyed through diegetic as well as non-diegetic means [Iacovides et al. 2015]. Explicit information is expressed through symbolic languages with clear associated meanings (e.g. messages written in English). Implicit information is conveyed through the state and interactions of entities of the game environment, thus requiring a deeper level of interpretation (e.g. state of vegetation suggesting an incipient drought; attitudes of a character hinted by her facial expressions). Both explicit and implicit information can be conveyed through diegetic or non-diegetic means, depending on whether information is represented through entities pertaining to the game world (e.g. architecture and garments representative of a specific historical period; a speech from a game character), or elements external to it (e.g. a health bar).

Game feedback cannot be analyzed in abstract. Meaning-making in goal-oriented activity is relevant because it serves to achieve a goal and to attribute personal significance to the activity that it entails (cf. Ryan/Deci 2000; Bedny/Karwowski/Jeng 2004). Hence, I argue that the analysis of game feedback should be situated, and that designed gameplay tasks can be adopted as units of analysis for this purpose. These should be identified as stages of the game associated to objectives designed as sub-goals of the end game goals (e.g. quests, levels or missions purposeful to the attainment or preservation of desirable game states). In terms of meaning-making, gameplay tasks would therefore represent self-contained units through which the player is expected to understand what she should transform within the game world, how and why. Feedback should then be analyzed within game tasks to understand how it supports the comprehension of scope, context and purpose of a task through providing to player contextualized and integrative information, accounting for workflow, causal-mechanistic and socio-cultural schemas, the involved entities and relationships, and the underpinning background conditions.

Feedback may be helpful for the player to identify, accept and evaluate a task, when the information it conveys relates to: i) what the task goal is (e.g. mission objective); ii) when a task is available to engage in (e.g. accessibility of a quest); iii) when a task has actually started (e.g. commencement of a new level); iv) what the progression state of the task is (e.g. degree of accomplishment of a race); and v) when a task has been completed (e.g. debriefing of a mission).

Feedback may also be useful to plan methods to achieve a task goal, when feedback information conveys: i) which target objects can be transformed in order to achieve the task goal; ii) how game entities can interact, and which hindering and enabling functions they may have, in relation to the contextual task conditions, the object to be transformed, and the goal to achieve; iii) state of entities in the game environment (e.g. position and other properties relevant to define their potential function in the task).

By integrating information regarding physical, socio-cultural and historical circumstances, game feedback may be helpful to fully understand how and why schemas afford and constrain interactions. By extension, feedback may support the evaluation of contextual conditions, which may affect task performance. For this, feedback may relate to: i) social groups, their cultures and relationships (e.g. guilds and their relationships); ii) topological and biological environmental features (e.g. geomorphological characteristics and ecosystems of an alien planet); iii) urban environmental features (e.g. layout of towns and road networks connecting them); and iv) geopolitical and economic systems. Contextual information can overall foster situational sense-making, allowing the player to understand that things and events are driven by more than abstract cause-effect relationships. By extension, contextual feedback may lead the player to attribute a deeper sense of purpose to a task. This may be the case when feedback relates to implications of the task that transcend the practical transformation of objects in the game, and which reflect how the task outcomes will be valorized based on the socio-cultural circumstances in which the task unfolds (i.e. moral value of saving people from slavery, and implications for their future lives). Thus, game feedback should be analyzed to determine the extent to which it allows the player to comprehend the significance of her acts in the game world, as defined "by design".

As previously discussed, meaning in games span across time and space. Hence, the analysis of game feedback cannot be confined within the boundaries of game tasks. Tasks are connected with one another, and altogether they are rooted in broader socio-cultural, physical and historical environmental conditions, which define the game world perceived as it is by the player, and the history that originated it. Therefore, I suggest that the analysis of a specific task should be conducted simultaneously at two levels: a local goal-focused level, and a global integrative level. The local analysis should be focused on feedback related to elements of the micro- and meso-context that: i) may directly influence the meaning-making processes involved in the planning and evaluation of a task; ii) may facilitate the appreciation of the significance of the task within the boundaries of micro- and meso-context. The global analysis should consider micro-, meso- and macro-context in an integrative way, accounting for goal-related as much as non-goal-related events, and how and why the interplay of events through space and time defines the game world. For this, micro- and meso- contexts should be analyzed investigating how their elements provide feedback regarding: i) propagating impacts that the task goal may have in the meso- and macro-context, accounting for material transformations of the game environments, implications that these may have for the socio-cultural, physical and historical context underpinning the game, and the consequent valorization of the player's deeds within the game; ii) defining events happening in the meso- and macro- context independent of the player's acts, their potential influence on the planning and performance of a task, and the extent to which they reflect the significance of the player's  acts as these are valorized in the game world.

Temporal features of game feedback should also be considered and analyzed both at local and global levels. In particular, the timing of game feedback should be examined to investigate its influence on the player's ability to establish connections between things and events in the game world. Feedback information relevant for this may relate to: i) the timeliness of provision of feedback, accounting for the time that elapses between an event and the actual provision of feedback (e.g. moment of presentation of an object to the player vs. provision of explicit information highlighting specific object features; time of occurrence of an event which the player character cannot not participate in vs. message conveying news anticipating the happening); ii) reiteration of feedback throughout the task, possibly conveyed through different means (e.g. reiteration of the importance of specific object features by means of written and verbal messages provided throughout the game through artifacts and characters).

Last but not least, meaning-making unfolds as a subject is actively engaged in transforming the external world, and cannot be fully developed through mere contemplation and reflection on reality (Leontiev 1978; Bedny/Karwowski 2006). Hence, the analysis of feedback loops should also consider the extent to which information is provided in response to the player's active engagement with the game world, and in situations promoting its exploration and interpretation. Passive reception of information (e.g. through non-interactive scenes) might not be sufficient to comprehend deep meanings. High-pressure situations might narrow the spectrum of attention of the player to what is strictly essential to achieve task goals.

All accounted for, by integrating task-oriented local and global analyses, game feedback should be examined to understand to what extent it allows to comprehend what, how, when, where and why things have happened, are happening or could happen in the game. The analysis should focus on abstract causal relationships between game entities as much as on the significance of these relationships defined "by design". Hence, the analysis should take into account, the socio-cultural, physical and historical backdrop that may be underpinning the game.

## CONCLUSIVE THOUGHTS

By embracing an activity-theoretical perspective, in this chapter I have highlighted the importance of meaning-making in games, and the relevance of game feedback in relation to it. Existing trends in the study of games, game mechanics and the gameplay experience risk to overlook the role of meaning-making as a key driver of the player experience. Meaning-making is central to all conscious human activity. In games, meaning-making is crucial for the player to form rational understandings required to inform practical decision-making as much as to grasp the significance of game events and, consequently, of her role in the game world. Meaning-making is therefore the driver of the player's agency as much as the primary source of her motivation. Game feedback, in turn, is pivotal to convey designed meanings and support their interpretation.

Analyzing meaning-making requires exploring games as systems of meaning. This involves analyzing which designed meanings are relevant to define gameplay entities, their causal relationships and significance across time and space, as well as how these meanings are conveyed to the player, when, and by means of which game elements. The guidelines proposed in this chapter to support this process do not have the ambition to represent a comprehensive guide to analyze game feedback in relation to meaning-making. Rather, their purpose is to motivate and provide orientation to embrace a meaning-making approach to game analysis. Furthermore, by connecting game elements, game feedback and meaning-making, they may also suggest trajectories to pursue further research on meaning-making in gameplay. For example, I believe that formal ontologies of game feedback, relating types of feedback with their potential sources and possible effects on meaning-making processes would be highly useful to support both the analysis and design of games. These could in turn serve as valuable instruments to progress empirical research exploring the relationships between game contents, decision-making and motivational processes involved in games.

All accounted for, I believe that the investigation of meaning-making in games may lead to significant advances in understanding player's preferences and behaviors, as well as in the design and use of games, for leisure as well as for other purposes.

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# Guidance Systems

# Hansel and Gretel

## Design and Reception of Orientation Cues in Game Space[1]

*Hiloko Kato and René Bauer*

> And when the full moon had risen,
> Hansel took Gretel by the hand.
> The pebbles glittered like newly minted
> silver coins and showed them the way.
> *Brothers Grimm, 2014 [1812]*

## INTRODUCTION: "I AM PROBABLY ON THE RIGHT TRACK"

```
01  NOV:  ((clicks his tongue))
02        SO.=
          right
03        = <<all> was sollen wir denn jetzt hier> (.) TU:N.
          what are we supposed to do here, anyway
04        das spiel heisst JOURney,
          the game is entitled journey
05        REIse?
          journey
06        (2.5)
           \___/
             \
          the camera performs a 360° rotation, heads for the
          hill with the flags
07  NOV:  da O:ben ist irgendwas.
          there is something up there
08        (1.0)
```

1 This article was originally published in 2016 German with the title "Hänsel und Gretel. Konstruktion und Rezeption von Orientierungshinweisen im Spielraum." In: Martin Hennig/Hans Krah (eds.): Spielzeichen. Theorien, Analysen, Kontexte des zeitgenössischen Computerspiels. Boizenburg: Werner Hülsbusch Verlag, pp. 308-330. We are grateful for permission to reproduce it here with minor changes.

```
09        das_sieht aber COOL aus wie das_wie der sand so weg
          that looks cool though, how the … how the sand is
10   EXP:  das [sah in        ] uncharted zwo auch so toll aus
          oder mit
          dem SCHNE:,
          that looked great as well in Uncharted 2 with the snow
11  NOV:       [<<p> fliegt;>  ]
                    flying off like this
12        ja-
          yes
((...))
13  NOV:  oa jetzt geht_s aber ganz schön beschWERlich hier
          oh now it's quite troublesome to go
          [ho:ch;              ]
           up
14  EXP:  [<<creaky voice>JA:?>]
                         yes
15  NOV:  jetzt kann ich die KAmera nicht mehr drehen.=
          now I can't turn the camera anymore
16         =das ist irgendwie (.) ich bin wohl auf dem richtigen
          WE:G;
                                \__/
                                   \
                            the  music  of  the  game's  intro
          comes in
           that's somehow (.) I am probably on the right track
17        (-) !HUI:!;
               whoosh
18        (13.0)
           \___/
             \
            game's intro and cross-fade with change in perspec-
          tive
19  EXP:  °h
20  NOV:  potsTAUsend.
          upon my soul
21        (1.0)
22        wir müssen wohl zu diesem !BE:RG!,
          we probably have to go to this mountain
23        (-) das IST die jOUrney, (-)
              that is the journey
```

The above transcript quotes a *Let's Play* in which two presenters of the YouTube channel *GameTube* play the beginning of the game *Journey* (Sony Computer Entertainment 2012).[2] As a genre, *Let's Play* can be described as a play through of

2 The transcript has been created on the basis of the transcription system GAT2. (cf. Selting et al. 2009) For the transcription conventions of this system or the meaning of individual symbols, please refer to the key at the end of this article. The letter "L" is used to refer to specific lines.

a game that is made accountable[3] as being performance and entertainment and demanding continual commentary by the player(s).[4] In our example, the presenters act specific parts (cf. GameTube 2012, the transcript begins at 03:03) and Michael refers to himself as a 'novice' and performs as an inexperienced player. His co-commentator, Daniel, has already played through the entire game and acts as the 'expert'; however, he lets Michael explore independently and restrains himself from instructing Michael.[5]

In this example, which is the beginning of, as yet, an unknown game that does not fit into the established schemes of a certain genre (first-person shooter, simulation or sports game), the question immediately arises for the demanded ludic action ("what are we supposed to do here, anyway?" cf. L03 in the transcript). The answer is quickly found thanks to the title of the game ("the game's title is *Journey*" [in German "*Reise*"], L04 and L05) and with the help of the activity of running and visual orientation ("there is something up there", L07). Even if the reasons for choosing this specific hill are not explicitly stated, by the full 360° rotation of the camera executed immediately beforehand (L06), it becomes obvious that the disruption of the monotonously rolling landscape by this "something" (Michael is probably referring to the flags blowing in the wind, cf. Figure 1) "up there" is crucial as an orientation cue. The correct interpretation of the cue is proven when Michael is going up the hill and the game takes over the perspective: "Now I can't turn the camera anymore [...] I am probably on the right track" (L15 and L16). The intro, in the form of a cutscene, is conceived as a reward and, simultaneously, accepted as a prospective instruction: "Upon my soul! We probably have to go to this mountain; that is the journey" (L20, L22 and L23).

3 The term *accountable* is used here in the terminology of ethnomethodology: "I mean observable-and-reportable, i.e. available to members as situated practices of looking-and-telling." (cf. Garfinkel 1967: 1).

4 There are exceptions, where games are played through without any comment.

5 This is thematised as such: Michael: "I don't have the slightest clue what to expect", at 00:14; Daniel: "Actually, you don't need me at all, I could go home", at 05:34.

*Fig. 1: "What are we supposed to do here, anyway?" Beginning of Journey*

Source: Screenshot (GameTube 2012).

The major points on which we will focus, are raised by the novice, Michael.[6] They provide an enlightening insight into fundamental problems of computer games: on the one hand – from the viewpoint of the recipient and when it comes to beginning a game – one has to grasp the cues given within the design of the game for the purpose of goal-orientated execution, and be able to interpret them in the way they are intended. Only by doing so can the events of a game proceed. We define the general set of such cues as *guiding principles* (in German: *Leitsysteme*). On the other hand – from the viewpoint of the producer or the game designer – the guiding principles are designed as both reasonable and compelling, in such a way that there is a satisfactory balance between the challenge and the player's redemption. Only in this way will the player continue the game. In our example of *Journey*, this balance is successful throughout: not only is the first task, rewarded by a longer cutscene, completed without the help of the expert, but at a linguistic level, the playability and difficulty of the game's guiding principles seem to be reflected in the flow of commentary from the novice,

6 Linguistically, this is also shown through prosody: e.g. the key words "to do", "journey", "path", "mountain", and the title of the game, *Journey*, are stressed. Furthermore, the intonation does not rise in the case of a question, but only after the additional information of the title ("*Journey*", "journey", L05).

which is only punctuated with a few pauses and a sprinkling of small talk from the expert that as such does not disturb the novice's comments or the gameplay.[7]

In our article, we focus on the spatial guiding principles of the orientation cues, whereby we assume that the spatial sign systems of computer games fulfil the exceedingly important task of allowing the play and action to continue running. This focus begins from the general assumption that guiding principles always have to be analysed from both the reception-orientated and game design-orientated perspectives. We act out of conviction that the interplay between the construction and reception of guiding principles displays symbiotic features, especially in commercially successful cases. For this purpose, it is not only games that are being analysed, but also the *Let's Plays*. They are particularly relevant in examining, in detail, the players' understanding and acquisition of the guiding principles predefined by the game designer. The beginning of a game is particularly vital because a veritable acquisition of the game's pattern of specific guiding principles takes place. In the following course of the game, this pattern does not have to be explicitly verbalised anymore, as it is played accordingly without comments on the existing rules.

Below we would like to explain the reception-orientated and game design-orientated perspectives on the guiding principles in general (part 2), and theoretically discuss the idea of the orientation cues in particular (part 3). Subsequently, there are examples of our analysis that lead to a first attempt at piecing together a typology of orientation cues in computer games (part 4). Finally, this typology shall be related to a wider context concerning the constitution of computer games: it shows how guiding principles serve as specific realizations in order to cope with ludic challenges and how they are acquired by playing (part 5).

## *WHAT'S NEXT?* THROUGH *WHERE NEXT?:* GUIDING PRINCIPLES FROM THE PERSPECTIVE OF RECEPTION AND DESIGN

The beginning of a game is of utmost importance, not only from the perspective of the recipient (cf. above) but also from the perspective of game design. In this moment, the entire future course of the game can be condensed, through which a game becomes compelling and makes a name for itself. The question of how

7 Due to the lack of space, not all of the small talk about the *Uncharted* series is reproduced here (suspension marks in the transcript between lines 12 and 13).

such a game course can be established in the gameplay arises especially for games that either cannot be matched to the established scheme of a genre and its patterns and regularities or refuse to operate with the aid of explicit tutorials at the beginning of the game. In recent times, the question has also arisen for new kinds of games that vary from established game schemes by their hybrid structure (cf. Beil 2012). As a matter of fact, the lack of exemplary cues telling the player what to do at the beginning of a game can have a peculiar appeal – for which *Journey* is a beautiful example. The answer to the question "What has to be done?" is apparently solved by orientation cues ("there is something up there"), which is self-evident because computer games are fundamentally based on space and ultimately depend on motion sequence (cf. below part 3). The meta level inherent in the title, which can also be read as an instruction of travel and orientation certainly renders the solution in *Journey* notably elegant. The coupling, however, of the further course of the game (*What's Next?*) to the question of future orientation (*Where Next?*) is a premise essential for all computer games and therefore entirely independent of genre (cf. below part 4).

The preoccupation with guiding principles reveals a second fundamental aspect of computer games: any freedom promised by a game to the player is illusory. Admittedly, as in our example, an avatar is able to move around more or less freely, but it is never possible, however, to break out of the guiding principles.[8] In the worst case, the player experiences this guidance as inescapable: the camera cannot be turned around anymore and the player moves on predetermined tracks. The fact that the players might not view this circumstance negatively but as in our example, quite positively as a confirmation of being on the right track is due to the subtlety of the game design. Players are able to solve the task of *What's Next?* autonomously and are therefore willing to accept the predetermined tracks as a transition to the following rewarding cutscene.[9] However, in our example, even more factors come into play: with this cutscene being the intro of the game, it is made clear that discerning orientation cues ("there is something up there") leads to the goal of the game ("we probably have to reach this mountain") as fast-paced low-level action. This linkage by game design of short-

8 In this example, whenever the player leads the avatar further on in a 'wrong' direction, a severe wind – which is motivated by the gameplay and is therefore quite an elegant solution as well – blows the avatar back onto the right track.

9 The players very likely come to expect this transition to a cutscene as a common pattern. The timely beginning of the background music (L16) adds to the plausibility of this assumption.

term and long-term motivated mechanics during the first few minutes of the game densifies the instruction and supports the sense of play.

The guidance in games is quite often forgotten. This is made especially clear by the popular comparison between conventional texts (e.g. novels) and computer games, in which – in the fashion of naive media criticism – minimal freedom is attributed to the former and maximal freedom to the latter (thus often under the pretext of interactivity).[10] This profoundly shortens the way of seeing the constitution of media in general if, on one side, the non-variability of the medial artefact (printed paper) is put on a level with the coercion of unicursal-linear reading, and on the other side, the moving of avatars or the alleged exertion of influence on the ending of the story of a game is understood as a new kind of independence.[11] The fact that recipients or players do not always immediately perceive the existence of guiding principles is of course the goal of any clever game design.[12] Against this background, it seems important to explicitly examine the point of intersection where designed and received guiding principles meet: from the perspective of game design, it is the matter of the *setting*. It serves as the screen where the implementation of the guiding principles by the game mechanics takes place. From the perspective of the reception of games, this setting is perceived as the *surface* on which the approach to and the interpretation of the cues take place.[13] Setting and surface as well as game design and game reception are therefore two sides of the same coin.

## GUIDING PRINCIPLES AND ORIENTATION CUES – THEORETICAL BACKGROUND

By discussing guiding principles and orientation cues, we focus on the playability of the game world: “Game designers don’t simply tell stories; they design

10 On the critique of the inflationary use of the term *interactivity* cf. Landow (2008), Aarseth (1997) or Costikyan (2006 [1994]).

11 Cf. also Aarseth (1997). The book culture indeed offers many examples that defy a unicursal reading, especially in postmodern literature, hyperfiction and/or through the way in which annotations are used (cf. Klappert 2008).

12 Cf. in return the fertilisation of the phenomenon of the hitch in computer games or in game play, e.g. Bojahr (2012).

13 Already in the early 1990s, game designer, Greg Costikyan had discussed the necessity of the proper information exchange between game designer and player: “The interface must provide the player with relevant information. And he must have enough information to be able to make a sensible decision.” (Costikyan 2006 [1994]: 201).

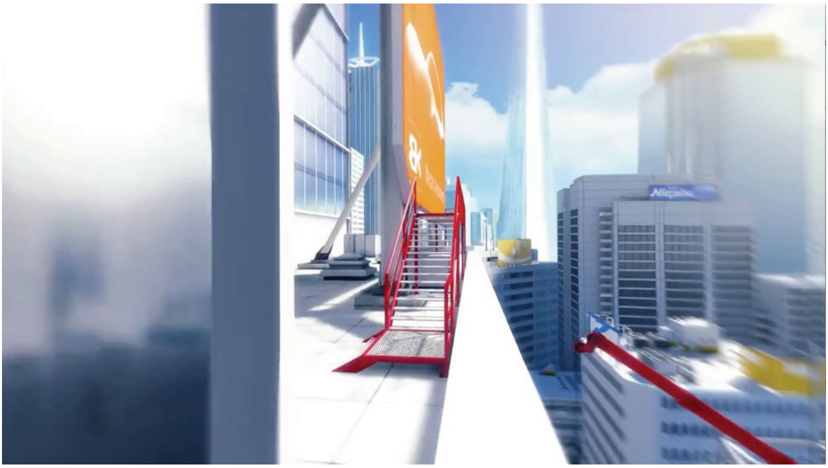
worlds and sculpt spaces" (Jenkins 2006: 674). This statement by Jenkins can be read as an early plea for a fruitful fusion between narratology and ludology. Our example shows beautifully how game action always consists of fast-paced low-level action of the "*What's next?/Where next?*" variety, which functions as a hinge between narratological and game-inherent moments. These situations of low-level action are effective at all times, but they gain importance whenever the required direction of the game action is not easily recognizable by orientation (e.g. an open door at the end of the hallway) or by narrative patterns (e.g. the way out is blocked by a mob of zombies). Thus, in order to be able to answer the questions "*What's next?/Where next?*", the players need to interpret the design of the space and surroundings and to use them according to the objectives of the game. Against this background, the quotation by the cognitive scientist and usability expert Donald Norman reads as a plea for orientation cues or for guiding principles: "The user needs help. Just the right things have to be visible [...] to indicate how the user is to interact with the device" (Norman 2002 [1988]: 8). Norman corroborates his approach to the usability of objects on the theories of affordances by the psychologist James J. Gibson: "Affordances provide strong clues to the operation of things. [...] When affordances are taken advantage of, the user knows what to do just by looking" (ibid: 9). Not surprisingly, this theory of affordances is also perceived in many divergent fields such as game studies, architectural semiotics and text linguistics.[14] No other theory seems more suited

14 Concerning game studies, cf. Meeldgard (2012), who uses Peter Weibel's term of the interactive image – "[t]he picture field became an image system that reacted to the observer's movement" (Weibel 2003: 594) – to connect computer games with the theory of Gibson. Or Neitzel, who is primarily interested in the aspect of strategies of involvement: "games are affordances to act" (Neitzel 2012: 86, our translation). Regarding architectural semiotics, cf. Gleiter (2014: 29, our translation): "architectural signs do not only provide a sense of purpose but also shape a promise of the realization in a specific situation so to speak. With reference to James Gibson this might be called 'affordances' or 'the affordance of architectural signs'" (cf. Gibson 1979). In text linguistics, the textualisation cues or readability cues are analogous with the terminology of Gibson (Hausendorf/Kesselheim/Kato/Breitholz 2017: 58, our translation): "Readability cues explain that and how texts make certain ways of reading and interpretation possible and highly probable. The readability of the text fundamentally resembles the 'affordances' of the artificial and natural environment (Gibson 1979)." Interestingly, Jesper Juul (2011) also refers to the term *affordances*, but – and nicely corresponding to our purposes – in the context of rules of a game: "Rules specify *limitations* and *af-*

to underlining the fundamental semiotic activity of any perceptual process – whether target-orientated or poetic. In this regard, it is obvious that we clearly understand computer games as a semiotic system analogous with other semiotic domains. (cf. also Gee 2006)

By focussing on the orientation cues and, at the same time, discussing the essential questions "*What's next/Where next?*" the applicability of the idea of cues shall be proven on a subdomain of the manifold realised semiotic levels. The importance of space for computer games and its constitution as a sphere of action that comes alive is well known: "The defining element in computer games is spatiality. Computer games are essentially concerned with spatial representation and negotiation" (Aarseth 2001: 154). Günzel draws on the terminology of Lefebvre: "[The lived space] only exists through the relation between perceived and conceived space or simply space practice" (Günzel 2012: 87, our translation). Salen and Zimmermann offer this advice to all players (2006: 67): "[l]earn to read the space of a game".[15]

*Fig. 2: Extremely explicit orientation cues marked in red: Mirror's Edge*



Source: Screenshot (Drachenbursche/Drabu 2012).

It is often necessary to make correct decisions regarding direction far in advance. Here, cues aimed at visual orientation are best suited as computer games func-

*fordances*. [...] they also add meaning to the allowed actions and this *affords* players meaningful actions that were not otherwise available" (ibid: 58).

15 *Readability* is again the umbrella term for semiotic processes, cf. annotation 14.

tion primarily on a visual level. An example that incorporates evaluation at a very early stage as the ideal strategy in the gameplay, as well as employing visual cues very boldly, is *Mirror's Edge* (Electronic Arts, 2008): the Parkour to be completed is marked by elements in the architecture turning red in good time (cf. the stairs and the crane in Figure 2).[16] A *Let's Play* example of *Mirror's Edge*, this time by the YouTube channel *drachenbursche* (now *Drabu*), shows how players identify the required direction: "You really have to go up there?" – "The ladder is red, the beam is red, therefore I need to go up there" (drachenbursche/Drabu 2012, at 08:40). The scarcity of information in this short dialogue between drachenbursche and JJOOEEKKEEZZ underlines the fascinating explicitness and simplicity of the orientation cues that *Mirror's Edge* relies on. Additionally, the dialogue demonstrates the significance of the point of intersection between production and reception (cf. above part 2): of vital importance for the orientation is the interpretability of the signs on the surface of the setting, which – as an abstract game such as *Mirror's Edge* shows to its advantage – is often more important than the succession of a narration. In *Mirror's Edge*, the plot takes place 'beneath' the surface of the Parkour consisting of rooftops and facades.

## CASES: REALIZATIONS OF CUES

Each computer game applies its own appropriate system of orientation cues; the possibilities of their realization are manifold. In the following sub-chapters, we present five main characteristics with which we shall approach the diversity of the realised cues and attempt to bundle them into useful categories, thus hoping to obtain a, certain – although presumably illusory – exhaustiveness.

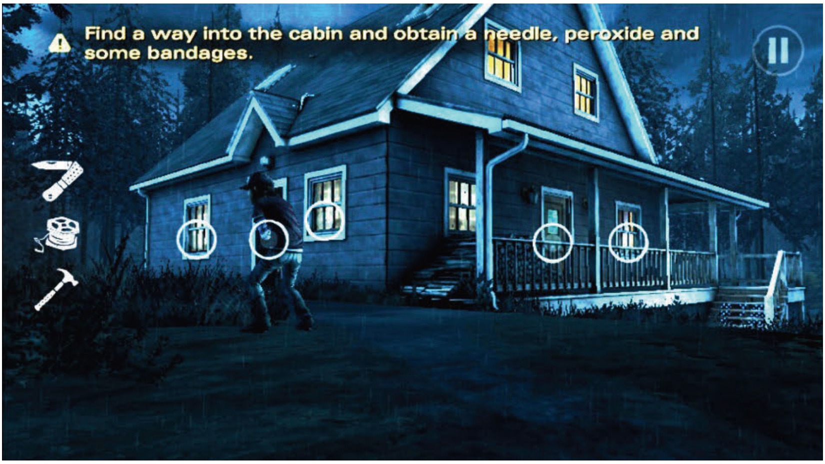
### Implementation: Ingame/intradiegetic vs Hud/Blending in

Whenever there is talk of cues conducive to orientation, one might automatically think of breadcrumbs and pebbles, or of signposts – thus, specific affordances are embedded intradiegetically in the game world, for example the signpost to Hook Island in *The Secret of Monkey Island* (Lucasfilm Games, 1990). The wide range of these prototypical realizations of cues is further differentiated in the following sub-chapters concerning the questions regarding which perception chan-

16 The explicit coloring is explained in the logic of the game plot: the special kind of perception is a specific skill of the protagonists – the so-called *runner vision*.

nel is applied (4.2) or how salient the cues are that are revealed (4.3). However, orientation cues do not necessarily have to be realised intradiegetically: they can be implemented in the head-up display (HUD) as well. These realizations are characterised by blending in over or on the scene of the depicted world, even 'covering' avatars, as the example of the curls in *The Walking Dead* (Telltale Games, 2012) shows (cf. Figure 3), flagging interactive objects in the game world.

*Fig. 3: Implementations in the HUD: The Walking Dead (Roshan 2014).*




Source: Screenshot (Roshan 2014).

The illustrations of the tools on the left side of the screen make clear that the implementation in the HUD may contain other realizations of cues as well. Similar to the iconic illustration of the controllers (cf. picture 4) or the display of control buttons in quick-time events, the depicted tools are something like cues of action. This revelation of the HUD becomes a crucial endeavour whenever the emergent illusion of the game world is broken because it makes visible a level of gameplay between the player and the intradiegetic game world. This is primarily the case if written words or conventionalised symbols are called into action.[17] A clever combination between implementation in the HUD and the intradiegetic realization is again shown in an example of *Journey* (cf. Figure 4).

17 Cf. the criticism concerning *Beyond – Two Souls* (Sony Computer Entertainment, 2013) as being merely a series of quick-time events and cutscenes.

*Fig. 4: Combination of a cue realized both in the HUD and intradiegetically/ ingame: Journey.*


Source: Screenshot (GameTube 2012).

In the *GameTube Let's Play*, novice Daniel runs past the spot at which the cue in the HUD is activated: it consists of the illustration of a controller – with a clearly highlighted hold button – together with the intradiegetic cue of a symbol lighting up on a stela, which signals that there is still something to do here. Daniel's reaction is instantaneous: he turns around and verbally marks the re-orientation ("Oh, what's here?") (GameTube 2012, at 06:55). The lighting up on the stela alone would probably have been a sufficient cue signalling that something has been forgotten here, but it is precisely the combination of the extradiegetic and intradiegetic cues that helps to answer the question of "What's next/Where next?" (push the hold button right in front of the stela).

## Perception channel: Visibility, Audibility and Palpability

Another characteristic is made clear by this example of *Journey* when the player is not only alerted by the flashing up of intradiegetic or HUD-implemented cues, but he also gets support by a particular sound on an additional auditory level. Thus, we can broaden the ways of perception for orientation cues in computer games: visual, auditory and – although they are rather rare – palpable cues can also be conducive to orientation.[18]

Starting with the latter case: examples of orientation cues made palpable with the aid of vibrating controllers are found in the *Gran Turismo* series from the fifth release onwards (Sony Computer Entertainment, 2010-2017). In these games, the swing off the lane is notified by vibration. *Shadow of the Colossus* (Sony Computer Entertainment, 2005-2006) is another example where the vibration indicates the distance of the avatar to the colossus (cf. Immersion Corporation 2010). The search for good examples reveals that palpable cues are often connected to other non-spatial guiding principles as indications of vital functions (e.g. when the beating of the heart is simulated by vibration in order to display the level of vital energy and, in doing so, generate tension), or rhythmic or temporal guidelines (e.g. in *Rez* [Sega 2001] where correct action in time is rewarded with vibration).

Such observations of visual cues (cf. above part 4.1) apply to auditory orientation cues: sounds, noises and spoken language can intradiegetically be part of the ingame world, but they can be located outside of it as well. Clear categorisation is often difficult, as the example in *Journey* shows (cf. ibid.): the sound effect is chosen in such a way that it matches the flashing up of the stela. A special case is certainly the *voice over*, for which clear and simple attribution to either intra- or extradiegesis cannot always be given.

We would like to add two further observations regarding auditory cues: on the one hand, there is the issue of mediation of the cues and attachment to the cues (cf. below part 4.3). While certain characters can be directly heard as a source of orientation, other characters indirectly indicate the next relevant point of orientation. On the other hand, there is the issue of how orientation cues are activated. While some are automatically triggered, other cues have to be explicitly activated (cf. below part 4.4).

### Attachment of Cues: direct (noticeable vs unobtrusive) vs indirect (mediated)

In prototypical cases, orientation cues are directly attached to the visual or auditory affordances – as in *Journey*, where the mountain becomes visible as the

18 Although Gibson developed the theoretical insights on affordances (cf. part 3 above) with respect to visual perception in his major publication (Gibson 1979), he considered all “five modes of external attention” (Gibson 1983 [1966]: 49) in detail in his earlier publications.

primary goal on the horizon. In the introduction, the mountain is explicitly designated as a noticeable cue – and is recognized as such by the player (cf. above part 1) – and differs greatly from those cues put in place unobtrusively. The quest of finding these 'hidden' cues is part of the special appeal of point-and-click adventures. As in the depicted example of *Machinarium* (Amanita Design, 2009), the solution of the riddles demands the deciphering of various guiding principles combined together (cf. Figure 5):[19] the conspicuousness of the carnivorous plant and the possibility of reaching one of its blossoms by using the ladder makes this partial solution to the main goal – which is to open the metal door – quite plausible.[20]

*Fig. 5: Direct attachment of cues, but unobtrusive: Machinarium.*

Source: our Screenshot.

The direct attachment of the cue is coupled to the implementation in the intradiegetic game world. But also the second category of the indirect, and therefore

19 In addition to the orientation cues, cues of utility are especially important in point-and-click adventures. They provide information on things that can be combined.

20 There is a magnifying glass to be found in the blossom. This object has to be combined with the projector in order to make the slides visible. One of them reveals the combination of the door code.

mediated, attachment of the cue can take place ingame. In the example of *The Last of Us* (Sony Computer Entertainment, 2013), once the guide, Tess, indicates where the player has to move next by her posture and gaze turned to the right, she becomes the mediating orientation cue (cf. Figure 6). Her call of "Boost me up" can also be understood as an indirect cue. In the *Let's Play* of VintageBeef, this merely mediated orientation is explicitly thematised by the player: "Where? Here?" he asks while coming very close to Tess with his avatar, Joel, and following her gaze (cf. VintageBeef 2013, at 03:50).

*Fig. 6: "Boost me up!": Indirectly mediated orientation cue in The Last of Us.*

Source: Screenshot (VintageBeef 2013).

## Activation of Cues: triggered, explicitly activated vs permanent

The example of *Last of Us* clearly shows the diverging types of activations to which cues are bound. Some of them are executed, as in this example, automatically – in any case, Tess is going to position herself at this very spot at this very moment, urging the player to boost her up and looking up to the relevant locus, thus acting as a mediating guide. In other words: there is no way around this spot and the activation of the cue is a given constituent of the procedure of solution. A further rather crude example is the automatically triggered tracking shot revealing the path the player has to take (e.g. *Brothers: A Tale of Two Sons* [505 Games, 2013]). Other cues, however, are only activated if the player comes near the cue – this is often the case in games offering multiple solutions (e.g. *The Walking Dead*). There are also orientation cues that have to be activated explicitly, for which *The Legend of Zelda – Twilight Princess* (Nintendo 2006) provides a very good example: only by turning him/herself into the wolf will the odour trail leading to the next target be revealed to the player. Permanently visible cues can be on the cards as well, but examples are not easy to find. That certainly has to do with the sequentiality and the short-termed tasks in games. An interesting orientation cue that often is permanently visible is the reticule: it defines the point of view for the player/avatar and thus makes it possible for him/her to orientate 'on-screen'. In the case of *Unfinished Swan* (Sony Computer Entertainment 2012), the reticule in fact helps the player to grasp the fundamental gameplay by indicating "to shoot somewhere".[21] Lastly, the state of a cue is able to change, e.g. if the triggered cue becomes a permanent one. An example would be the mission target in one of the first missions in *Far Cry 4* (Ubisoft 2014): The tower only becomes permanently visible when the first smaller tasks are completed and the player approaches it to finish this level.

### Relevance of Cues: rewarding, punishing vs irrelevant

The last categorisation concerns the relevance of the cue: Is its perception just an optional possibility – nice to have, as with collecting objects with the aim of completeness (e.g. the collecting of coins in *Super Mario Bros.* [Nintendo 1985])? Or is the perception of the cue mandatory for the completion of the game, as with the discovery of the fabric strips in *Journey* from which the kinetic energy is gained whilst at the same time they indicate the right track to follow similar to pebbles? Either way, both cases can be assigned to a rewarding principle – in contrast to when the player is punished: In those instances, pursuit of the cues can lead the player astray and signify an abandoned match in the worst case scenario, as shown in the trailer entitled "Alien: Isolation – Misdirection Trailer" in *Alien: Isolation* (Sega 2014).[22] Leading the player astray, however, is not a common idea or rather it is a style of play very much linked to specific genres (e.g. for survival horror games or self-ironic games such as the works of Lucas Arts). Being led astray is often attributed to simple programming errors, which

21 In terms of its categorisation, the reticule implementation in *Unfinished Swan* might have an indefinable position: as such, it belongs more to the extradiegetic level, as paintbrushes do not have reticules, therefore revealing its origin as a cue for the gaming principle. But it still keeps an intradiegetic moment for being in the game world, carrying the "point of view" and "point of action" message.

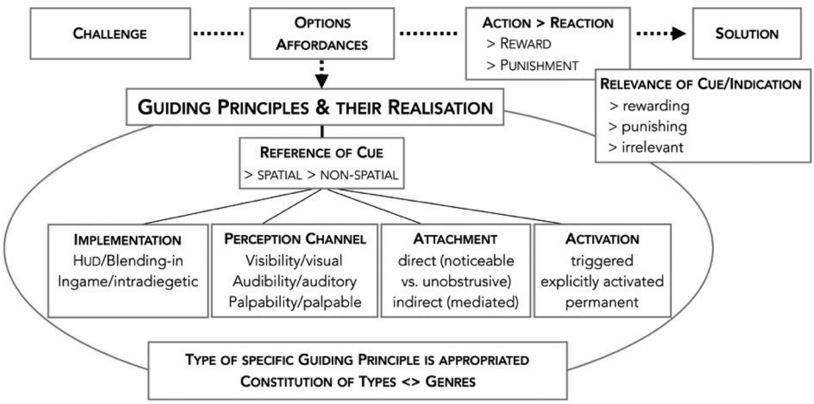
22 The stimulated assumption that the alien seems to retreat turns out to be fatally wrong (cf. PS4-Magazin 2014).

can drive a player like VintageBeef in his *Let's Play* on *Ryse: Son of Rome* (Microsoft Studios 2013) to downright desperation (cf. VintageBeef 2014, at 00:52). Cues that prove to be irrelevant for getting further in the game are interesting. A famous example is *Deus Ex* (Eidos Interactive, 2000-2003) where the player has the possibility of visiting the ladies' room: In a strict sense, it allows the male protagonist to ignore the socially controlled orientation cue for which he is admonished, but does not entail serious consequences (cf. machmuelltonne 2011).

## REALIZATION OF CUES AS POINTS OF INTERSECTION BETWEEN PLAYER AND GAME – FORMATION OF PATTERNS

The latter category regarding the relevance of cues has already introduced an issue that concerns the connection between the realization of cues and the constitution of computer games as a system/framework. By this system/framework, the player is faced with challenges offering reward in the event of success or threatening punishment when there's failure (cf. Figure 7). In this general structure, guiding principles and their realization of cues are the point of intersection between player and computer game: They are made available by the game design as utilisable affordances – the player interprets them in order to meet the challenge. This is why irrelevant cues are seldom implemented; they undermine this structure; they even reduce the structure to absurdity.

*Fig. 7: Guiding principles and their realizations of cues relating to the game system.*




Source: Bauer/Kato

Perceiving challenges and taking appropriate action – in our sphere of focus: *What's next?/Where next?* – is made possible by the realization of cues created with individual design and unique disposition for each game. It has to be ensured that the player is able to acquire a game's own system of rules in reasonable time and without being stretched to the limits of frustration (not too difficult, but not too obvious either). Therefore, it comes to a formation of patterns of the particular guiding principles at the beginning of a game, where the player explicitly learns the actual procedure or repetitively acquires it by frequently encountering similar situations. This formation of patterns of cues very much depends on the genre. In many established genres, such as the first-person shooter, this acquisition is no longer required; however, ever-new and elaborate weapons and combat techniques have to be mastered initially.

Observing the formation of patterns in *Let's Plays*, it is especially interesting to choose computer games that do not match the usual mainstream structure or can be attributed to the novel hybrid genre. Instead of referring once again to *Journey*, we would like to glance at the *Let's Play* of VintageBeef on *The Last of Us*. VintageBeef is known for being a decidedly explorative player who likes to examine and discover as much as possible, a fact that he also thematises (L01, VintageBeef 2013, at 07:10).

```
01  VB:   sorry i am expLORing a little bit-
02        (2.5)
          \___/
            \
          walks through the room, looks at everything
03        there_s no rush RIGHT?
04        (1.5)
05        <<p> robert_robert_s WAIting.>
06        <<p> but he can_he can wait LONger,>
07        (4.0)
          \___/
            \
          a dull sound, and a small circular cue appears in the
          dark
08        <<whispers> u: what_s THIS;>
09        (4.5)
          \___/
            \
          opens the drawer, it is empty
```

```
10      ^!NOTH!ing.
11      okAY;
        \___/
          \
         the next circle appears, VB opens the drawer
12      !O!u?
13      can i TAKE that?
14      <<reads> parts to upgrade your WEApon.>
15      !AWE!^some-
16      (3.0)
        \___/
          \
         another dull sound, the focus is on Tess, who is
        waiting
17      <<ff> you_re WATching me,>=
18      =<<ff> yeah just a SEcond.>
```

At this very moment in the course of the game, the player acquires the following two exemplary realizations of cues (L07 and L08): On the one hand, it is the pattern of a visual cue implemented on the HUD as a symbolic curl. This cue appears whenever a drawer can be opened. On the other hand, it is the pattern of an auditory cue realised as a dull sound. This cue signals the necessity to increase attention to detect the visual cue – therefore it can be described as a sort of meta-cue. VintageBeef's reaction is, in this respect, interesting as he responds twice to the meta-cue (L17 and L18), but only verbalises recognition of the basal visual cue: "Uh, what's this?" (L08). The way in which the game design stages the acquisition of the pattern is worth detailed analysis: The first of the drawers 'furnished' with the curl is empty. Accordingly, VintageBeef is both flabbergasted and resigned to the fact: "Nothing!" (L10).[23] He accepts this fact ("Okay" L11), but that does not discourage him from opening the second marked drawer. Here, he is rewarded: There are parts to be found with which weapons can be upgraded (L14). Two things are made clear: If the second drawer had been empty as well, it would have been a strong signal that the opening of drawers is not worth the time or, more specifically, that the player is cautioned about the misleading game design. In this binary way, though, the following is made apparent: One

23 His whispered statement in L08 is already suspense packed. In L10, the special prosody stands out (a heavily rising–falling movement in pitch on the first syllable of "nothing").

can be rewarded, but this is not always the case. Hence, a certain positive tension mounts and the player is committed to interpreting the curl as an orientation cue: further in the game, VintageBeef is going to try to open each single drawer, whether Tess is waiting (L17) or not.

In this article, we undertook a detailed examination of the most important guiding principles of the orientation cues, but the analysis and application of the concept of cues would be productive for other, non-spatial, domains as well. Furthermore, the study of other deviant conceptions within computer games would be interesting (e.g. *Portal*, cf. Bauer/Kato, in this volume).

## KEY TO GAT2 TRANSCRIPTIONS

(The list below only contains the conventions relevant to this article)

| | |
|---|---|
| [ ] | overlaps and speaking simultaneously |
| [ ] | |
| °h | breathing in |
| (.) | micro pause, estimate, up to approx. 0.2 seconds |
| (-) | brief pause, estimate, approx. 0.2 to 0.5 seconds |
| (--) | medium-length pause, estimate, approx. 0.5 to 0.8 seconds |
| (1.0) | timed pauses |
| robert_s | words joined together within units |
| ((coughs)) | para- and extralingustic actions and events |
| <<whispers>> | para- and extralingustic actions, events accompanying speech |
| ((...)) | gap in transcript |
| = | fast, immediate follow-on contribution by speaker |
| : | extending, lenghtening by approx. 0.2 to 0.5 seconds |
| acCENT | focal stress, accentuation |
| accEnt | secondary stress |
| ac!CENT! | pronounced stress |

Fluctuations in pitch at the end of intonational phrases:

| | |
|---|---|
| ? | steep rise |
| , | medium rise |
| - | even level |
| ; | medium drop |
| . | steep drop |

Intralinear notation of fluctuations in stress and pitch

| | |
|---|---|
| ^SO | rising-falling |

Changes in volume and pace of speech:

| | |
|---|---|
| <<ff> > | fortissimo, very loud |
| <<p> > | piano, quiet |
| <<acc> > | accelerando, becoming faster |

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# The Spectacular Space

## Rules and Guiding Principles of Irrational Spaces in Games[1]

*René Bauer and Hiloko Kato*

> "And then again, from another aspect, the solution of an intellectual problem comes about in a way not very different from what happens when a dog carrying a stick in its mouth tries to get through a narrow door: it will go on turning its head left and right until the stick slips through. We do pretty much the same, only with the difference that we do not go at it quite indiscriminately, but from experience know more or less how it should be done.
> *Robert Musil, Man without Qualities*[2]

## INTRODUCTION: "I GUESS THE GAME WANTS ME TO GO HERE"

```
01  PEW:   is that a cock (-) oh: !GOD! i hate cockroaches;
02         door opens quietly with a creaking sound
03         does it have a fAce in its BUTT?
```

1 This article was originally published in German with the title "Der spektakuläre Raum. Regeln und Leitsysteme irrationaler Computerspielräume" In: Hennig, Martin/Krah, Hans (eds): Spielzeichen II — Raumspiele / Spielräume. Boizenburg: Werner Hülsbusch Verlag, 2018, pp. 104-132. We are grateful for permission to reproduce it here with minor changes.

2 Musil (1953: 128).

```
04        what the hell is over THEre;
05        (9.0)
06        AH:-
07        ^OK,
08        i guess the game wants me to (-) GO hEre huh,
09        (5.0)
10        WOW.
11        the graphics looks a!MA!zing;
((...))
12        !WHAT!?
13        isn_t this the (--) <<h> it !IS!> the same corriDOR!
14        what Is THIS;
15        am i stUck in a LOOP,=
16        =am i stUck in a LOOP,=
17        =am i stUck in a LOOP,=
18        =am i stUck in a LOOP,=
19        =am i stUck in a LOOP,=
20        =am i SORry ts ((laughs))
```

*Spectacular* is an apt description for the spaces in computer games, for a number of reasons. In its most prominent usage, the adjective captures the notion of a near-perfect simulation of a world. The focus in this simulated world is on graphics, atmosphere or the aesthetic experience of the game – whether in thoroughly researched and detailed sections of the real world (for instance, in the *Assassin's Creed* series (Ubisoft, 2007-2016, cf. chapter 3) or in fictitious environments (the most recent example being *Last Guardian* [Sony Interactive Entertainment, 2016]). We propose the use of the term *hyperreal* for this kind of spectacular space in computer games. Even the spaces in *P.T.* (Konami, 2014)[3] can be regarded in this sense as hyperreal, which is supported by the player PewDiePie's comment in the transcript (PewDiePie 2014, the transcript starts at 00:32): "Wow, the graphics looks amazing!" (L10 and L11).[4] Similar to a picture puzzle, players, who find themselves in an L-shaped corridor, are encouraged to look a little longer and more closely at the numerous details, rendered with minute graphical precision; otherwise, they will fail early on in their endeavors to assemble the solution.

3 P.T. stands for "playable teaser" of the game *Silent Hills* (which has been cancelled in the interim).

4 The transcript has been created on the basis of the transcription system *Gesprächsanalytisches Transkriptionssystem 2 (GAT2)*, cf. Selting et al. (2009). For the transcription conventions of this system or the meaning of individual symbols please refer to the key at the end of this article. The letter "L" is used to refer to specific lines.

The space in *P.T.* is accurately described as spectacular not least because it is an impossible, irrational space. At the end of the L-shaped corridor, the player climbs down some steps in order to open a door which in turn leads to the same corridor. Being trapped in a loop, a situation which PewDiePie tries to give a humorous spin by willfully repeating the same sentence five times (L15-L19), seems to intensify the scary setting of the horror genre to the point of madness. It is the horror of being caught up in cybernetic circuits or, to put it in a more game-theoretical way: becoming stuck in the system of rules.[5]

In this article we want to examine this second type of spectacular space. Non-Euclidian, impossible or other irrational spaces in computer games create a challenge for players and game designers alike, because the rules of space need to be defined or learned anew. Particularly when the computer game's space does not depict a real space, the question becomes relevant as to whether players will be able to get their bearings, with their motivation and acceptance more or less intact.

All our observations are based on the assumption that a computer game must establish its playability. This can be done inelegantly – as a break with the perfectly staged "anything-goes, make-believe world" – and rather obviously, such as in *P.T.* before the player enters the loop: as if the staging of the entrance door – solid, polished, illuminated – was not enough, it also opens with a quiet creaking sound (L02), in an obvious invitation to enter right here, and nowhere else. PewDiePie uses it as an opportunity to sum up the situation: "I guess, the game wants me to go there, huh?" (L08). It is a balancing act for game design: on the one hand, everything in a game is predetermined, but on the other, it is important that players do not feel patronized. With the present-day focus on hyperreal simulation as the ultimate goal, players are increasingly spared the additional learning effort regarding the game's own guiding principles (cf. Kato/Bauer "Hansel and Gretel" in this volume). Separate tutorials are therefore avoided, and instead, there are short, embedded learning sequences.

In order to identify what players must do to comprehend or master the space in a game, we will initially examine some early games and introduce different approaches to understanding space in computer games and its appropriation (comparison between the analog world and the digital game world, trial-and-error method, space appropriation model). Afterwards we will take a closer look at three more recent games, which are characterized by different forms of irra-

5 And the question arises if hyperreal graphics and rules (cf. Salen/Zimmermann 2006: 9) of a game might stand in a possessive – and at the same time charming – opposition to each other.

tional space and appropriation of space. *Let's Plays* will form part of our analysis, as they enable us to observe how events unfold from the player's perspective.

## SPACE AS THE RESULT OF A PROCESS: RULES OF SPACE IN COMPUTER GAMES

The most significant rule of space in relation to games has been proposed by Johan Huizinga: the "magic circle" of the game opens up a space with its own rules. (Huizinga 2008[1938]: 18f.)[6] These are comprehensive and must cover all aspects of the game, from elements such as the game's world, its layout, its look, its behavior, to the possibilities of interaction for the user, and the rules-based mechanics of the game: everything is subject to rules.[7]

In analog (= Euclidian, real) games, street games or board games – which are often the first thing aspiring game designers study as part of their training –[8] rules are already very comprehensive. They need to be translated and made applicable in interaction, when the game is played for the first time.[9] It is a widely observable and fascinating fact that the rules of the classic analog space (the Euclidian space), or those of its construction, form the basis of these games, albeit mostly in a very rudimentary way and only as a designated section of the real world. Board games predominately revolve around two-dimensional actions; in street games such as *Himmel und Hölle* (literally "Heaven and Hell", known as hopscotch in English-speaking countries) the transformation from the vertical to the horizontal becomes particularly evident in the Swiss version of the game, in

6 Our main focus here is on the rules underlying computer games, and we are not primarily concerned with the question of transferring the magic circle from general games to computer games, nor with the relationship between reality and fiction. We will therefore not deal with the discussion around the concept of the magic circle for the purposes of this article. (cf. Günzel 2012: 95-99).

7 In this matter we follow Juul's understanding of computer games (2011).

8 Game development often takes place over different stages of iteration and, in the best case, becomes increasingly more concrete: it begins with technology-free paper prototyping, followed by a first stage of technical box prototyping, and finally the application of increasingly concrete settings.

9 It is always a challenge to play an unfamiliar board game only by its instructions (and therefore by its rules). A good example is *RoboRally*, a programming board game for multiple players (cf. Wikipedia 2017).

which the bottom field ("earth") is replaced with "hell". These games are additionally augmented by symbolic worlds (such as in *Ludo* or *Monopoly*), which are in the foreground when players learn the rules of the respective games, thereby moving the rudimentarily applied rules of space into the background. Yet, this process does not only involve a simplification in terms of board or street games, but also a considerable effort of abstraction which should not be underestimated by players and designers.

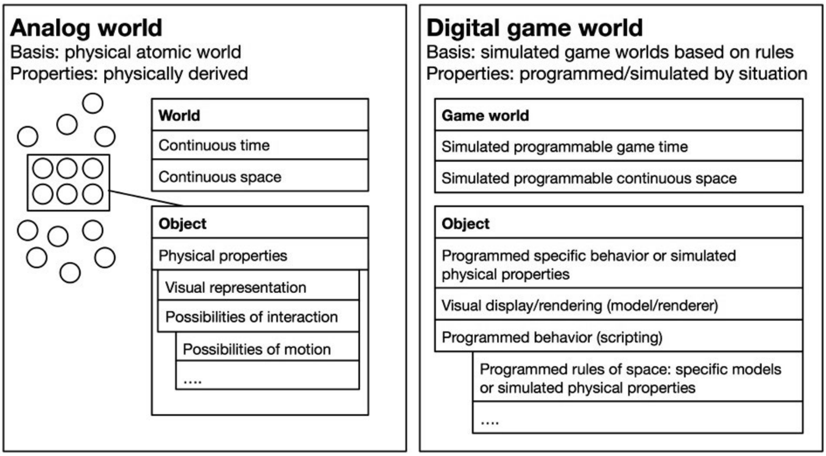
## Analog and Digital World – the Analog as Simulation

Computer games radically change spatial relations. The computer-generated digital game space is no longer based on real materials and their inseparable connection with visual or physical atomic properties. Cyberspace can be programmed at will. "The [computational] image became a picture field, its pixels became variables able to be altered at any time." (Weibel 2003: 594) Whether the material is wood or stone, everything is a direct application of rules: the game world and its objects all need to be created, managed and represented. This also means that the space can be changed completely, at any time. Even when an analog space is created in cyberspace, it is still a simulated analog space. It behaves like the real, analog world only because it follows the same or very similar rules. The fully programmable layer behind it is often assembled as a "holistic" world only at the very end, or that notion is suggested by means of different specialized engines (e.g. physics, rendering, scripting engines, Figure 1).[10]

Despite these almost endless possibilities, in most cases the simulated analog space continues to be used, seemingly unquestioned, as the basic model in cyberspace. Primarily, this is because the transfer effort required of players can be kept to a minimum, which means they can attend to other tasks. Against this surprisingly conventional background, the – much more complex – spatial behavior of some of the earliest games appears strikingly modern:

10 The direct, unchangeable and complex laws of the analog world, which is based on atoms and their visual or auditive and physical properties, are replaced in cyberspace by a simulation of the individual and separate functions: the (visual) display of objects ("rendering"), the representation of physical properties (logic, programming, physical simulation, subsumed under the label of "colliders"), and the behavior of objects ("scripting"), which are all also simulated in this way by game engines (e.g. game engines such as "Unity3D" or "Unreal").

*Figure 1: Analog world (physical atomic properties) vs. digital game world (generated by different rules).*




Source: Bauer and Kato

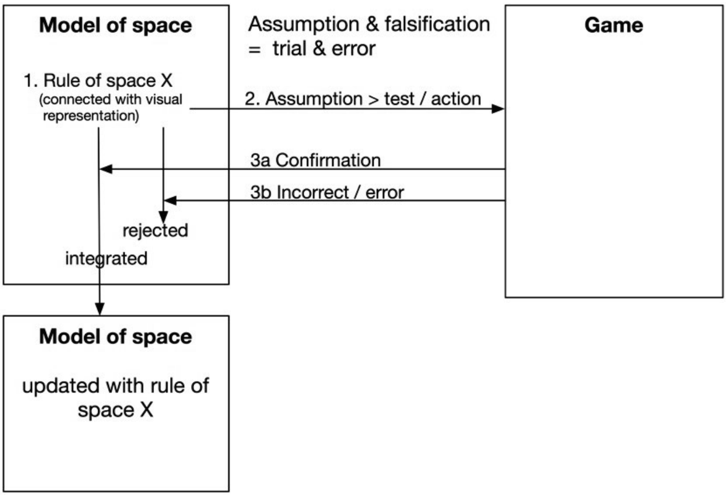
In *Tennis for Two* (William Higinbotham, 1958), for instance, several analog rules applying to tennis games are suspended: the omnipotent, invisible player can play the ball from anywhere on their own side of the court, and in any direction. In *Spacewar*! (Steve Russell, 1962) and *Asteroids* (Atari, 1979) it is possible to fly beyond the edge of one side, and, as if by magic, reappear on the opposite side. Spaces are radically transformed and special rules are applied to make these games less predictable and more exciting. Of course these discontinued game spaces could simply be accepted as a given rule of space – and part of the magic circle – of the game. Yet attempts to explain the spatial behavior (*Asteroids*, for instance, could be set on a sphere) seem to prove how difficult it is to accept such impossible spatial relations. In some cases, however, these constructions do not translate to the analog world, with *Frogger* (Sega, 1981) probably being the best example. Here, the traffic on the streets can alternate (!) between moving to the left and to the right, and, even more spectacularly, the river simultaneously flows in different directions. In cases such as this, we simply have to accept what the digital game gives us.

## Mastering Space in Digital Game Worlds

In order to find their way around a game, players must learn to master the game space. For economic reasons, this happens systematically by learning to interpret the game's rules of space, usually by evoking equivalents to the analog space. In cases of irrational spatial behavior, however, players reach for explanations of the specific rules which apply to the game, or these rules are simply taken for granted as part of the magic circle. Forming analogies to similar games is another strategy; the respective rules or principles are mostly genre-specific and become more ingrained with increasing game experience (cf. chapter 3.3). Further explicit help is given by tutorials at the beginning of a game. In addition to self-contained units which enable players to acquaint themselves with the rules before they move on to the actual game (cf. chapter 3.1), in many games there are also discreetly embedded tutorial sequences towards the beginning of the game. These are used conspicuously often and provide an implicit introduction for instance to the rules of space (cf. chapter 3.2).

However, even these tutorials do not save players from having to try out whatever they are presented with, using the method of trial and error (cf. Figure 2). Players make assumptions, which they then apply. The game responds and shows whether the assumption was correct. This increasingly complex process of assumption and falsification eventually produces the set of rules pertaining to space for the specific game. Of course this mechanism does not only come into effect at the beginning of a game but in any situation in which the existing model with its sets of rules is not sufficient or in which the space responds differently. At this point, an update of the model becomes necessary.

*Figure 2: Modified models of space generated by the trial-and-error method*




Source: Bauer and Kato

This process of space appropriation is found in its most radical form – as part of the game's concept – in the maze game *Trailblazer* (Gremlin Graphics/Fairchild Semiconductor, 1977).[11] In this multiplayer game, the player who first leaves the maze wins. The problem is that there is neither a back- nor a foreground – the entire game is plain green. At first it is impossible to visually deduce what the effect of an action or of moving the avatar might be. Only when it is moved (i.e. tested) does it become clear whether the surroundings are actually a wall or a corridor; these are colored white afterwards. In other words: there is no color-coding which would help players to arrive at a rule, and the rule is visualized only after the event. When the field turns white, then it was and is a corridor. Players therefore have to derive the accessible playfield from facts (which correspond to a single local rule) without being able to use this knowledge to generate visually deducible rules. This means that spatial rules do exist, but there is no corresponding visual, no interpretability beyond the specific situation, and consequently players are not able to arrive at any universal conclusions. *Trailblazer* is certainly a radical example but it shows that rules of space do not necessarily require corresponding visuals. Normally there must be a clearly discernible and established connection between a function and its visual analogy before it can be used effectively and economically. Practically all games therefore assign visual codes to their rules of space. A rule can then be read as an interactive sign.

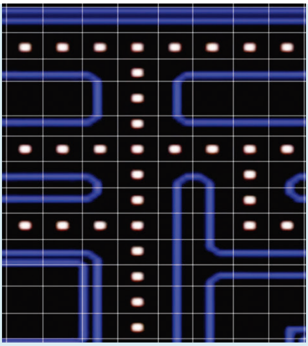
## Rules of Space in Tile-based Models of Space

Current games are characterized by allowing "free movement" within their worlds, and as a result, players hardly ever think about what it means to master the rules of space (see also chapter 3). To gain a better understanding of the subconscious mechanisms which are in action when we learn these rules of space, we want to examine *Pac-Man* (Namco, 1980). Here, we have a tile-based model of space whose specific rules are learned by means of the trial-and-error method. In tile-based models of space such as *PacMan* or *Sokoban* (Thinking Rabbit, 1982), playfields and backgrounds are assembled from recurring objects and arranged in a grid. This requires fewer resources (storage, administration) and enables a faster level design. For this reason, most consoles of the first generations, from Atari 2600 to NES and PCEngine, support tile-based playfields. The findings are transferable to models of space without grids, in which objects can be

11 Playable in the emulation at https://archive.org/details/Maze_and_Jailbreak_and_Blind-Mans_Bluff_and_Trailblazer_1977_Fairchild.

placed in any position. The different rules, which are learned in this way, are described in the following table.

**Visual-functional rule of space: tile-based setup**

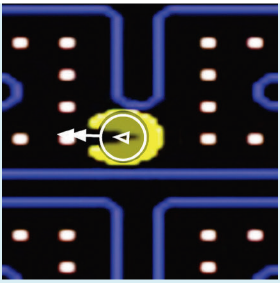


Players initially make a visual observation: the playfield consists of different recurring parts.

Assumption: The playfield is made up of right-angle fields which serve as points of reference for the game's principle, as in other games of the era.

Initial hypothesis: The moveable objects move at a right-angle along the grids consisting of adjacent fields (later confirmed by the movements of the ghosts).

**Avatar rule of space: automatic movement**

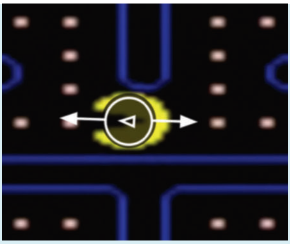


The avatar moves forward automatically (most likely players will test whether they can stop the avatar). Players have no control.

Rule: The avatar moves forward irrespective of the input.

This rule may be interpreted, based on analog knowledge, as a person moving continually forward, a vehicle gone out of control, a car (the unofficial precursor to the game, *Hand On* [1979], used cars) or specifically as a Pac-Man within the game setting.

**Avatar rule of space: interactive rule of movement, forward and backward**

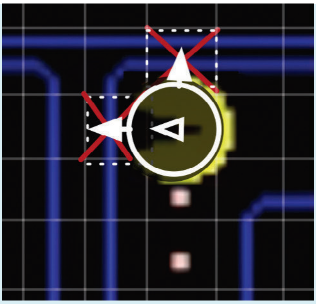


The avatar can be controlled by the input, i.e. a change of direction can be forced.

Rule: Variable movement is possible in the forward direction, as well as in the opposite direction.

Analog interpretation: normal movement.

**Avatar rule of space: rule of movement; wall**



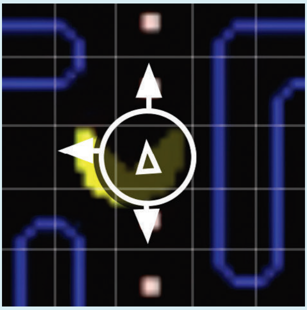
When the avatar comes across a blue field, the “interactive rule of movement” is no longer valid: it is not possible to move in the direction of the blue field, and the game does not respond (no sound). Blue fields seem to be obstacles which limit freedom of movement.

Rule: The avatar is prevented from changing direction, when it is directed towards a blue-edged field.

Analog interpretation: The blue fields are walls.

Supplement to the rule: The avatar stops and waits for an input when it comes across a wall.

**Avatar rule of space: rule of movement; 4 directions (free fields)**

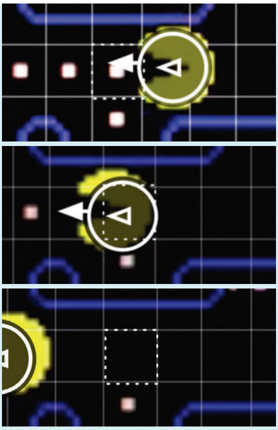


In certain places, the avatar can be directed towards free fields. A free field is either an empty black field or a field containing a (colored) dot. Theoretically, this is possible in all four directions.

Rule: The avatar can be directed in all four directions, assuming there is a free field. Predominantly black fields or sequences of dots seem to indicate possible movement.

Analog interpretation: The path is clear or there are pebbles to follow.

**Avatar rule of space: small and large pills**

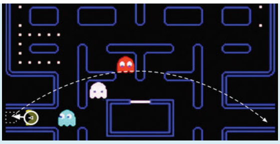


When the avatar is moved into a field with a colored (here: salmon pink) small dot, the dot disappears.[12] When this is tested with a large round dot, no doubts remain: players can temporarily eat ghosts, and the color salmon pink seems to be a positive signal for the avatar.

Rule: Players can move into black fields with or without colored dots. These objects needs to be collected in order to win.

Analog interpretation: The colored pills are eaten by Pac-Man (supported by the animation).

**Avatar rule of space: teleporter fields**



Players notice that they can move into a field at the left edge and a field at the right edge, and then reappear in the field on the opposite side.

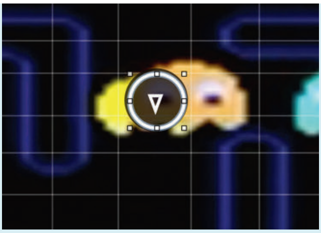
This can be useful for strategic purposes (escaping from enemies, collecting points, eating enemies).

Rule: Players can move to a different side from two special fields.

Analog interpretation: This behavior does not exist in the analog world. It therefore must be a kind of magic teleporter.

12 In this first arcade version, the dots are salmon pink. In later versions, the color is changed to yellow, which creates a positive connotation: the dots are now the same color as the avatar, Pac-Man.

**Avatar-enemy rule of space: in the same field or occupying the same space as an enemy**



Players notice that there are other objects traveling through the maze. On first contact, they realize that they get killed by them. These enemies are visually coded: by color or through animation.

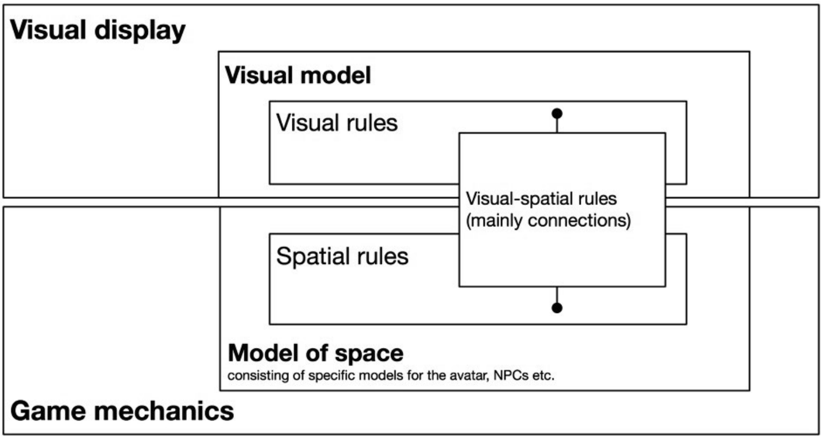
Rule: Players have enemies, these also move around in the maze. If they occupy the same spot, the avatar "dies".

Analog interpretation: This is a type of rival – the game suggests visually, and in terms of the story and game design, that these are deadly ghosts.

Apart from these rules of space for the avatar, there are equally specific rules for the enemy (which, in the case of *Pac-Man*, are very similar): the ghosts move within the same space or maze but they are different in terms of how they are controlled (avatar vs. NPCs). More significantly – and this was an innovation at the time – every ghost behaves individually in a different way. It is not surprising then that the various ghosts have their own visual rules: they each have different, and highly distinctive colors. The enemies give dynamic to the concrete model of space by being dynamic elements of a rigid part (the blue maze). In the best possible scenario, players must offset these two models against each other, while always remaining alert: where are the enemies, where can I find a passage, what is or could become dangerous? At the same time, they need to keep an eye on the actual game: where can I find any more pills, how do I reach them in the safest way, is there a bigger pill, and where and how do I use it? How can the spectacular, non-Euclidian element of the teleporter be made use of?

In the example of *Pac-Man*, the systems of rules are two-dimensional, at all levels of the game. These comparatively simple relationships become much more complicated in three-dimensional games, where the rules of space of the avatar often remain two-dimensional (walking, moving along on the ground), but the enemies can move in three dimensions (e.g. by being able to fly). As a result of the three-dimensional perspective (1$^{st}$ person or 3$^{rd}$ person), both the perception and appropriation of space change fundamentally (e.g. through the lack of an aerial view, i.e. overview). Adding to the complexity, the perspective is interactively dependent on the avatar. Therefore, games and their guiding principles need to be expanded, or the content must become more concrete and more in correspondence with the analog world. In *Pac-Man*, the set of rules pertaining to space and its visual representation (visual rules in 2D, spatial rules in 2D) are relatively contained and easily understandable. The space appropriation model provides a more detailed examination of this dual relationship between game mechanics and the visual display (cf. Figure 3):

*Figure 3: Space appropriation model: spatial rules (e.g. the enemy's behavior) can be connected to visual rules (visuals, depiction) through visual-spatial rules.*




Source: Bauer and Kato

The visual display of a game contains a visual model which comprises all the graphical aspects of the game. It has a rules-based structure and includes definitions for the depiction of objects (in *Pac-Man*, for example: "What does a wall look like?"). Game mechanics, on the other hand, contain a model of space consisting of rules of space. This model of space includes (in the same way as the visual model) the definitions for the spatial behavior (e.g. "The wall is an obstacle"). The visual rules and the spatial rules are then connected through visual-spatial rules. The visual wall become interactively recognizable as an obstacle, and this information is saved with this connotation for potential future application in the game. Visual-spatial rules are intended by game design as a form of structural connection and encourage an interpretation based on decoding. The same spatial rule for an obstacle could be referenced, for instance, in the case of an extended wall (e.g. made out of wood).

When we take a closer look at the rules of space in games such as *Pac-Man*, we realize that the appropriation of space is a process of small, sequential steps. In many of the current games, it is impossible to unravel this process easily. This is mainly because this kind of cognitive effort becomes obsolete in computer games, as a result of the hyperreal simulation of the analog world with its "normal" or known rules: now, players no longer ask themselves whether a specific space could perhaps be a wall – they can see it and they know it. With the unconscious recognition and learning of graphically coded rules (simple guiding principles) of course comes the advantage of a very economic engagement with the game's world. The need to understand the rules of space is no longer given: the perfectly simulated wall can be read directly as an orientation cue ("this way"); the actual spatial rule for the wall ("I can't get through here") is already implied visually. In most current games it is necessary to recognize the guiding principles, but the underlying rules no longer need to be learned. Paradoxically, space appropriation in these newer games is a much simpler process than in the early, graphically much more unsophisticated games. However, when spaces explicitly do not function according to real-life criteria, the logical assumption is that space appropriation becomes more complex again, albeit under different circumstances (the wall is still immediately recognized as such).

## CASES: ECHOCHROME, ANTICHAMBER AND PORTAL 2 CO-OP MODE

Simulations of the real world at the most sophisticated graphical level are now the standard in AAA titles, and no effort is spared in their design. What springs first to mind is the technology of voice and motion capture, with its ability to transfer the characters, their movements, gestures and facial expressions as authentically as possible to the computer game.[13] But even the game's space is created with the utmost elaborateness, when, for instance, academic experts from the field of architecture are consulted, in order to design sites as historically accurate as possible, such as in the *Assassin's Creed* series.[14] In the case of *The*

13 The story-centric approach of many current titles, in which the characters – more recently even played by well-known actors – and their stories are at the center, is probably also a result of voice and motion capture increasingly gaining ground. Or, as predicted by Jay Garnier, the director of Faceware (a software specialist for face animation) in an interview about this technology in 2013: "Gameplay will become more story focused and the ways we as players interact with characters in-game will only get better and more enjoyable." (Freeman 2013).

14 See also the interview with Maria Elisa Navarro who was a consultant on *Assassin's Creed II.* (cf. Saga 2015).

*Last of Us* (Sony Computer Entertainment, 2013), designers tried to outdo each other in creating true works of art, even when the design subject was just a simple wall:

> "Everything was art deco! Nothing could just be like a flat wall with stucco painting, you know what I mean? Nothing could just be normal. Artists would be like, I'm going to make this the most awesome fucking wall ever." (Edge Staff 2013)

"Normal" no longer seems real enough, the space needs to become even more of an experience by added aesthetic value. It is exactly this hyperreal quality of the space that is celebrated in *The Last of Us*, which goes hand in hand, from the player's point of view, with the promise of a very realistic relationship to the space. Yet, that means any possible actions in relation to the space are limited to those we are familiar with as possibilities in our real world.[15] Identification with the characters certainly becomes easier by being accustomed to the contextual concept of space in these initially unfamiliar, post-apocalyptic worlds. However, that is not to say that this kind of socialization towards the computer game's space happens automatically: at the beginning players must still learn, for instance, that they are indirectly guided by their companions or that the drawers can be opened.[16] In other words, they cannot avoid this socialization to the game's world with its own specific rules. Despite all this, this basic mastering of space in hyperreal games should be called by its name: it is anything but spectacular.

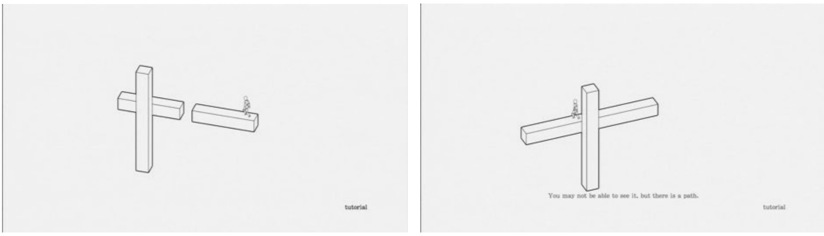
## Echochrome

The situation is quite different in *Echochrome* (Sony Computer Entertainment, 2008). The levels in this puzzle game consist of architectural constructions – composed of bars, stairs, gaps, and jumping-off points on or holes in the bars – on which an articulated mannequin automatically moves back and forth (cf. Figure 4).

15 With the exception of the protagonist's phenomenal hearing capacity which can also be used indirectly for space appropriation ("Where is the enemy?").

16 Cf. our analyses in Kato/Bauer "Hansel and Gretel" (in this volume, pp. 127 ff.) and Kato/Bauer "The Player as Puppet" (in this volume, pp. 222 f.).

*Figure 4: Creating impossible objects by changing the spatial perspective: Echochrome.*




Source: Screenshots Bauer and Kato

The players' task is to now change the perspective of the space[17] in such a way that the mannequin can use the resulting construction of impossible objects in their new, altered perspective to reach a specific goal and, in the higher levels, traverse additional points, so-called "echoes", in the form of semi-transparent shadows. The game's principle is both unique and distinctive, as it requires the manipulation of the spatial perspective, as opposed to the avatar. The impossible objects are reminiscent of the famous images by M.C. Escher, but were created by the "father of the impossible figure", Oscar Reutersvärd. (cf. Reutersvärd 1991) Through its minimalist design, and with its background music of modern-classical strings, this game focuses completely on the experience of space and spatiality. *Monument Valley* (Ustwo, 2014) is also based on the construction of impossible objects, but the two games differ significantly in terms of their graphics and storytelling: While the former is minimalist in these respects, the latter is anything but. *Echochrome* lacks a narrative causality which would encourage players to move from one level to the next. The sole reason for continuing the game is the challenge of ever more complex constructions and their solution through the experience of space. There is an almost esoteric flavor added to this playful concoction by the so-called "five laws", which are introduced at the beginning of the game as part of a tutorial presented by an artificial-sounding female voice.[18] The purpose of this is to help players to reach their goal ("Use the 5 mysterious laws and create the path"). In the example of the construction

17 This raises the question of whether players are more likely to feel that they are turning the objects, rather than changing the space or the perspective of the objects in the space. As far as perception is concerned, that would suggest a neglecting of space in favor of figure-centric actions.

18 Interestingly, this is similar to *Portal 2*, see below.

seen in Figure 4, where the challenge is to overcome a gap, the voice provides the following commentary: “The first mystery is perspective travelling. Yes, in this world, what you see becomes the truth”. As the construction of impossible objects, with all its irrational features and requirements which go against our normal understanding of space, is not a self-explanatory endeavor, a tutorial like this seems necessary. Matching the concentrated experience of space in the game, this tutorial does not rely on conventional instructions in the usual pattern followed by tutorials, such as in *Monument Valley* (where the first instruction is “hold and rotate”). The explanations provided by the artificial voice are more aptly described as very vague paraphrases or strong metaphors for what players *see* in the tutorial, before they can, or have to, do it and attempt it themselves: “travelling“ for the possibility of crossing the gap, or “seeing” for the change of perspective as the solution. The tutorials in *Echochrome* are characterized by a certain vagueness, which elegantly reflects the indeterminate state of the impossible objects and shows that impossible constructions are likely to require some help to be properly understood, and that there is a sympathetic way of achieving this.

## Antichamber

*Antichamber* (Demruth, 2013) is another game which contains impossible spaces yet manages without a tutorial. This can be explained by the fact that the mastering of space is not spectacular as in *Echochrome*, but rather more conventional: players wander through simulated passages within a maze-like structure. Of course these do not function in the Euclidean sense or in a way we would recognize from experience: as the run speed changes, the surroundings change as well; things can appear and disappear depending on proximity; going back the same way means ending up in a different location – that last realization is particularly important as it is a prerequisite for solving the very first puzzle in *Antichamber*. As the walkthrough on www.steamcommunity.com recommends, “If the game gives you any advice, take it.” (Asha Man 2013) and indeed there are boards on the walls with cryptic messages designed to help players, which tend to make sense fully only in hindsight. In the *Let’s Play* with Martin and Daniel from the YouTube channel *GameTube*, what makes this game so distinctive becomes particularly clear in the first few moments of their gameplay. (cf. GameTube 2013) After a relatively unproblematic start, the Let’s Players are faced with a choice between going up the blue stairs to the right, or going down the red stairs to the left. The board reads: “A choice may be as simple as going left or going right”. Martin – a novice who has only seen a few screenshots of the game – twice decides to go up ("So I'll go up again") and then down. The players then find themselves once again in front of the same set of stairs,[19] but opposite the first board there is now a second one, and Daniel – who already has some experience with the game and acts like an expert – reads out what it says:[20]

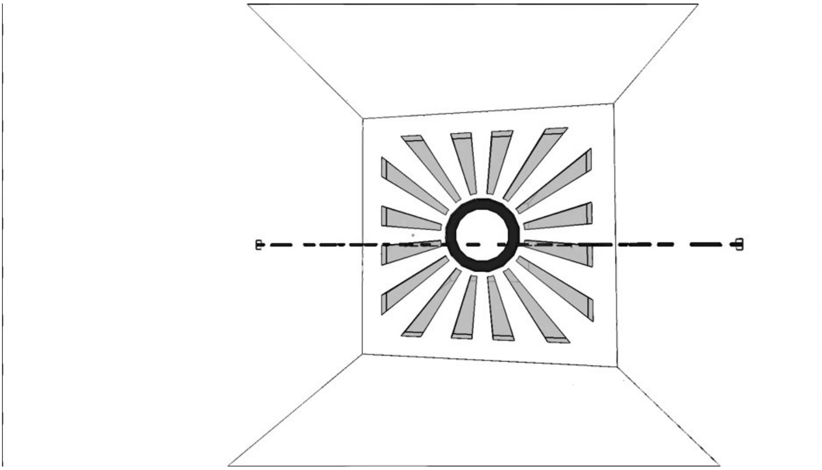
01 DAN: the choice doesn_t mAtter if the outcome <<len> is the SAme>.
02 MAR: j[a: ]
*yes*
03 DAN: [des] ist wohl egAl wo du lang LÄUFST?
*so it doesn't matter where you're going*
04 MAR: ja gAnz kanns ja nicht egal <<len> SEIN>.
*well it must make a difference somehow*
05 ich geh NOCHmal rUnter.
*I'll do down again*
06 (3.0)
__/
\
Goes down the stairs and through corridors, arrives back in the same old corridor
07 was ist denn wenn ich zurÜckgehe ge=funktioniert DAS,
*what happens when I go back does that work,*
08 Ah kuck (-) vielleicht war DAS des [rätsels lÖsung; ]
*ah look (-) maybe that was the solution to the puzzle*
09 DAN: [brennendes HAus,]
*burning house*
10 MAR: zuRÜCKzugehen.=
*to go back*
11 [=when you ] return to where you have BEen things aren_t always as
12 DAN: [ when you- ]
MAR: reMEMbered.
13 DAN: AH wenn man zurückkehrt sind die dinge oft nicht so wie man sie noch in_ner erinnerung hatte,
*ah when you go back, things are often not the way you remembered them*
14 aber [JETZT,]
*but now*
15 MAR: [kUck ] das war des rätsels lösung zuRÜCK<<len> zugehen.>
*look that was the solution to the puzzle to go back*
16 DAN: die farben ändern sich auch Aja (-) ok.
*the colours change as well I see (-) ok*

19 Astonishingly, the impossible space is taken for granted without further comment. Likewise the L-shaped corridor which leads back to the starting point (as in *P.T.*, see above) does not seem to cause any surprise.

20 The transcript begins at 02:43.

The two gametubers conduct the process of reading out, translating and interpreting the text on these boards almost like a ritual. The boards themselves form a system of guiding principles which provide different kinds of cues at a meta level. The text read out by Daniel as an introduction informs the players about the futility of their current actions: it indeed makes no difference which stairs they take, as they would not get them anywhere regardless. Martin initially does not believe this, but on seeing the same corridor, with the same two boards and stairs, his thoughts take a different direction (L07). This principle of reversal is in fact not an easily conceivable or prototypical walking pattern in games, and that is exactly what is exploited by *Antichamber* for its irrational concepts of space: the path walked so far changes when it is walked back. This first, extended challenge reveals itself as an important waymarker in the socialization of the players to the (non-)logic of the game, with the boards functioning as guiding principles. Interestingly, the authority over reading out the text from the boards is now with Martin after he has correctly interpreted the cue, and so he proceeds to read out the next text. The conflict over the right to perform the role of reader (overlapping in L11/12) is resolved in Martin's favor, even though his speech contains closing markers (L08, L10) which would allow Daniel to take over again. Daniel accepts this role change and seamlessly provides a translation (L13). The transcript also suggests that Martin regards the role of reader as a reward for his correct interpretation or action, which manifests itself in his repeated emphasis on "going back" as "the solution to the puzzle" and his emphatic proclamation "look". There are two different types of boards in the game: those providing cues for future or current actions, and others which confirm or comment on the solution. Thus, the first puzzle at the beginning of the game also socializes the players to this dual system of guiding principles.

*Figure 5: Red laser as door opener: Antichamber*



Source: Screenshot (GameTube 2013)

Immediately afterwards, the gametubers need to go through a closed gate, in front of which there is a red, broken line (cf. Figure 5).[21]

```
15   DAN:  jetzt ACHtung,
           now watch out
16         is ein LAser;
           is a laser
17   MAR:  öh ich kann mich aber nicht DUCken;
           eh but I can't duck
18         oder ich kann GEhen [und] springen,
           or I can go and jump
19   DAN:                      [ja ]
                                yes
20         [vielleicht musst du in den laser REINgehen.]
           maybe you need to walk into the laser
21   MAR:  [<<p> kann ich irgendwo REINklicken?>       ]
                  can I click anywhere?
22         macht man ja eher UNgern_ne sieht ja immer so nach
           selbstschussanlage und alarmanlage und so aus;
                                     \_/
                                       \
           nevertheless, he walks into the laser, the gate opens
           not something you'd want to do no, always looks like a
           spring gun or an alarm system or something
23   DAN:  macht in dem fall die TÜR auf (-) auch nicht schlecht-
           opens the door in this case, not bad
```

21 The transcript begins at 03:17.

Daniel interprets the red line as a "laser" and therefore as an indirect orientation marker which needs to be bypassed (L15). His aversion to it is of course based on the gaming experience of these two gametubers; this is reflected by Martin's comment ("always looks like …", L22). The verbal effort made in this passage, which contrasts with Daniel's plain statement about the solution (L23), very vividly shows how difficult it is to overcome these learned patterns – particularly when they have a negative connotation. In that sense, *Antichamber* pursues a kind of tabula rasa policy regarding the players' socialization to the usual guiding principles, and keeps the promise implied in its name.

## Portal 2 Co-op Mode

In *Portal 2* (Valve/Electronic Arts, 2011), the game's world consists of a simulation which is close to the analog space and as such quite unspectacular. A "portal gun" fires teleportation portals into flat surfaces and enables an (impossible) mastering of space whose logical complexity makes this game particularly attractive. The players' progress in this game depends on the ideal positioning of the two portals, and they need to search the space in which they currently find themselves for clues to the right combination. The question then is not "what's next", but "where next" in terms of the positioning of the portals.[22] This becomes especially evident in the co-op mode of *Portal 2*: the exchange between Peter and Christian in their *Let's Play* on YouTube channel *Pietsmiet* is peppered with deictic expressions such as "there" and "here" (L01, L04, L05, L06, L07); most of them are given a primary stress which audibly marks them out as central to the information exchange (Pietsmiet 2011b, at 08:38):

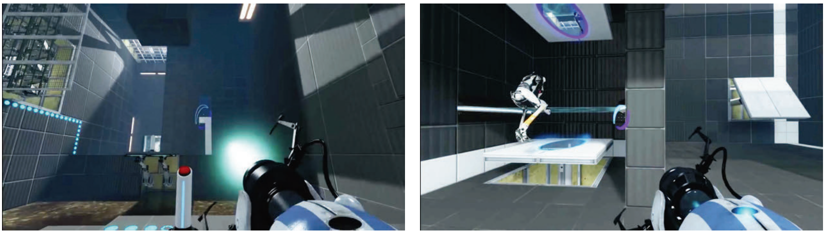
01 CH: also von dA wird nachher einer geSCHOSen.
*so the launching of one of us later on happens from over there*
02 PS: ich weiss aber noch nicht WIE.
*but I don't yet know how*
03 CH: °hhh DAS weiss ich ^Auch noch <<len> nich.>
*I don't know that either yet.*
04 PS: ich kann an diese weisse fläche DA: (-) nichts schies[sen; ]
*I can't fire anything into this white surface there*
05 CH: [wasisn] HIER wenn du hier runter fällst ist das portl weg.
*what's here when you fall down here then the portal is gone.*

22 In other words: "what's next" no longer follows on from "where next", but "where next" follows on from "where next".

06 PS: achso DA ist noch wAs?
ah ok so there is something else there
07 CH: aber hier ist das PORTL direkt weg;
but here the portal is gone straightaway

In this sequence the Let's Players are in a position where for the first time they do not immediately find a solution. Christian recognizes early that a tilted surface will be the final jumping-off point for the exit (L01; cf. Figure 6, right), but "how" (L02) to get there remains a puzzle. This is partly because surfaces are falsely interpreted as significant but are in fact insignificant: Peter initially fires, without success, at "this white surface there" (L04; cf. Figure 6, left).

*Figure 6: Misleading and useful surfaces: Portal 2 Co-op Mode.*



Source: Screenshots (Pietsmiet 2011b)

His trial-and-error strategy contrasts with the knowledge immediately displayed by both players regarding the functionality of the tilted surface. Their choice of words is interesting (ibid, at 09:13): on the one hand, the surface is described vaguely and without stress ("thing" L11, "whatsit" L14), but on the other, it is identified as an important spatial element – it is notably not simply paraphrased as, for instance, a "tilted surface", similar to the aforementioned "white surface" (L04):

10 CH: <<f> doch naTÜRlich,>
yes of course
11 du machst das portal hier UNten und und auf dem ding das abgeschossen wird;
you put the portal down here and and on the thing which is fired
((30 seconds omission))
12 PS: <<f> NE (-) ich WEISS es->
no I know it
13 ich muss das im richtigen moment ich muss im RICHtigen moment das (-) UNtere por!TAL!,
I need to at the right moment I need to at the right moment the lower portal
14 (-) ne das Obere por!TAL! auf die=auf die dingens tun.

> *no the upper portal, I need to put in on the=on the whatsit*

The two Let's Players recognize the surface as important because of their gaming experience: they (must) have played *Portal* (Valve Software, Electronic Arts, 2007) and the single-player mode of *Portal 2* which includes a narratively embedded tutorial and is also part of the well-known setting of *Portal*.[23] This means they are sufficiently familiar with the specifics of space in this game, and do not explicitly need to discuss most of the actions which are required to find a solution. It is a disadvantage in terms of being able to follow the players' thought processes. However, their sometimes quite elegant and seamless task sharing is proof of their "reading" of the game's space and their internalization of its typical rules of space. The specific fascination of the *Portal* series lies in the dynamic element controlled by the players, i.e. the positioning of the portals, which is similar to the changing of the perspective in *Echochrome*. Even though the available options are preprogrammed and preset by the game design,[24] this dynamic element makes the space, and particularly the process of mastering the space, spectacular.

## CONCLUSION

This article set out with the assumption that games – and electronic games in particular – follow the concept of the magic circle and consist of a space with its own rules. These rules do not only affect game mechanics but also the way in

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23 This is certainly true for Peter, cf. Pietsmiet (2011a). Unfortunately, there are hardly any *Let's Plays* of *Portal* which are worth seeing.

24 This raises the legitimate question of whether there are perhaps "accidental" solutions which do not necessarily correspond with the various solutions suggested by the game design. Based on our understanding of spatial rules and their design-specific constitution (cf. Figure 7), this is, strictly speaking, impossible as every eventuality is already covered by and inscribed into the rules of space. In other words: there is no freedom, unless it has been preprogrammed. In the example of *Portal* the case seems to be different. Here and in similar moments players prioritize the rules of space over the design of the game (to be more precise: over the guiding principles). In analogy, the white, non-playable surface in our example is (mis-)read according to the rules of space. In this context further reflections are necessary about the nature of the relationship between explicit/implicit guiding principles and specific/general rules of space.

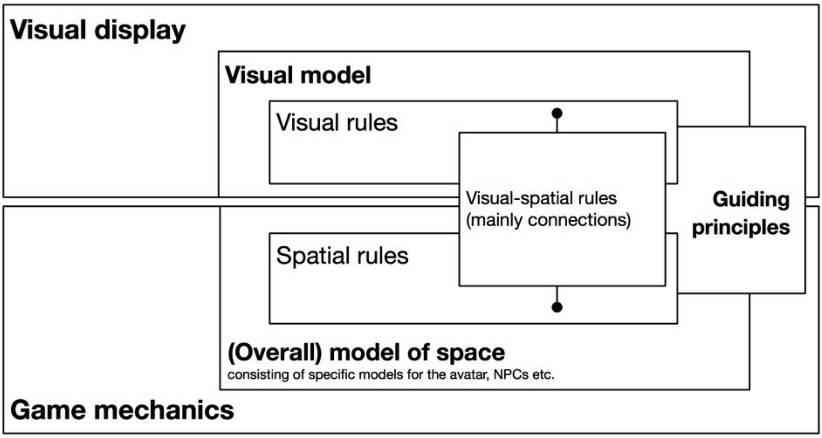
which the game and its space are displayed. The space in a computer game is freed from the analog (atomic) space by means of technology. Computer games make use of computer-generated spaces, both in terms of their display and their game design-specific "management". Since they are entirely programmable, it would be possible to change the space completely at any time and with any kind of input. Of course most games do not make use of these possibilities, but instead import simpler, analog models for the visual side of the game, and the spatial behavior.

Against this background, it comes as no surprise that there are only very few games which deserve the label "spectacular" as far as their spatial features are concerned. The spaces of hyperreal computer games which impress with their perfect graphics could justifiably be called spectacular, but as our observations have shown, the transfer effort and the cognitive effort are both minimized to such a degree that the actual process of comprehending or mastering the space is in danger of falling below the threshold for detection and perception. In order to be able to draw accurate conclusions about the prototypical process of space appropriation, and about the specific models of space and their visualizations, we have chosen to examine computer games that do not use an analog model of space.

Early games have proven to almost have a modern quality. A detailed analysis of *Pac-Man* provided us with a break-down of space appropriation, which emerged as a gradual process of understanding and mastering the rules of space and their visual representations. For our analysis of modern games, we chose *Echochrome, Antichamber* and *Portal 2* which exemplify three different forms of the spectacular. The playfully mastered spaces in *Antichamber* are simulated in an analog fashion, but have a spectacular-irrational quality in terms of how they behave. The spaces in *Portal 2* are analog simulations, however players have the option to use a portal gun and master the spaces in a spectacular way. *Echochrome*'s spaces are spectacular both in the way they are conceived and in the mastering of space.

The following space appropriation model is a result of these findings (cf. Figure 7):

*Figure 7: Space appropriation model extended by guiding principles.*




Source: Bauer and Kato

The separation between the visual level of the display and the spatial behavior of game mechanics has shown itself to be pivotal especially for the more recent examples: there is a difference between what players see – as a visual rule – (e.g. the tilted surface in *Portal 2* or the red laser in *Antichamber*), and the specific, underlying rules of space (a firing spot or door-opening mechanism). As our examples have shown, the connection between these two levels is mostly due to knowledge acquired through gaming experience. In one case (*Portal 2*), this connection was created through previous incarnations of the game as well as tutorials, enabling players to make fast and correct assumptions about a challenge. In another case (*Antichamber*), the game presented a situation – most certainly deliberately – in which the Let's Players were faced with a dilemma, specifically to demonstrate its different way of functioning and to invite them to give up ingrained mechanisms of space appropriation.

Regarding the notion of guiding principles, our assumptions so far can be extended and integrated into the space appropriation model: guiding principles are cues on the game's surface which are placed by game design and continually assessed by the players so they can successfully continue their gameplay. The guiding principles of space, which can be described as a systemic set of rules resulting from the connection of visual rules with the rules of the model of space, manifest themselves, from the players' point of view, primarily in the form of orientation cues ("where next?"). They are generally interpreted as visual elements whose connected rules are decoded automatically, especially when the spaces are simulated in an analog fashion. The situation is different in spectacular spaces: here, a learning process is necessary for players to comprehend, by way of the visual level, the underlying rules of space or the rules of game mechanics.

As a general conclusion, and a potential basis for future research, we believe that the concept of appropriation would lend itself well to gaining further related insights, also outside the notion of space – through examinations that probe beyond the visual, and focus on the game-mechanical core of computer games. This would be useful both on the reception and also on the concept side of computer games.

## KEY TO GAT2 TRANSCRIPTIONS

(the list below only contains the conventions relevant to this article)

| | |
|---|---|
| [ ] | overlaps and speaking simultaneously |
| [ ] | |
| °h | breathing in |
| (.) | micro pause, estimate, up to approx. 0.2 seconds |
| (-) | brief pause, estimate, approx. 0.2 to 0.5 seconds |
| (--) | medium-length pause, estimate, approx. 0.5 to 0.8 seconds |
| (1.0) | timed pauses |
| robert_s | words joined together within units |
| ((coughs)) | para- and extralinguistic actions and events |
| <<whispers>> | para- and extralinguistic actions and events accompanying speech |
| ((...)) | gap in transcript |
| = | fast, immediate follow-on contribution by speaker |
| : | extending, lengthening by approx. 0.2 to 0.5 seconds |
| acCENT | focal stress, accentuation |
| accEnt | secondary stress |
| ac!CENT! | pronounced stress |

Fluctuations in pitch at the end of intonational phrases:

| | |
|---|---|
| ? | steep rise |
| , | medium rise |
| - | even level |
| ; | medium drop |
| . | steep drop |

Intralinear notation of fluctuations in stress and pitch

| | |
|---|---|
| `^SO` | rising-falling |

Changes in volume and pace of speech:

| | |
|---|---|
| `<<ff> >` | fortissimo, very loud |
| `<<p> >` | piano, quiet |
| `<<acc> >` | accelerando, becoming faster |
| `<<len> >` | lento, slow |

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# Nonverbal Guidance Systems

## Seamless Player-leading in Open-world Games

*Francine Rotzetter*

What are nonverbal guidance systems in open-world games? Why are they so important for the immersive aspect in a game and how do game developers design such systems with a high usability? In order to answer these questions, nonverbal guidance systems were analyzed according to their perceptual channels, using an approach based on the semiotic symbol theory. This research process, which started in the context of a Master Thesis in the subject area in Game Design at the Zurich University of the Arts, resulted in six different guidance systems. As a way of showing the applicability of these systems to open-world games, nine different open-world games were successfully categorized according to the identified guidance systems. Furthermore, a survey was conducted with the aim of examining the players' and game developers' views about guidance systems in open-world games.

This article presents a catalogue of different guidance systems and their use in open-world games. It provides the means to a deep understanding of what is necessary for good player-leading, and explains how to improve existing guidance systems.

## NONVERBAL GUIDANCE SYSTEMS

### Special case: Open-world

Guidance systems are different strategies that game developers use, to lead a player towards a goal. Usually players do not seem to be troubled when they recognize that they follow predetermined ways and paths, but open-world games claim that players can operate in complete freedom. Thus, game developers must hide their control strategies in open-world games. Ideally, the developer only suggestively communicates the guidance system to the player by a large number of different verbal and nonverbal clues, which together form the guidance systems. These clues can motivate the player to use the corresponding path towards a goal, but the designers do not always succeed in conveying their intentions to the player due to wrong or unalterable use of the guidance systems. Additionally, an overload of information or clues, which are too complicated or hidden can lead to a failure of the guidance system. On the other hand, the player can become bored with clues that are too obvious, and the essential aspect of open-world games, namely exploring, vanishes. If a guidance system fails, the player is left behind confused and disorientated, and the virtual reality created loses its credibility and atmosphere.

## The "100-steps method" and the identification of the six guidance systems

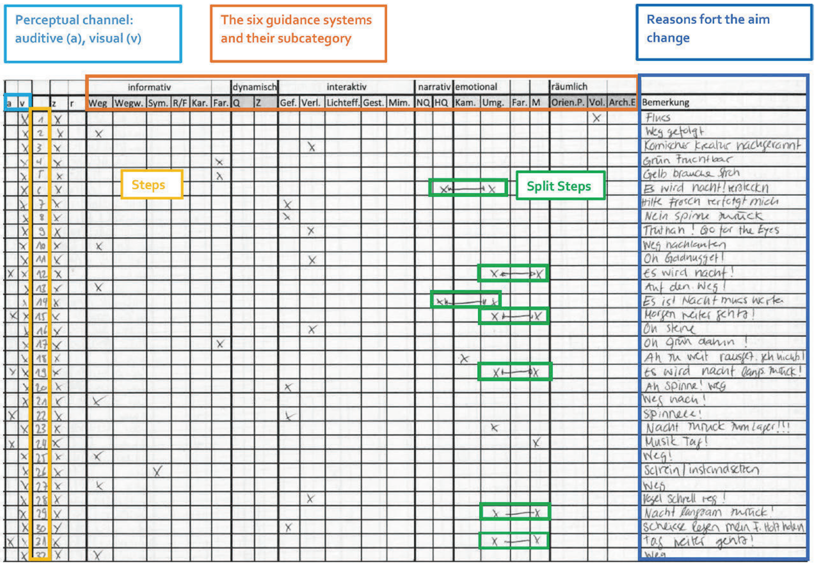
With the purpose of identifying the existing strategies of player-leading, and to analyze and categorize these systems, a new approach called the "100-steps method" was developed. This method allows the classification of guidance systems according to their design, perceptual channel (visual or auditive) and effect on a player. In order to record most of the existing guidance systems occurring in an open-world game, one hundred goal-changing choices ("100 steps") made by players were analyzed. For example, in the game "Don't Starve" (Klei Entertainment 2013), the player decides to leave the regular path and head for his camp because his game character is tired and needs to rest. Altogether nine open-world games were examined by this method. As a result, six different guidance systems (with a large number of subcategories) were determined, specifying all the analyzed steps. To identify the preferences of these systems among open-world game players and game designers, two surveys were conducted.

*Table 1: Game test: open-world-games examined with the "100-steps method"*

| Game | Release | Plat-form | Genre | Perspective | Reason for choice |
|---|---|---|---|---|---|
| Sid Meier´s Pi-rates! | 1987 | PC | Action-Adventure, Strategy | Third-Person | Release date |
| Aardwolf MUD | 1996 | PC | Text-based RPG | Third-Person | Text-based game |
| Far Cry 2 | 2008 | PC | FPS, Action-Adventure | First-Person | Map handling |
| Red Dead Redemption | 2010 | PS3 | Action-Adventure | First-Person | Compare publisher |
| The Elder Scrolls V: Skyrim | 2011 | PC | Action-RPG | First-Person | Success |
| Grand Theft Auto V | 2013 | PC | Action-Adventure, Third-Person Shooter | Third-Person | Compare publisher |
| Don't Starve | 2013 | PC | Action-Adventure, Survival | Third-Person | Indie game |
| The Witcher 3: Wild Hunt | 2015 | PC | Action-RPG | Third-Person | Success |
| Mirror´s Edge Catalyst | 2016 | PC | Action-Adventure, Platformer | First-Person | Stereotypical guidance system |

Source: Rotzetter

*Table 2: Game test: primary table to analyze the different guidance systems with the help of steps. (Table from game test "Don't Starve")*




## THE SIX GUIDANCE SYSTEMS IN OPEN-WORLD GAMES

In order to recognize a clue from a guidance system, the clue must be in some way different from the other objects or circumstances in the game. A contrast must be made. As a result, the player's attention is attracted, and sometimes followed by a completely intuitive reaction.

A simple, but effective contrast is used in the games "Mirror's Edge" (Electronic Arts 2008) and "Mirror's Edge Catalyst" (Electronic Arts 2016). By coloring some objects of the rather colorless environment in red, the player is able to recognize these objects very quickly. This is exactly what the game designers intended because fast reaction and action is necessary to succeed in this action-adventure game.

### Informative guidance system

The most obvious guidance system is the "informative guidance system". It only informs players, it does not limit their movements or evoke feelings. The players usually have to learn how to use and interpret these systems. The "informative guidance system" comprises elements such as *maps*, *symbols*, *near or far* and *right or wrong* data.

Definition 1, "informative guidance system":
"Informative guidance systems" inform the players about:
a) their own position in relation to a predetermined goal
b) the properties of a specific goal

These guidance systems are usually easily available to the player and very informative. Therefore, a good balance must be found so that the player remains challenged, but not overwhelmed. Strategies using yes or no questions such as *near or far or right or wrong* are accepted well by the player because only directions are provided but not the goal itself. In "Far Cry 2" for example the player can search suitcases with diamonds in it. A specific sound gives the player information about the distance between him and the suitcase without telling him the exact position. This keeps the game interesting and challenging for the player and at the same time provides an efficient guidance system.

In *maps*, especially in *mini maps*, game designers tend to provide players with information about everything in their near surroundings. An overload of information means the player doesn't need to explore the environment and the game will become boring, which is comparable to somebody sitting next to you and telling you the outcome of the next scene of an interesting movie. A so-called "fog of war" that masks parts of the map can reduce the risk of an overload of information.

*Figure 1: "Informative guidance system": The top-down mini map from "The Witcher 3: Wild Hunt" shows every detail in the nearby environment of the player.*


Source: edited screenshot Rotzetter

The top-down perspective of mini maps is likewise problematic because humans gain orientation through motion in space and a top-down perspective counteracts this process. The mini map from "The Elder Scrolls V: Skyrim" (Bethesda 2011) shows a design with reduced information and a perspective that is better suited to aspects of exploration, suspense and human orientation (Figure 2). Only the position of the character, the goal and two key points are provided on a one-dimensional map. This gives the player enough support to find the goal without ruining the joy of discovery.

*Figure 2: The mini map from "The Elder Scrolls V: Skyrim" only shows the line of sight and the goals in front of the player.*


Source: edited screenshot Rotzetter

Another way of handling maps is used by the game "Far Cry 2" (Ubisoft 2008). Area map and the mini map are in-game objects, which the avatars can hold in their hands or use as a GPS in the car. While these so-called "embedded maps" are used, the game doesn't pause. This strategy creates additional suspense.

*Figure 3: "Informative guidance system": map appeal in "Far Cry 2" by driving a car*


Source: screenshot Rotzetter

### Interactive guidance system

For the players, the most interesting and highly preferred guidance system is the "interactive guidance system". This leading system uses the players' curiosity and their motivation to guide them. Because of this, the players don't recognize the designers' leading strategies and are under the illusion of deciding in their own way. The system fails if the players overlook clues or can't be motivated enough to go in one specific direction. The "interactive guidance system" doesn't limit the players' mobility. It operates with elements such as *motivation-based decisions* (*menace/ temptation, ways and signposts*) and *interpersonal interactions* (*non-player character gesture, chase/run after*).

Definition 2, "interactive guidance system":
"Interactive guidance systems" guide players by interactions with or properties of the nearby environment, creating an incentive for the players to change their direction by their own motivation.

Because the "interactive guidance system" claims to use subjective reasons to guide a player, it must offer more than one way to reach the goal. Thus, the non-linear characteristic is a part of this system and one of the reasons why it is so valuable for an open-world game.

In *chasing or running after* quests, the players follow tracks or people. These offer the opportunity to guide a player on a completely predetermined path, allowing the designer to place different events on the way. Additionally, they can be used to teach the players something or hand them narrative information. To keep the process interesting, it should not take longer than five minutes.

*Menace or temptation* elements can prevent or lure a player to enter a specific area. For example, a menace in form of cold weather ("The Legend of Zelda: Breath of the Wild", Nintendo 2017), which the player only survives with the right equipment, or a temptation like food ("Don't Starve") that the player needs at this moment. It can be a very convenient method for defining areas with different challenge levels. However, it is crucial for the designer to know what the player wants at a specific moment. Otherwise, the strategy fails or is implausible.

*Non-player character gestures* can show a player the right direction (like a pointing finger) or the avatar's or NPC's health (posture), or they can be used to teach a player something. For example, in "The Legend of Zelda: Breath of the Wild", felling trees is taught by a NPC.

*Ways and signposts* are hybrid guidance systems because they fulfill different purposes in games. For example, routes are a meeting place for traders ("The Elder Scrolls V: Skyrim"), enable the players to increase their walking speed ("Don't Starve") and guide them to interesting places ("The Witcher 3: Wild Hunt", CD Project Red 2015). Additionally, crossroads and signposts can be points of orientation in the game, which help the players to find their way.

## Processual guidance system

The "processual guidance system" is part of the "interactive guidance system", but the guiding strategy does not communicate directly with the player. It depends on autonomous linear movements in the environment that the player cannot influence himself.

Definition 3: "Processual guidance system":
A "processual guidance system" depends on movable objects or object parts in the environment. The player can identify a source or a goal from the linear motion.

The "processual guidance system" can use the specific ability of the virtual space to make invisible motion visible. This can happen with help from visual or auditive clues. For example, an enemy can be detected by making his shot visible, or in "The Legend of Zelda: Breath of the Wild", the direction is given by a visible wind current.

The problem with this system is that it is based on human perception. The *visual translocation* is always preferred over the *auditive translocation*. Experts called this effect “visual dominance” (Goldstein, 2002). The designer must always keep this in mind when he creates two different translocations.

*Figure 4: “Processual guidance system”: A visible wind current gives the player information about source and target through its linear motion.*


Source: edited screenshot Rotzetter

## Spatial guidance system

The “spatial guidance system” can guide players by limiting their freedom of movement, inspire them to execute a specific action, or it can create a point of orientation. *Points of orientation*, *architectonic elements* and *natural obstacles* are aspects of this system.

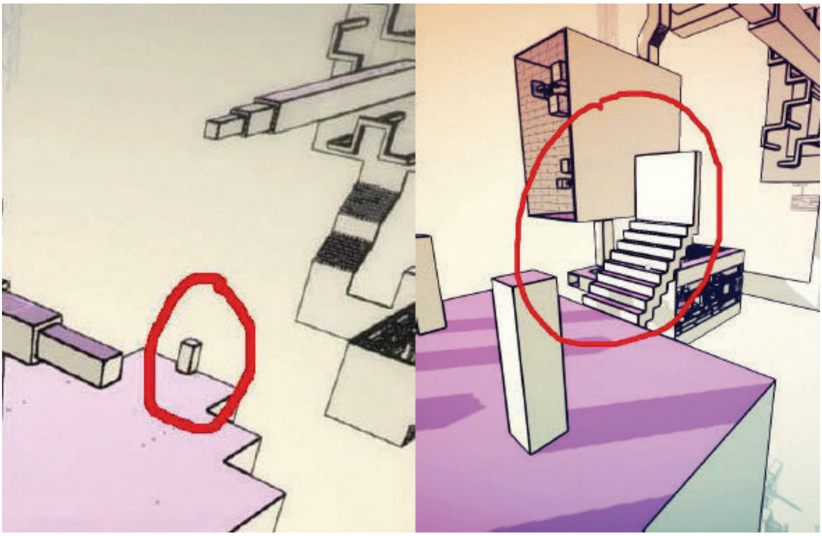
Definition 4, “spatial guidance system”:
The “spatial guidance system” uses static objects that:
a) the player can use for points of orientation,
b) limit or inspire the player to execute a specific movement

*Points of orientation* help the player to divide the environment into segments. To define a recognizable object or place, the contrast to the environment must be distinctive enough. The contrast can be auditive or visible. The latter is more easily achieved, for example by architectural elements or natural obstacles. The greater the contrast, the greater the absolute meaning of a point of orientation, and the smaller the subjective interpretation.

*Architectonic elements* are building blocks like doors, walls, corridors or stairs. They can limit the players' movements in different ways without troubling them. Additionally, they can animate a player to do something very specific and give hidden clues.

For example, in an early version of "Manifold Garden", the players did not realize that they had to step on a cuboid to progress in the game. After the developer added a set of stairs instead of the cuboid, the players knew very well what they had to do, and the problem was solved (Chyr, 2016).

*Figure 5: "Spatial guidance system": The problem (described by William Chyr at GDC 2016) that the players did not recognize they had to step on a cuboid (left) was solved by adding a set of stairs (right) instead of the cuboid.*



Source: edited screenshots Rotzetter

Additionally, architectonic elements have the ability to predefine the direction of sight. For example, players usually look straight ahead in a corridor or after opening a door.

*Natural obstacles* limit the freedom of movement just like the architectonic elements, but in this case, the obstacle is part of the natural environment. With these elements, the game designer can define natural borders, which the player cannot cross. To create a plausible border, the game designer should always use natural obstacles of appropriate dimensions. The player will not accept a river that is one foot wide as a barrier. On the other hand, a wide, heavily flooded river will be accepted as a barrier without generating any confusion. And locked doors are also not so easily accepted by players. By playing a short sound sequence of a door locking, this problem can be easily solved.

### Emotional guidance system

The "emotional guidance system" intensifies other guidance systems and has the ability to evoke feelings in the players that may influence their movements. It is a very subjective guidance system, and it can easily fail, but if it works, the gain in immersion from this strategy is extraordinary. *Atmosphere*, *light*, *music and sounds* and *camera and environment* are elements of this leading strategy.

Definition 5, "emotional guidance system":
The "emotional guidance system" evokes feelings in the players and influences their movements.

*Atmosphere* is quite difficult to create. It depends on different sensory perceptions; light and music play important roles.

"And so, I put this on the board: Silence-and-Light. Silence is not very, very quiet. It is something which you may say is lightless-darkless. These are all invented words. Darkless – there is no such a word. But why not? Lightless; Darkless. Desire to be; to express. Some can say this is the ambient soul - if you go back beyond and think of something in which light and silence were together and maybe are still together, and separated only for the convenience of argument." (Kahn, 2013)

Additionally, other atmosphere qualities can influence the movement of the player, like weather for example. Fog or rain can complicate the player's view or hearing process.

*Light* is a many-sided element. The change of little aspects such as brightness, color, angle of incidence and duration can communicate different things to the player, and the meaning changes completely if the game designer alters only one of these aspects. Additionally, light naturally creates its own contrast unlike any other element. The game designer should be aware that light creates "no light", as the architect Louis Kahn describes in the following text:

> “I cannot speak enough about light because light is so important, because, actually, structure is the maker of light. When you decide on the structure, you´re deciding on light. In the old buildings, the columns were an expression of light – no light. No light, light, no light, light, no light, light, no light, light – you see. The module is also light – no light. The vault stems from it.” (Kahn, 2013)

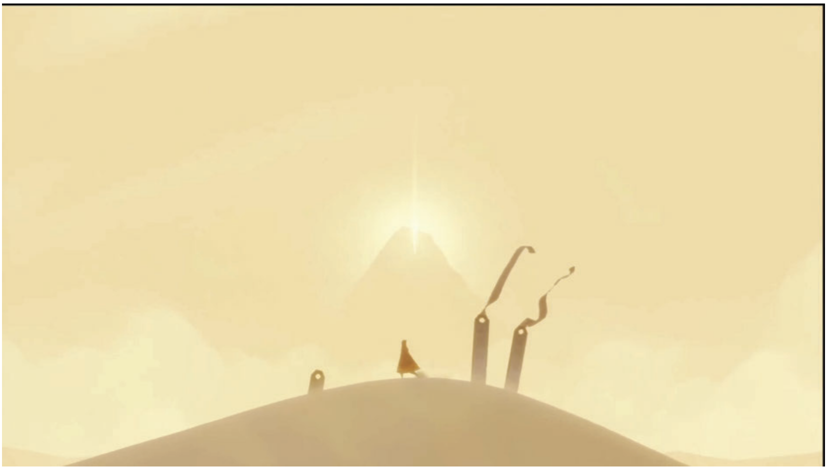
Light can emphasize one thing and completely hideanother. Therefore, with the use of light, the game designer steers the player’s attention.

*Music* does not have the ability to communicate a direction to the players, but it can influence their movements. For example, if battle music starts, experienced players look for enemies or other causes of danger. Some players begin to sneak, others try to hide or simply run away. And the end of the battle music suggests that the situation is safe for now. (Polus, 2016)

*Sounds* can communicate more specific information to the player. They can be *natural*, *cultural* or *abstract*. Abstract sounds, which indicate ‘right’ or ‘wrong’, are part of the “informative guidance system“ (Polus, 2016). Cultural sounds like the chime of a bell provide information simultaneously about the culture and time and may be able to evoke emotions. Natural sounds can inform the player about natural phenomena like thunder, or they simulate the avatar’s body. Heartbeat is an example of a natural sound with an emotional aspect (Hug, 2016). Footsteps also simulate a part of the avatar’s interaction with the environment, and provide the players with important information about the ground they are walking on. This helps the players orientate themselves, particularly in a first-person perspective.

*Camera and environment* can steer the player in the same way as light does. But in this case, the player’s actions are limited in some way. For example, the fixed position of the player’s camera prevents the view being rotated. In the game “Journey”, a fixed camera position is used to show the player the ultimate goal in the game.

*Figure 6: "Emotional guidance system": The fixed camera position in the game "Journey" determines the field of view and shows the ultimate goal.*



Source: screenshot Rotzetter

Other player restrictions can be created by elements of the environment, for example by mist, which complicates the perception. These elements impact the clarity of the environment and the player's feeling of safety.

### Narrative guidance system

"Narrative guidance systems" are not pure nonverbal guidance systems. They are always based on a narrative background, which is presented to the player in speech or in written form. Once the players understand the basics of such a system, they are able to comprehend very complicated issues within the environment of the game.

Definition 6, "narrative guidance system":
"Narrative guidance systems" guide the players by specific circumstances that they are able to understand only if they know the narrative background of the respective system.

"Narrative guidance systems" are not as commonly used as the other five guidance systems, and their use is more passive. It appears that game designers fear that the players are left behind without orientation and not knowing what to do. But "narrative guidance systems" are very suitable in combination with other guidance systems such as the "interactive guidance system". They are able to extend the story from a single point in the game to the whole world. In this way, the open-world game gains more substance. Elements such as *places with history* and *characteristics* are elements of this guidance strategy.

*Places with history* have the ability to link together different places in the game and reveal a greater meaning. For example, ruins in a specific architectural style have a narrative connection. They can also suggest specific circumstances, helping the players understand the importance of the place so that they are able to recognize that place later on. In the best case, a point of orientation is created in this way. In a Let's Play episode of "The Legend of Zelda. Breath of the Wild", the player suddenly recognizes that the NPC in front of him lives in a house he can see. Afterwards, the player is able to easily locate the NPC because he knows where the NPC lives.

*Figure 7: "Narrative guidance system": The player connects the place with the NPC (lookslikeLink, 2017): "Is this his house? ... He lives here!"*

Source: screenshot Rotzetter

*Characteristics* are evidence that allow the players to infer something. Smoke may indicate a fire. The clues can only be understood when the narrative system is completely recognized. Like in a riddle, the players must understand all parts of it in order to be able to successfully solve the mystery. Otherwise they will be frustrated. In this case the game designer must give the player subtle hints for the right answer without creating the impression of failure.

## Evaluation of the six guidance systems in the tested games

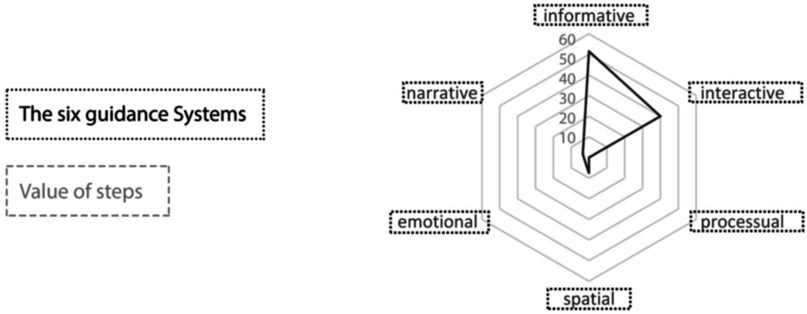
The following figures illustrate the distribution of the identified six guidance systems in the games tested under the “100-steps method”. Most decisions are indicated by visual clues. In “The Elder Scrolls V: Skyrim” and “Grand Theft Auto V” the value of auditive steps reach nearly 40 percent. Additionally, the examination shows that shooter games like “Grand Theft Auto V” and “Far Cry 2” have a short interval between steps and a fast clue output.

*Table 3: Game test: distribution of visual and auditive steps in the tested games and the length of time (minutes) to the next step*

| Game | Visual steps | Auditive steps | Duration between steps (minutes) |
|---|---|---|---|
| Sid Meier´s Pirates! | 88% | 12% | 6,7 |
| Far Cry 2 | 76% | 24% | 1,8 |
| Red Dead Redemption | 82% | 18% | 5,0 |
| The Elder Scrolls V: Skyrim | 63% | 37% | 6,3 |
| Grand Theft Auto V | 64% | 36% | 1,7 |
| Don’t Starve | 91% | 9% | 2,6 |
| The Witcher 3: Wild Hunt | 85% | 15% | 2,9 |
| Mirror´s Edge Catalyst | 93% | 7% | 6,7 |

In most games a major part of the 100-steps are split in two guidance systems: the “informative” and the “interactive” system. Only in “Elder Scrolls V: Skyrim” and “Mirror´s Edge Catalyst” one system is clearly preferred. No game has an equal distribution of steps in different guidance systems. In “Don´t Starve” the player has to make the most “emotional” steps of all surveyed games – nearly a third of all steps. This means that the player faces the most emotional decisions of all tested games. Overall, the “processual” and the “narrative” guidance system are used the least.

*Figure 8: Game test: classic example of the evaluation of the "100-steps method", shows value of steps in the six guidance systems.*




Source (Figures 8-16): Rotzetter

*Figure 9: Sid Meier's Pirates! (1987), Third-Person, Action-Adventure/Strategy Game for PC, 12 hours gameplay for 105 steps.*

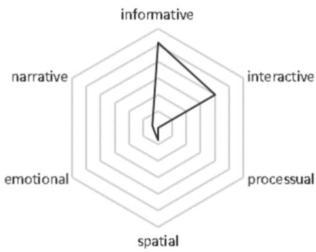



*Figure 10: Far Cry 2 (2008), First-Person, First-Person Shooter/ Action-Adventure Game for PC, 3.5 hours gameplay for 118 steps.*

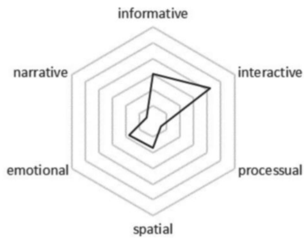


*Figure 11: Red Dead Redemption (2010), First-Person, Action-Adventure game for PC, 9 hours gameplay for 107 steps.*

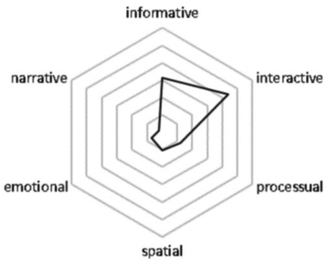



*Figure 12: The Elder Scrolls V: Skyrim (2011), PS3: First-Person, Action-RPG, 11 hours gameplay for 108 steps.*

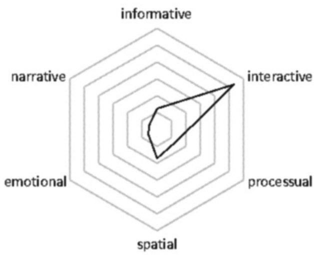



*Figure 13: Grand Theft Auto V (2013), Third-Person, Action-Adventure/Third-Person Shooter, 3 hours gameplay for 108 steps.*

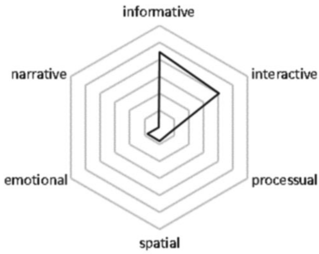



*Figure 14: Don´t Starve (2013), Third-Person, Action-Adventure/Survival Game for PC, 4.3 hours gameplay for 100 steps.*

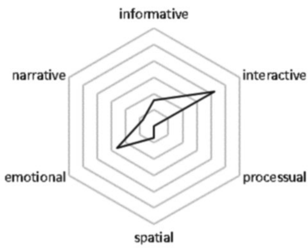


*Figure 15: The Witcher 3: Wild Hunt (2015), Third-Person/Action-RPG for PC, 5 hours gameplay for 104 steps.*

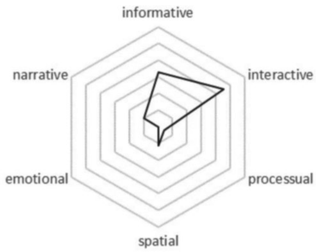
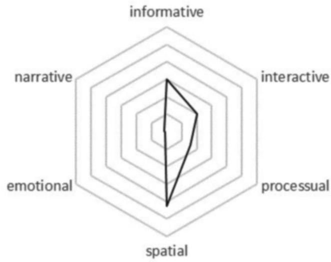


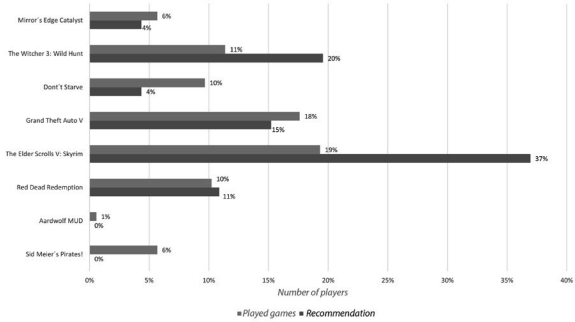

*Figure 16: Mirror's Edge Catalyst (2016), First-Person, Action-Adventure/Platformer for PC, 12.25 hours gameplay for 111 steps.*




## What players want

In the survey, open-world-game players were asked which of the nine tested open-world-games they had played. Afterwards, they had to choose their favorite and give the reason for that choice. "The Elder Scrolls V: Skyrim" was both the game most often played and most often chosen. The reasons provided for this rating were the high quality of the atmosphere, the opportunity to explore, the story and the design of the world.

*Figure 17: Player survey: Shares of played games (data total 176) and recommended games (data total 46).*




Source: Rotzetter

### What game designers do

In the second survey, game developers were asked how they design a guidance system. Most of them look to other games for inspiration or use guidance systems from the real world (cartography, architecture, signage etc.).

Among the important contributing factors to successful player guidance in open-world games are non-linear guidance systems. They give the players opportunities to choose. In the best case, the players intuitively decide to follow one of the predetermined interactive guidance systems. Thus, the intention of the game designer is completely hidden, and the players have the illusion they can do whatever they want.

“They're doing what they want to do and not what you, the designer, wants them to do. The more open, the more reactive you can make it, the better the player experience.” (Howard, 2008)

“The Elder Scrolls V: Skyrim”, one of the most successful open-world games, confirms Todd Howard's statement. But “Skyrim” does even more. There is an obligatory tutorial that feels more like the “narrative prologue” as the developers call it. It is not a pure learning exercise. Both game basics and the main story are introduced in this tutorial, and the players keep learning afterwards by exploring the environment on their own. The developers do not confine the information to a single point, but spread it over the whole world. The players get to know and learn it step by step. A huge number of accidental events appear in “Skyrim”. These events give each player the opportunity to enjoy a unique experience.

## CONCLUSION AND SUMMARY

Nonverbal guidance systems have the ability to improve the atmosphere and the immersion of a game if they are used smartly, have sufficient contrasts and are correctly placed in the game design. The most important guiding strategies and their elements can be summarized in six guidance systems. They guide the player by varying motivations, movement steering and restrictions and also point out strategies and information. The exploration aspect and the desired intuitive guidance through an open-world game depend on understanding human perception, balanced information allocation to the player and the diversity of the offered guidance systems. Of the six guidance systems, the majority of the players preferred the “interactive guidance system”. There is no guarantee that a guidance system works because it always depends on interpretable game aspects. Yet a combination of the six guidance systems and the deliberate use of their different capabilities reduces the risk of failure and may improve immersion and atmosphere considerably. While all guidance systems are predominantly visually perceptible, a combination of the different perception channels (visual and auditive) is recommended for every open-world game.

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# Ethics

# Ethics as a Game Mechanism

*Wolfgang Walk*

As the computer game matures and grows as an art form, the question of how game designers can use ethics as a means of game motivation and thus also as a means of game mechanics becomes increasingly important. The times when designers could hide behind phrases like “It’s just a game” are a thing of the past. For an art form that wants to be taken seriously, it is intellectually pathetic anyway.

When I started to approach the question, I quickly found out that we still know far too little about whom the player is. Furthermore, it proved to be essential to define a clear dividing line between ethics and morality in order to raise conflict potential (each art form treats conflict as a main subject). Only then could I turn to the core question: How does ethics work in the context of a game at all - and which levers can be used for the creation of gameplay mechanics?

This article started as a three-piece on my blog *Der Blindband*, then was printed in the German *Making Games* magazine, was then translated into English for the *makinggames.biz* website before I revisited and edited it for publication in this book. This gave me the chance to clarify some weaker points, lift around some of the emphasis and fix some typos. In very few instances I fixed some logical missteps, and one little detour into Ryans “Possible worlds-theory” was cut. I also had to erase any reference to the three-parts of the series. And I needed to sew these three parts together at the edges to make it a one-piece.

My thanks go out to Bettina Wilding for the initial translation. All mistakes that remain in the text are mine.

## WHO'S PLAYING?

In fall 2014, I was invited by the Mediadesign Hochschule (MD.H) in Munich to give a lecture on "Ethical and social aspects". I still don't know to this day if my interpretation of the topic was what the MD.H had in mind, but at least I took the opportunity to deal with a series of questions on a more or less scientific basis:

- What does ethics have to do with games at all?
- What's happening there?
- And if it can't possibly be avoided – is there a chance to take advantage of it maybe?

To say it directly: The answers I found added a completely new angle and in part significant changes to the way I look at game design – and in this case especially the design of the story within a game – which I will try to explain in the following.

The underlying scientific discourse isn't easy and delves deeply into the toolboxes of psychology and hermeneutics, among others. I will try to reproduce it as far as required to understand the topic, keeping it straightforward enough, so that as many people as possible can finish reading it to the end without suffering major brain damage. May psychologists and philosophers throw up their hands in horror about inadmissible simplifications – for me it is all about the bigger picture: to make better games – in order to make a better world.

My seriously simplified main thesis is: Unlike any other form of art, games are predestined to act as an ethical fitness center; and if they take that opportunity, they usually become even better games – more challenging, interesting, in brief: more fun.

In this context, it is necessary to clear up a few misunderstandings and set up a few axioms from the start:

- An ethical game is usually not the kind of game that lets us replay a dichotomy of good and evil and, in worst case, denies us to judge between right and wrong. An ethical game design takes the player seriously as an individual with an ethical reasoning developed appropriate to their age, leaving it up to them to make a decision.
- For this reason, an ethical game is also in no way a game that treats its players as "moral infants". It presents the player with ethical challenges just as it poses motoric, exploratory, strategic or logical challenges.

- Purely abstract game mechanics can't create an ethical aspect. Ethical challenges can only be generated through portraying them in the game world (and particularly through the narrative context: rules and laws, morals and ethics of the game world and its inhabitants) – and through the medial interaction of the player with it.
- Conversely, however, an ethical challenge can create game mechanics, which are never presented in their abstract form, but result from the conflict in the player's mind as a very specific challenge in the concrete representation of the game world.

So when we talk about ethics in games, it isn't about raising a warning finger, but about an additional way to present the player with interesting challenges. Of course, this topic also touches the discussions on violence in computer games, which was "enriched" by the distinctive allegation stating that first-person shooters were at least partly responsible for modern-day terrorism. (Paoli 2015) The scientific approach, however, kicks the self-proclaimed moralizers from the press, radio and television right in the behind:

It is a commonly accepted fact that game challenges adjusted to the skills of the players actually boost the respective skills of the players. For example, people who play a lot were found to become better surgeons faster. (Rosser JC. Jr et al. 2007) Only if the player is faced with ethical challenges, a part of the public still acts on the assumption of a general defenselessness, even though the thesis that gamers are moral "zombies" (Sicart 2009) may be regarded as extremely questionable to clearly disproven based on various studies. (Ferguson 2014; Markey et al, 2013; Gitter et al. 2013) If anything, players show increased aggressions for a very short time only and – depending on the game objective – in part even a reduced aggressive potential. The reasons for this will become clearer a bit further on.

This is why I would like to emphasis again that ethical challenges in game design nurture the player's ethics, at least as long as the player isn't overwhelmed by these challenges as it is probably the case if a game like *GTA 5* (2013) is being played by an eight-year old.

Obviously, it would be nonsense to act now as if the concept of ethical challenge in games was something completely new. Such mechanics have existed for a long time, and the results are usually monitored with goodwill by the public, be it *Spec Ops: The Line* (2012), *This War of Mine* (2014), *Papers, Please* (2013), *GTA 5* (2013) or *BioShock* (2007), just to name a few of the most popular examples. Everyone has played games before where they were faced with ethical dilemmas. Dilemmas that couldn't be resolved in a satisfying way (otherwise they wouldn't be dilemmas); dilemmas that you had to live with; or dilemmas that even made you stop playing the game. I will try to explain why these games still don't become unethical – and why they may be outstanding games just because of that.

But first, of course, we need to clarify one question:

## Ethics – what is that exactly? And what does it have to do with games?

Ethics, says Wikipedia, "is the branch of philosophy that involves systematizing, defending and recommending concepts of right and wrong conduct. (…) Ethics seeks to resolve questions of human morality, by defining concepts such as good and evil, right and wrong, virtue and vice, justice and crime."

So when we talk about ethics in a game, it is clear that ethics in the game world doesn't need to be justifiable in our real world. It must be rational in the virtual counter-world that is built by us designers, and justify moral actions there, not in our world.

And since it is a counter-world, moral actions in that world can obviously completely differ from our world. Just as sometimes the laws of physics in games are different from those in our world (Lightsabers? Seriously?), the laws of human coexistence may differ. And yet that doesn't make them unethical. It might be said rather that the complete, uncritical acceptance of ethics from this world by a counter-world may result in an unethical game design since in the course of the design process it needs to be at least tested if rational reasons from this world don't become irrational in the counter-world.

We game designers are used to adjusting clothes, everyday items, weapons, technology, flora and fauna as well as the interface and dozens of other things to the circumstances of the counter-world. There is not one good reason not to do the same with the basic rules of all things, which govern society there – at least not if we have acting characters. Tetris has no ethics because it keeps its game mechanics almost completely abstract and doesn't really have a narratized representation of its game world. After all, what else is supposed to justify the actions of the characters, if not their own, mostly faulty ethics? (The ethics of each individual is faulty due to irrational breaches resulting from the id of the character, even if it is a god – especially if it is a god!)

What else is supposed to justify an action, a story, if not the conflicts between the id, ego and super-ego, the conflicts between one's own and society's interests, the conflict between reason and religion, inhabiting every ethics? And what is supposed to justify an ethical challenge for the player, if not the conflict between ethics from this world and the counter-world?

When considering these questions, it is essential to understand the relationship between player and computer game a bit better. How does it originate? To what extent could this relationship differ from our relationship to the real world? Why can we engage ourselves in ethical systems in a counter-world, which are to a degree diametrically opposed to ours, without being traumatized by these conflicts? The answer is surprisingly simple:

## The player isn't the player!

A person doesn't enter the counter-world of a computer game physically. At least the body stays in the here and now, and also a part of the brain's synapses remains occupied with problems from this world: Various body functions need to be controlled; the auditory and other senses remain at least partly active and stay focused on reality. So it's not exactly the players themselves who are confronted with the game. It's a subset of us. But it's a subset that follows its own agenda.

In Miguel Sicart's most interesting, if not always 100 percent consequential work *The Ethics of Computer Games* (2009), this subset of the player is called the "player subject": "Becoming a player is the act of creating a balance between fidelity to the game situation and the fact that the player as subject is only a subset of a cultural and moral being who voluntarily plays, bringing to the game a presence of culture and values that also affect the experience." (Sicart 2009). I have adopted the term in this definition for this article.

For us game designers it's important to keep in mind that both the cultural background and the moral judgments of the individual players can be as different from each other as are the players in a global market. While one player has no problem torturing an NPC in *GTA 5* (2013), another player would turn off the game at that point. Not every game is for every player. Neither does this make one player a better person, nor does it make *GTA 5* (2013) an unethical game, but as game designers we have a natural interest in keeping the player's attention (there are exceptions which I will address a bit further on). So this fact is something designers should be aware of.

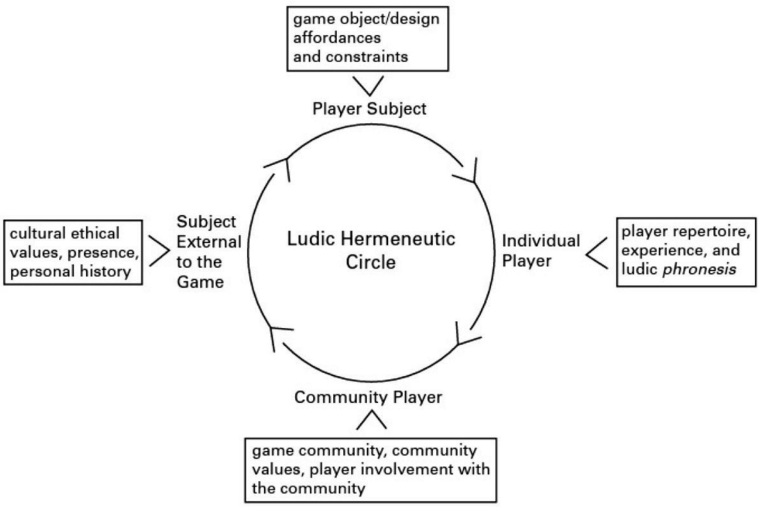
However, there are other reasons, too, why this fact is interesting for this topic: That moment when the player stops playing, the player subject, too, ceases to exist. The subject who possibly took actions in the counter-world, which would have put them immediately behind bars in the real world, fades away within just a few minutes. And potential effects on the player's aggressive potential, no matter in what way, fade away with them if current results in scientific research can be believed. What remains is the memory of this subject within the player, and in the event that the ethical conflicts were quite disturbing (and the player was mature enough to face them), a mental dispute with the actions of the "player subjects". Affect turns into reflection: an ethical training effect.

And (I promise this will be my last discourse about the discussion on violence) only very sick people will upon reflection come to the conclusion that it is also okay in this world to run around with a gun and randomly shoot at people. However, it takes no computer game to get to this pathologic conclusion, like the fact that there have been mass shootings even before the invention of first-person shooters shows.

The most important conclusion for us game designers though is that the actual ethical conflict arises in the "player subject" which is different from the player. Ethical challenges in the game are therefore instantiated for the player and experienced and endured by proxy – granting us a bit more freedom about what we expose the players to.

## The ludic hermeneutic circle

*Fig. 1: The ludic hermeneutic circle according to Miguel Sicart*




Source: Sicart (2009)

There are more elements adding to this reflection: The community of the game, consisting of press, forums, friends and all sorts of public reception of a game, takes up a considerable part in Sicart's definition of the ludic hermeneutic circle – and rightfully so.

This circle describes how a game is received and dealt with. It is, of course, actually a spiral since the reception of a game doesn't stop after having reflected upon it once. The reception of the game has just moved to a higher level.

What's interesting is the term "ludic phronesis" used by Sicart. In Aristotelian ethics, phronesis is a type of common sense or wisdom, specifically the virtue of practical thought.

Of course, there is a difference whether it evolves (for the "player subject") from game rules or whether it evolves from the real world, for which other rules apply. Accordingly, the ludic phronesis differs from the phronesis in the real world. In brief: Something that may be completely logical, reasonable and ethically correct in the game world, can be completely different in the real world.

And yet, of course, the ordinary phronesis is always present in the player, and it can never be switched off completely. Therefore, as soon as the ludic phronesis comes into conflict with our ordinary phronesis, it's a challenge for us. A person with moral integrity in the game world will be interested in this challenge. To avoid confusion: A person with no moral integrity in the game world may still be of utmost moral integrity in the real world – and vice versa. Hence, the result is an interesting challenge – and that's exactly what us game designers aim to create (and I regard story designers as specialized game designers since they are most affected by this conclusion).

This ménage-à-trois between player, player subject and game may therefore result in challenges which us game designers can use to make the game experience even more interesting. In the way that these elements are constructed, they differ greatly from the usual familiar game mechanics logic, strategy and motor skills. At the end of the day, however, they can be just as effective.

## ETHICS AND MORAL AS CONFLICT PARTIES

After explaining *why* it may be useful and *why* it should be possible to understand ethical conflicts as exceptional cases of game mechanics (and consequently use them as such), obviously the question arises how to generate these ethical conflicts and – in a third step – how to ultimately turn them into game mechanics.

To that end it is necessary to understand the nature of these ethical conflicts, to thoroughly look at the underlying psychology and then map it to its means of transport that is the narration (as noted above: purely abstract game worlds cannot carry ethical questions). It is only when the ethical conflicts can be successfully integrated into the narration of the game (of which the story is only a part) that they can get the necessary precision, presence and priority which the player subject has to experience in order to see them as a part of the game experience and the game challenge.

## The difference between ethics and morality

In order to manage the next steps in this procedure without struggling, I first have to define a pair of concepts that I would absolutely like to be understood as contradictory in this context, even though they are often used synonymously in everyday life. For the following, however, I would like to note that *ethics* and *morality* don't mean the same thing.

In this context, ethics is defined as I had quoted from Wikipedia above. It is "the branch of philosophy that involves systematizing, defending and recommending concepts of right and wrong conduct. Ethics seeks to resolve questions of human morality*, especially with regard to its justification and reflection*" (ibid., emphasis by author). Ethics usually and principally finds its ratio in the socio-economic conditions of a society, hence it is never universally valid.

In this context, *moral* means the rules that a society or an individual has given itself *without* necessarily having considered them rationally. The moral rules *can* withstand rational justifications, but can also derive from obsolete traditions or the power-political interests of a ruling group and may immediately fall victim to a serious ethical investigation.

When following this discussion, one will hardly find a society where ethics and morality are in agreement. This applies to the real world - and should apply to fictional worlds worth their money. Power-political interests, economic interests, religion and other things can and will have a non-ethical influence on the moral system. And the same goes for most individuals: Hardly anybody is able to meet their moral demands. So think about how much less they will be able to comply with rationally justified ethics in face of their own personal interests.

That is why there are only a few reasons to create a counter-world in the game where ethics and morality are one and the same. From a narrative point of view this would actually be awful since on the one hand, it would close a huge narratively useful area of conflict, and on the other hand, it would completely undermine the counter-world's credibility.

## Room for Conflicts

One of the first targets of my definition has therefore been met: By separating ethics and morality, we have created room for conflicts (or, in other words, not destroyed it from the start). Conflicts between the morality of a society or one of their individuals on the one hand and the ethically right conduct on the other hand are and have always been one of the most important resources for major narrative works. These conflicts can occur among different characters within a narration – or they can just happen to a single character: The expectations of the family interfere with the longings of an individual, which are also contrary to what the individual understands to be ethically right.

Applied to the counter-world of the game and my results so far, it amounts to a whole number of potential areas of conflict:

- Between the personal interests and/or the morality of an individual and the ethics of the counter-world as a rationally justifiable regulatory system
- Between the personal interests and/or the morality or ethics of an individual and the morality of the counter-world as a social regulatory system which is – at least partly – not rationally justifiable
- Between the ethics and the morality of the counter-world
- Between the ethics of individual characters within this counter-world (again in the context of the socio-economic conditions) and their own morality

All of these conflicts lie within the counter-world of the game. But there is another one for which this doesn't apply. This conflict exists between the players and their representation in the game:

- Between the ethics and/or morality of the player, the ethics and/or morality of the player subject as well as the ethics and/or morality of the player character (and yes: these are three different people!)

Obviously, any combination is possible, too. The only important thing is that the conflicts we create are both credible and at the same time not solvable in a trivial way – and that they are considered and not ignored in the narratization of the game. Additionally, we should remind ourselves that in this area of tension conflicts can be understood by the player not only as an ethical, but also as a playful challenge. Obviously, for this to work the designer also needs to find a playful expression for the ethical conflict.

## Constructing ethical dilemmas

Yet it's a safe bet to assume that most players will try to push their own personal morality within the counter-world as much as possible. For us game designers this is consequently another reason needing to know which player type we develop the game for.

Hence, if I know both my players and the counter-world and if I cared for not just visual consistency in the latter one, but also achieved cultural and intellectual consistency, narrative conflict potentials automatically occur between different entities within my game world as well as between player, player subject, player character and the game world. As a game and narrative designer I can obviously strategically build and support this potential in order to create an ethical dilemma for the player. A true game designer needs to be a sadist at heart after all.

According to Sellmaier there are three aspects that constitute an ethical dilemma:

- The lack of clear instructions on how to act: The players aren't told which decision they are expected to make. (This aspect will play an important role later.)
- The next decision will inevitably lead to ethical failure: No matter what decision the players make, they will violate an ethical principle. (Lind 2003) No matter what decision the players make, it will always result in guilt and regret about what they have done. (Railton 1996)
- Third, the decision-making process needs to be pressed for time: Not making a decision at all will have even worse consequences than the available options for action.

"Kill either your lover or your son, otherwise the thermo-nuclear apocalypse will begin in 60 seconds" would be an example for an ethical dilemma (albeit an extremely dramatic one). There is no positive way out, and doing nothing at all would be the worst option.

Of course, however, a narrative element like this alone doesn't feature any game mechanics. Also the ethical dilemma of the computer game as a form of art is hardly unknown. One can't even claim that it is a precious flower which can only blossom on the fertile soil of the indie scene. Mainstream titles such as *GTA 5* (2013), *Mass Effect* (2007) and even *Call of Duty* (2003) (remember the controversial airport scene) have worked successfully with ethical dilemmas.

### Heuristics as a key

Before I set out to explain how exactly game mechanics can be generated from ethical conflicts, I would like to highlight and explain another concept which can almost be regarded as a basic prerequisite of good narration: heuristics.

Humans practice heuristics wherever they go. This means they try to make assumptions about reality based on incomplete information and within limited time. Ever since Oedipus this has been an important means of narration: Decisions which seem rational and ethical at first can later become irrational and thus unethical in light of complete information and lead to disastrous consequences. Heuristics obviously are an important means of narration in basically all art forms: think of the empty space between comic panels. It simply exploits the natural human instinct to fill information gaps through extrapolation. Without this instinct the human species would probably have not survived. Humans are actually very good at heuristics, which in fact is the pleasant element of surprise when there is a good plot twist.

And it gets even better: Since us humans are natural heuristics, we assume other people (or intelligent aliens) think the same way. So when we realize while reading, watching or playing a story that our hero is lacking some decisive information that we have, it creates suspense. If we could, we would warn our heroes of the trap they're about to walk into.

This concept also works the other way round: The hero has additional information and therefore acts in a way incomprehensible to us, which confuses us and makes us even doubt his ethical integrity. Or it works like the power of knowledge that is held back by the author from the players and their character while at the same time they are already required to make a momentous decision that would actually require this knowledge as a decision-making basis.

So when constructing ethical conflicts we can also put up with the cognitive discrepancy between counter-world, individual characters in this world, our hero and the player/player subject (both have the same level of knowledge, but can evaluate it very differently): While playing *BioShock* (2007) I had a feeling that Atlas didn't mean me well, but I followed him since I didn't really have a choice, letting myself be blinded by the circumstance that, for example, the decision concerning the life of the Little Sisters was left entirely to me. This little freedom I had seemed to ratify the hope that I would also have the big one – until I realized that all that time my character was under external control without my knowledge. I had the assumption from the get-go, while my player subject with the same knowledge level didn't want to be aware of it – and the player character seemed to have been completely naive. My experience-based player knowledge was ahead of the player character's knowledge – but my player subject managed to succumb to deception and suppress the player knowledge to an extent that it could not prevail during the game.

### Consequences for Designers

The next step would therefore be to develop a feedback loop from the narrative illustration of the ethical dilemmas in the game and the effect generated within the player, which then actually interferes with the game mechanics. This isn't so much about purely formal game mechanics generally developed in the rules of the code, but about game mechanics which have strictly narrative causes, meaning the power of the narration pushes players to make game-based (as opposed to narration-based) decisions; decisions which, in case of doubt, may actually run contrary to their own interests with regard to the game objective.

Therefore we try to push the players to a point where, based on ethical considerations, they won't opt for the most effective way or decisions which get them the most advantage from a game mechanics point of view, but rather for whatever they personally regard as the ethically right thing to do, even if this means a much harder road to winning the game. I will provide more details about this approach in the third part of the series.

## ETHICS AS A GAME MECHANISM: THE NORMATIVE POWER OF ETHICS

But before I will provide more details about this approach, I have to make sure there's not a widespread misconception in our way of thinking: that an ethical game design necessarily requires ethically high-grade content and messages. In fact, the opposite is more likely: The content of a game may indeed be unethical, even to a great extent, and thus generate an ethical game design. It's not even necessary to reward the players with a narrative happy-end or something similar in return for their ethically correct behavior. Ethical game design is based on completely different structures. There are two prerequisites:

- Through the way it is presented and embedded into the game design, the ethical/unethical content allows for a free, age-appropriate reflection.
- It also allows for an ethically significant decision by the players themselves, a decision that isn't tainted or corrupted by advantages in the game.

If those two prerequisites are met, the game design becomes ethical, even if the game is about a mass murder, unpreventable by any decisions made by the player and to be executed by the player subject itself. This seems to be contradictory to the second prerequisite, but it isn't. The player subject still has the option to quit the game as a last means to keep its ethical integrity. And refusing the reception of a piece of art is a legitimate part of the reception – and it is legitimate for the artist to provoke the refusal. What these two prerequisites actually mean and how to fulfill them is what the following is about.

I explained have that, on the one hand, it can be reasonable and interesting in terms of gameplay to make ethical questions a tool of the game mechanics and that, on the other hand, there is a lot of conflict potential in the trade-off between ethics and morality in order to seize this gameplay treasure.

Now I would like to explain how game designers can use this potential for conflict to create an ethical game mechanism – and what mistakes they need to avoid. My task is of analytical nature since these techniques have already been used in numerous published games. When they were applied, they worked and have long proven efficient. My contribution is merely to classify those largely unsorted and undeclared gameplay phenomena into the category "ethical game mechanics" and, last but not least, to add a "how to" tag, which hasn't been done before as far as I know.

In the previous paragraphs we focused on the role of the player and the player subject, described the ludic hermeneutical circle and illustrated the area of conflict between ethics and morality of both the counter-world and its characters and, last but not least, also the player. It is this area of conflict where ethical conflicts can originate and work on a narrative basis.

### Avoid clear instructions on how to act

We also came to the conclusion that one of the continuous elements of an ethical dilemma is the lack of clear instructions to act: The players aren't told which decision is expected of them. Sometimes they don't even know *that* they are expected to make a decision at all. Also, based on the second prerequisite, the action is pressured for time. A third prerequisite for an ethical dilemma is that no ethically acceptable way out is given, causing every decision by the player to result in an ethical failure.

You don't have to be a genius to realize instantly that the first two elements – instructions to act and time pressure – also belong to game design categories. But what happens if there is a *lack* of instructions to act?

According to the western game design philosophy, a lack of such instructions is considered to be problematic, and the general design doctrine advises to use caution in such case. We have learned not to leave players in the dark. They should know what to do and be able to assess the consequences of their actions, and it is the game's obligation to instruct them accordingly. However, you just need to step outside the Anglo-American box (or check out our own game history) in order to understand that this design rule can't be applied universally, couldn't always be applied – and has successfully been broken numerous times.

In 2006, for example, *Pathologic* (2005) was a big hit in Russia and Eastern Europe. The player takes on the role of a doctor in a remote town after the outbreak of a deadly epidemic. In the game the player constantly faces ethical decisions whose consequences are unpredictable. Do I use my medication in order to treat a victim? Or do I trade it for food since, otherwise, I would probably be starving and not be able to help anymore at all? Or do I take it myself in order not to get killed by the epidemic as well? Food and medication are scarce and I have a lot of missions to carry out while time is running out. Which missions should I take on, if I can't complete them all? How do the other people in the game world react? What does the common morality demand? What about the morality of those who are affected? And what would be the ethically correct thing to do in a rationally verifiable way?

*Pathologic* (2005) even managed to provide answers or at least hints to a lot of these questions. But this is where the second parameter comes into play: You don't have enough time to search and assess all these answers since the player is constantly pressured for time. But what's most interesting here is *how* this time pressure is applied – something I will go into more detail about later.

## How to make time pressure your friend

But in order not to leave the objection unanswered that time pressure exists in western game design just as well, and in various forms, too: Of course that's correct, be it for time-limited missions, speed-based jump&run episodes or quick-time events. In *The Witcher 3* (2015) I am constantly confronted with dialogue options I have to choose between under time pressure. However, in this role-playing game the time pressure is mostly a simple gameplay decision, often not justifiable from inside the world. There, we'd prefer to spend more time thinking about an answer – and the counterpart would often happily grant us that time. Consequently, this mechanism often gets negative attention within the otherwise mostly brilliant narratization of the game.

But in any case, none of the time-pressure mechanics mentioned in the last paragraph seems to be very suitable for treating an ethical decision convincingly as a matter of urgency. In order to explain the reason for that, I need to go a bit deeper.

Time pressure as a game mechanism is directed almost straight at the player. One may even discuss the question whether time pressure eclipses the player subject or at least considerably deprives them of their power. The stress that the player is confronted with often overshadows every personal dissociation by a player subject: This means via time pressure, the player's morality can directly, and often without much reflection, make its way into the decision-making process of the player subject, often suspending its insubstantiality: The decision by the player becomes authentic. However, it's hard to imagine suspending an ethically ambitious situation via a quicktime event or a running stopwatch – without corrupting it. The necessary non-diegetic interface elements (Stonehouse 2014) – those that don't belong to the game world – take away any psychological and in-game credibility from the situation, like in *The Witcher 3* (2015).

This means the time pressure will appear artificial, coming from the game designer – an entity that isn't part of the counter-world ethics and has nothing to do with the problem to be solved. Also the respective interface is only a tool for providing necessary information. Furthermore, the players receive (via interface) an instruction to act. Even though they may not be told *what* to do, they still know that they need to do *something*. The result is inevitably the alienation from the game world, a movement that is obviously contrary to the ethical and moral integration of the player subject into said game world.

So that's not really the way to do it. But how can time pressure be integrated into a game, so that the player can understand it without being pointed to it via a non-diegetic interface element?

## Wanted: Diegetic Interface

*Pathologic* solves this problem in a very simple and elegant way since just like in real life the other characters in the town have their own agenda – they're not waiting for the player. In most of the western game designs, the player triggers pretty much everything: Opponents patiently wait wherever they are for the player character to come by and trigger their actions. At most, the NPCs have their own daily routine that the player has to adapt to. But it rarely happens that NPCs take actions themselves in their own interest; they usually wait for the player to arrive. Game- and narration-related events are triggered locally.

In *Pathologic*, however, there's a time-based trigger at work basically all the time: All citizens have their own agenda – and more often than not these agendas are not in the player's interests, but focusing on the interests of the respective character. The longer the player hesitates (or is being held up otherwise), the more difficult the situation becomes: In this game, a sick person who doesn't get any medication from the player will die the next day; and a missing food delivery has similar fatal consequences. A mission that has been taken on but not completed causes a bad atmosphere among the affected NPCs (as well as not taking the mission on at all). Therefore, the players need to make a decision otherwise the counter-world of the game will do it for them. The time pressure originates from a lively, self-acting world, which makes it appear not artificial, but natural, and is understood through "phronesis" – by following the common sense. There's no need for the non-diegetic interface since the system is obvious. Once the player has understood the principle, the time pressure itself acts as a diegetic interface, just like the submission deadline for this article does in real life.

This "phronesis" seems to be a basic prerequisite for ethical conflicts to successfully become a part of the game mechanics. Or at least it makes it a lot easier: The players need to understand the necessity and urgency of their actions from both an ethical point of view and the narrative, inner-worldly situation – and not from the game mechanics' point of view. But the peculiarity of the ethical game mechanics doesn't end here since the ideal ethical conflict doesn't just originate from the narration – consequently, it should at first only impact the narratization again and only then make its way into the game mechanics.

The bad counter-example: A system used in *Star Wars: Knights of the Old Republic* (2003) where the player's actions are immediately rated on a good/evil scale, avoids/circumvents the ethical impulse of the player, forcing the primacy of the game mechanics onto them since the game rewards consistency by giving the consistently evil or good player subject an advantage over players acting inconsistently. At some point the players decide to take the good or evil path – and then engage primarily in resource optimization, while being able to track their progress directly on a scale. The system appears to be similar to the class system of a role-playing game where I also engage in optimization once I have made a decision – without making any fundamental ethical decisions or even ethically questioning this decision down the road.

## Resource optimization corrupts ethical game design

Thus, ethics no longer play a role in the decision-making process for the player: The evil act isn't evil since the players, of course, see through their player subject's masquerade and don't take their decision seriously themselves: The game has long become a play itself. The player takes on a role and merely provides the Star Wars universe with another one of the badly required villains without whom the whole system wouldn't work. Sicart therefore describes this kind of game design as "unethical". I don't think you need to go that far. I would rather say that the ethical category in *Knights of the Old Republic* (2003) has no effectiveness and should therefore not be used for an evaluation of the game design. What I will leave out now is that this pseudo-ethical decision "freedom" of the player was the subject of intensive marketing efforts. Maybe there is no unethical game design, but there surely is something like unethical marketing campaigns.

The solution of an ethical challenge should therefore not be easily predictable and expectable for the players, plus significantly rewarding or punishing them in terms of game mechanics because in that case the players would most probably make an opportune decision from the game mechanics' point of view, possibly not even regarding it as ethical. Although players are indeed prepared to accept a reasonable punishment if it allows them to get to an ethically correct solution:

In *BioShock* (2007) the players were punished (which they could foresee) for letting the Little Sisters live: They only received half of the ADAM they would have received if they had killed the girls instead of healing them. Hence there was a foreseeable punishment. And yet, according to my (obviously anecdotal) findings, around 90 percent of the players decided to let the girls live and heal them. They accepted a disadvantage in the game (be it a temporary one, not much affecting the balancing) when making a decision that was ethically correct from our world's perspective. The ethical decision was real, but wasn't exclusively made considering ethical parameters, but more regarded as a deal between ethics and the game mechanics. It can be assumed that the higher the price, the more players would have killed the girls instead of healing them. The ethical game mechanism was indeed corrupted; however, the price just wasn't high enough for most players to make them breaking the game world.

Also, it remained pretty much unclear during the whole gaming time how the game world itself would judge the decision, and this is where the game certainly has given away some of its potential. It should be pointed out though that in *BioShock* it was an ethical problem rather than an ethical dilemma. Unlike ethical dilemmas, ethical problems offer an ethically correct solution, even though it may not always be evident. As explained above, an ethical dilemma offers no ethically correct solution.

I also mentioned the human propensity to heuristics that we designers can purposely take advantage of in this respect: We don't have to provide the players with all information about their decision-making. We can try to mislead them. We can hide relevant information from them or put them in remote and hard-to-reach places, so that the players who are focused on fast results won't get to see them. There are numerous possibilities (and we realize how the preparation of an ethical challenge immediately affects areas of the game mechanics, conjuring a risk of corruption). That way, we can make an ethical problem look like an ethical dilemma and vice versa. We can also work with the prospect of a reward and thus trap the player. We punish the corruptible player and reward exactly the kind of integrity we threatened to punish before. Or vice versa. Both are possible and both can be an ethical game design.

## Ethical game design thrives on the confrontation with the morality of the counter-world

A game design of that kind doesn't just lose its attribute "ethical" simply by trying to corrupt the "player subject" in an ethical way. It only gets non-ethical (and in an extreme case possibly even unethical) if the corruptibility itself has no consequences and the game lets the player subject proceed affirmatively and without safety net, even though the counter-world, too, should hardly approve of this lacking integrity. Hence, the error is not necessarily a reward in the game, but a possible inconsistency between the attack on the morality of the counter-world and the lacking reaction of said counter-world to this attack.

This means a world needs to enforce its morality, not its ethics. That's what all great stories are based on. The Greek mythology charged the Moirai with observance of the rules – three goddesses of destiny who killed everybody who broke the rules of the world. Those who have read Neil Gaiman's *Sandman* (1988) know that the three ladies showed no mercy whatsoever. By the way, their legacy can also be found in the three ladies of the wood in *The Witcher 3* (2015). This morality to be enforced may be unethical itself, but it will be enforced. Even towards the player and even if this world has not anthropomorphisized the observance of the rules. Otherwise the story will be useless. A player character that stands above the basic laws of the counter-world and isn't called to account by them, may perhaps appeal to adolescent visions of omnipotence, but won't be able to create a viable ethical game design - or any narrative depth for that matter.

At the end of the day though it can't be excluded that this reaction by the game world can be subversive and consequently reward the attack or punish the observance of morality. Nevertheless a good narration accomplishes that the players (even though not the player subject) recognize the consistency of this reaction and can understand it as a part of the ethical challenge – provided they have a certain personal maturity and self-reflection. But in this world, too, most of us would love to be a good person a lot more often – unfortunately, life often deals us the short draw in such cases.

That's why caution should be exercised when letting the solution of ethical problems immediately interfere with the game mechanics since first of all, sooner or later the damage and benefits quickly spread within the game community which is a significant part of the ludic hermeneutic circle, so that they become expectable and may therefore contaminate the ethical challenge from the get-go. And secondly, the actual addressee of an ethical decision is always the game world whose rules I either break or obey. This is what makes the ethical dilemma so rich in terms of narration since it always entails a violation of the rules of the counter-world – and that's why there always has to be a revenge to remedy the world again: The seed for tragedy is sown, and it will grow inevitably.

## In ethical game design, the designer becomes the executor

In ethical game design it should therefore be the world to decide between reward and punishment, rather than the game mechanics. The game designer usually in charge of the legislation of a game world now becomes the executor whose deed is to obey, enforce and execute the existing laws. Needless to say that this decision originating from this world can interfere with the game mechanics in an either rewarding or punishing way. The players can be given (or taken away) divine skills as a result of the narration; the people in this world can support or waylay them. All of this is consistent within the ethical system, and that's why it's an ethical game mechanism.

Or to be more precise: What's not consistent is receiving twice as many experience points in the future because you saved an orc baby, even though orcs are your enemies. It would be consistent if there were a way to make peace with the orcs – which the players would benefit from in the game, for example, by getting access to orcish weapons. In the first mechanism the designer becomes visible, in the latter the world is working on its own.

It wouldn't be consistent if the players lost three charisma points because they slayed an innocent woman. It would be consistent though if the woman's husband tracked down the players, trying to kill them. It may be consistent if this man belonged to a group of saints who are in no way to be killed, not even in self-defense. It would then be consistent if the player, after having killed the holy man after all, was hunted down in all parts of the world, constantly being threatened to get arrested and executed.

What we learn from this is that ethical decisions made by the player should have indirect consequences from the game mechanics: A phronetically comprehensible reaction of the game world to the player's actions. This phronetic reaction should possibly be shown from within the narration and not only (and especially not immediately) be reflected by some parameters of the game mechanics.

This is because the world will sometimes take a little while to realize the violation of its rules and to react accordingly: Oedipus was king for several years before the world identified him as the killer of his father and the husband of his own mother – which he was without being aware of it. This delay in time, too, is contradictory to our western game design rules. And it's right that mistakes in the game should result in a quick and possibly immediate punishment within the game mechanics. However, if the player's mistake is an ethical one, affecting the narration, the punishment may be delayed. Sometimes the phronesis allows – and even requires it.

Through time pressure and ethical challenges, *Pathologic* (2005) that otherwise bears all signatures of an open-world horror action-adventure in terms of gameplay requires a completely different way to play than other western games of that genre. There is no "comfort zone", no time and place for the players to take a breath. In order to do so, they need to press the pause button or quit the game. Additionally, the time pressure is nowhere to be found (or is very hidden) in the non-diegetic interface. You're not told how much time you have left for a certain task. There is no countdown timer. Only the changing times of day may serve as hints on how much time may be left – and you can also choose to have the time of day displayed.

## The potentially ideal solution for ethical game design

It seems there is indeed an ideal solution to make ethics become a part of the game mechanics. This solution includes four steps leading through the narration:

- **Step 1:** The game creates an ethical problem or even an ethical dilemma for the player *from within the narration*. This ethical problem/dilemma needs to be one for the counter-world of the game, so world design is key here.
- **Step 2:** The player is forced under time pressure to offer a solution to this problem. The time pressure itself also needs to come from within the narration

and be built up plausibly, but of course it will be managed through the game mechanics. Also, using the game mechanics, the counter-world can make it harder to access information the player would need in order to make an ethically valid decision.

- **Step 3:** The game system implements the consequences from this decision into the narrative game world. It may also take some time to do so if it benefits the credibility. The parameter for the narrative implementation is the morality of the counter-world, which will do everything in its power to punish violations and restore itself. It needs to be pointed out though that the ethically correct decision by the player may indeed violate the morality of the game's counter-world. And of course, there may indeed be different opinions about the adopted solution within the counter-world.
- **Step 4:** The efforts of the counter-world to restore its moral integrity not only interfere with the progress of the narration, but also with the game mechanics – wherever it is logical.

It should be added though that the process isn't completed by step 4. Often, the curse of the good (or evil) deed is that an ethical decision leads to further decisions. It's not necessarily about just a few decisions within a story. Without a doubt, you can picture this system as a fast-spinning spiral of decisions that lead to literally hundreds of further decisions, like in *Pathologic* (2005) or also in *This War of Mine* (2014). Obviously, it's therefore quite significant for the entire production whether I manage the further process via a rather heavy branching of the story like in *The Witcher 3* (2015) or via a system which generates its narrative decisions from the state of resource management and - after the decision has been made - also returns them after a detour into the narratives into the mechanical game system like in *This War of Mine* (2014).

## Ethical game design is target-group specific

One thing is certain though: Not every player will enjoy this form of gameplay. Many don't want to have to make tough decisions in the gaming world, too. But not everyone can warm up to the simple gameplay challenges of a shooter or the strategic challenges of an RTS. Personally, I love sports and hate sports games. At the end of the day it all depends on the target group. But the older the group of gamers gets, the higher the demand for games which require more from the players than to just handle hand-eye coordination and their motor skills. The commercial attention games like *This War of Mine* (2014) have received too, speak for a growing demand for ethical gameplay.

Last but not least I would like to add that my analysis shows *only one* way to make ethics become a part of the game mechanics. There may be others, so I won't claim that my analysis is exhaustive. I simply wanted to show *that* it is possible and *what* approach game designers can take. It was also important for me to point out that ethical gameplay always requires the narratization as a mediator for the gameplay and thus consistency with the game world. Besides, I wanted to establish some common rules and justify them, and I do hope that I succeeded.

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# The Player as Puppet

## Visualized Decisions as a Challenge for Computer Games[1]

*Hiloko Kato and René Bauer*

This game series adapts to the choices you make.
The story is tailored by how you play.
Bitch please, we know this!
*PewDiePie*[2]

Stay or go? Take the left door, or the right one? Side missions or main task? Read the long dialogue, or not? Green or grey eyes? And, anyway: Start? Try again? In computer games, players permanently face decisions,[3] yet they do not usually experience this as an unavoidable necessity but rather as something positively rewarding. It also gives them the feeling of being able to actively step into the action and be masters of fate on their own whim. However, decisions belong to the structural components of a computer game, and as such, they ought to be perceived very clearly as a designed system. At first glance, this seems to be an

1 This article was originally published in German with the title "Der Spieler als Marionette? Sichtbargemachte Entscheidungen als Herausforderung für Computerspiele" in: Ascher, Franziska et al. (eds.): "I'll remember this..." Funktion, Inszenierung und Wandel von Entscheidung im Computerspiel. Boizenburg: Werner Hülsbusch Verlag, 2016, pp. 167-192. We are grateful for permission to reproduce it here.

2 This reminder appears at the beginning of each episode of *The Walking Dead Season 1*. PewDiePie comments on it in the fifth and final episode (PewDiePie 2012c, at 02:25).

3 We understand decisions as "situations in which a person decides 'preferentially' between at least two options", or "that [a person] 'prefers', i.e. favours, one option over another, or several others" (Jungermann/Pfister/Fischer 2010: 3).

important difference between computer games and literary texts – users of the medium are no longer confined to being powerless spectators but can influence further developments by their own interventions. Or is this, after all, only a delusion, as every possible outcome has been mapped out in a computer game, and the predefined mechanics only appear to give the player free choice from a varied range of options?

In this article, we discuss what is often overlooked by players, by casting a double perspective on game design on the one hand, which deliberately plans and programs moments of decision, and game reception on the other hand, which focuses on the players' engagement with those moments of decision. We explore this subject against the background of an increasing emphasis on moments of decision in games and explicit marketing slogans which stress that players hold the protagonists' fate, the story, and the very future in their own hands: "Make choices. Face the consequences" (*Heavy Rain* [Quantic Dream, 2010]), "This game series adapts to the choices you make. The story is tailored by how you play" (*The Walking Dead Season 1* [Telltale Games, 2012]), "The smallest decision can dramatically change the future" (*Until Dawn* [Supermassive Games, 2015).[4] With such a strong focus on moments of decision, it becomes a particular challenge for games of this type to not make the player look like a puppet. This raises the question if, and in what way, the specific moment of decision is charged with strategies of emotionalization. It is highly relevant in this regard that these strategies are normally linked to the player's connection with a character (which the player does not want to lose) or the connection between the player's ego and the challenge of mastering the game (as a feasible task in which hard work pays off); they also come into effect in relation to reward or punishment, as a consequence of the decision.

This article begins with a comparative discussion of established and new forms of reception (part 2: *Games as Decision Machines*). This is followed by an analysis of the visualization of moments of decision in games by means of case studies of *Let's Play* sequences (part 3: *Visualized decisions: cases*). It is worth taking a closer look in this context at the relationship between decisions and questions of morality. These metareflexive examples are particularly well suited to addressing the question of whether games make players look like puppets – after all, game design needs to be prepared for all eventualities, for instance, it must be able to challenge players who have lost their moral sense and – as paradoxical as it may sound – also offer them an enjoyable gaming experience (part 4: *Moral Decisions*).

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4 JosPlays 2012; PewDiePie 2012a; KPopp 2015.

# GAMES AS DECISION MACHINES

## Visualizing the Action of the Game

Whichever type of medium we consume, reading a novel, watching a film or playing a game, we are always confronted – consciously or unconsciously – with decisions. To begin with, we need to enter a fictional world, i.e. actively become a reader, viewer or player. We decide, at that very moment, to step into the magic circle and to understand, accept and follow the rules of the fictional world laid out in literature, films or games. (cf. Huizinga 2009 [1938]) Over the entire duration of our engagement with the medium, we go through endless interpretation processes and conclusions based on what we read, see or play. Readers, for instance, do not simply decode a text, in the sense that they "perform" it by creating an imaginary world in a semiotic process, but they rather fill in the gaps in the text by making assumptions that fit in with the rules of fiction, continually checking these against what they have imagined thus far. (cf. Iser 1976) They permanently have to decide whether these assumptions can be accepted or should be dismissed; this is what constitutes fiction. This process is no different in visual media such as feature films; focal planes, tracking shots and cuts can be used to generate gaps which will then require interpreting by the viewer.

The main difference between texts and films as opposed to games is the visibility of the reception process, which in the case of texts, takes place entirely in the reader's mind, and in the case of films, in terms of gaps only, is equally played out in the viewer's mind. In games, however, the reception process manifests itself in the experienced and visualized or tangible action of the game, which can be described as a permanent reaction by the player to the game setting and, vice versa, by the game system to the player's inputs. By using the criteria of experience and tangibility as the most important distinction between games and other media (Venus 2012: 106), the term *interactivity* can be avoided. That term, though often used as a specific marker of computer games compared to other media, has proven unsatisfactory. [5]

In terms of the visibility of moments of decision, we contend that the experience and tangibility of the reception process, which is so specific to games, is intensified and becomes particularly apparent in these moments of decision. There is further evidence for this when players verbalize moments of decision in rela-

5 Amongst several other reasons for this, it is often unclear whether the term is being used in a narrow or wider sense. (Neitzel 2012: 80).

tion to a specific action.[6] This is often the case in *Let's Plays*, which can be described as a form of visualized playthrough of a game for instruction and entertainment purposes; we will return to them as part of our analysis. It might also be worth asking whether the specific, staged format of *Let's Plays* actually encourages visualization. Certainly, moments of decision in this format come with commitments: if the audience questions them, this may lead to further *Let's Play* sequences in which other or perhaps even all possible decisions are played through. (e.g. PewDiePie 2014b)

## Decision Machines

Games are decision machines. They are designed to create challenges for players and give them options, to wait for inputs (execution as an action within in-game time)[7] and to respond to a player's input decision (selecting an option) with preprogrammed reactions of reward or punishment (consequences).[8] This is based on the understanding that the selection of an option and its execution as an action normally lead towards a solution, or that they are the solution to the challenge. In games, a "decision" is therefore any kind of reaction to the game, as every input requires a prior decision. Decisions come in many different forms and can be described as routine (automatic, requiring minimal cognitive effort), stereotypical (chosen from a clearly defined catalogue of options) or reflected (requiring further information and assessment) (Jungermann/Pfister/Fischer 2010: 31-38): loading ammunition (routine), left or right door (stereotypical), stealth mode or attack (reflected).[9] As regards the visibility of decisions, routine decisions are

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6 They are – in the terminology of ethnomethodology – made accountable (cf. Garfinkel 1967).

7 "Wait" is actually the wrong term here, as the game of course continues in time; an opponent may move without waiting for the player. Even doing nothing (deciding to do nothing) becomes a decision.

8 The term "options" ("objects, actions, rules or strategies to choose from") and the term "consequences" ("all states which may result as a consequence of choosing an option") have been taken from the literature of psychology (Jungermann/Pfister/Fischer 2010: 19; 22, our translation).

9 Because of the preprogrammed nature of games, the fourth type of constructive decisions hardly ever occurs – where "options are either not predefined at all or not sufficiently clearly defined" and "the personal values relevant for the decision are either unclear or need to be created in the first place", therefore requiring the greatest cognitive effort (Jungermann/Pfister/Fischer 2010: 35, our translation). Also, the catalog of

certainly less observable in a player's reactions, or made less relevant by the player, compared to stereotypical and reflected decisions. The phases at the beginning of a game are particularly interesting in this respect, as routines are visibly adopted at this stage through a targeted formation of patterns (see below, section *Guiding Principles*).

Games are always one step ahead, at the beginning of a round (Start? Try again?) or by predefining the structure of the game's principle.[10] In fact, many games depend on forced decisions, such as numerous Shoot 'em Ups which follow in the tradition of arcade games, with sections of a scrolling screen that never stops (e.g. *R-Type* [Irem, 1988]). Equally unstoppable are the falling blocks in *Tetris* (Alexei Paschitnow, 1984), which put the player in a difficult spot, but also always offer a new point of departure. Because of the clever spatial boundaries and flowing motion of the opponent's entities (spaceships, boulders) in these "worlds", it is often not immediately obvious that a player's moves are relatively limited within any given section of screen.

This feature is successfully used (again) in current games: in the iOS/Android game *Lara Croft GO* (Square Enix Montreal, 2015) paths are predetermined by a kind of panelled floor with tracks, this way forcing the next move with very limited rooms for decisions. Here, as in rounds-based role-playing games or simple quick time events, the principle of the game, with all its forced moves in the style of a question and answer game, becomes especially evident (cf. Bauer/Kato 2011).[11] These seemingly archaic principles form the basis of every computer game. Every possible decision is preprogrammed – in this respect, games are just like texts and films. There is only a limited number of options. Yet the players' experience is quite different – they feel that they could go anywhere, could do anything; open-world games such as *Grand Theft Auto* (Rockstar Games, 1997-2013) are advertised as giving players open-ended possibilities. This is, however, an illusion, as everything is in fact predefined – even

options cannot be extended by the player. Even seemingly free inputs such as entering names are, in fact, reflected decisions with preprogrammed options (in the form of the alphabet and special characters).

10 Which then cannot be changed. (cf. also Sicart 2009: 27).

11 Strictly speaking, these are examples of a radicalization of possibilities which already exist in texts or analog games (pen-and-paper role-playing games). Supposing that text and film are constituent media of games as the super-medium, this radicalization of course would be a core feature which is then somewhat watered down in the constituent media.

the freedom in *Minecraft* (Mojang, 2009). Behind most closed doors, there is, literally, nothing.

## Guiding Principles

This brings us to the question of why players fall so deeply under the spell of this illusion. Guiding principles (cf. Kato/Bauer "Hansel and Gretel" in this volume) play an important part in explaining this phenomenon. They operate in every game and serve the purpose of socializing players in their respective game world: consisting of a network of preset cues or instructions, they can, for example, help with orientation (where to go next, and how to recognize it?) (cf. ibid.), provide clues about the usefulness of certain objects (what's that shiny thing by the side of the path, is it useful for something?) or contain information about the state of wellbeing (how much life energy do I have left?). The more players are able to read these guiding principles[12], the better they can float through the world of the game with a sense of ease and routine – i.e. without the need for conscious decisions. In this sense, players take the possibility to make decisions away from the imagined representation through which their imagined avatar moves (e.g. wanting to open a drawer which is not specifically marked etc.). In the best case, players do not even notice any more that they only seem to be free, when in fact they act as slaves to the system.

Our first example, an excerpt from a *Let's Play* session of *The Last of Us* (Naughty Dog, 2013) played by VintageBeef of which we provide a transcription,[13] shows that the game's guiding principles and the apparent freedom of decision go hand in hand – which is a distinctive feature especially of current games. VintageBeef who is known as a highly explorative player, keen to discover and see as much as possible. (VintageBeef 2013a, the transcript begins at 07:10) This is exactly what he does in the sequence quite near the beginning of the game, and he expresses this also verbally. ("Sorry, I am exploring a little bit" L01, with the focal stress on "exploring"). So despite knowing that a certain Robert (L05, conspicuously quiet-voiced) is waiting for him/his avatar Joel and

12 In this sense, guiding principles can also be regarded as preemptive trial-and-error decisions.

13 The transcript has been created on the basis of the transcription system GAT2. (cf. Selting et al. 2009: 353-402) For the transcription conventions of this system or the meaning of individual symbols please refer to the key at the end of this article. The letter "L" is used to refer to specific lines.

his companion Tess, he deliberately decides to take his time so he can explore the space within a derelict building.

```
01  VB:   sorry i am expLORing a little bit-
02        (2.5)
          \___/
            \
          walks through the room, looks at everything
03        there_s no rush RIGHT?
04        (1.5)
05        <<p> robert_robert_s WAIting.>
06        <<p> but he can_he can wait LONger,>
07        (4.0)
          \___/
            \
          a dull sound, and a small circular cue appears in the
          dark
08        <<whispers> u: what_s THIS;>
09        (4.5)
          \___/
            \
          opens the drawer, it is empty
10        ^!NOTH!ing.
11        okAY;
          \___/
            \
           the next circle appears, VB opens the drawer
12        !O!u?
13        can i TAKE that?
14        <<reads> parts to upgrade your WEApon.>
15        !AWE!^some-
16        (3.0)
          \___/
            \
          another dull sound, the focus is on Tess, who is
          waiting
17        <<ff> you_re WATching me,>=
18        =<<ff> yeah just a SEcond.>
```

VintageBeef's decision to explore, for which he offers some further explanation (L03 and L06), is rewarded: a dull sound can be heard and a circle appears in a dark corner (L07). Both are cues within the system of guiding principles of *The Last of Us* – the player's attention is attracted by means of the auditory cue which signals usefulness, whereas the orientation cue in the head-up display guides the player towards a specific place, in order to do something.[14] It is espe-

14 This pairing is essential to all games, between the further development of the action (including further instructions) and the question of further orientation, which we have

cially important at the beginning of a game for players to recognize these pattern-like cues, which are specific to each game. In this case, the player becomes aware of drawers which can be opened and which contain rewards such as component parts – an important, recurring feature[15] which appears here for the first time, and VintageBeef reacts correspondingly ("uh, what's this?" L08). However, the first drawer is empty (L09 and L10, signalled by a noticeable change of pitch) – a clever move by the game design in more than one sense, which also puts an interesting perspective on our subject of moments of decision, as it becomes clear that opening a drawer does not always come with a reward. At the same time, this strengthens the player's sense of his own decision-making ability: if a reward can not be expected reliably every time, it is down to the player to choose whether to open a drawer: the player needs to decide.

Looking at the composition of games, they may be described as systems which confront players with challenges, with the prospect of reward for success, and the prospect of punishment for failure, by providing – through game design as an intrinsically motivational design which needs to be perfected – guiding principles and their cues in the form of interpretable options; decisions may then be described as moments at which the player's acceptance or rejection of the option becomes apparent. Reward or punishment by the game system follow as direct consequences of these inputs, especially when decisions are non-routine and cognitively demanding (see above). Decisions without consequences, i.e. without a reaction by the system, are very rare as this would involve the danger of taking the basic principle of the game to the point of absurdity. But there are exceptions, one example being the well-known scene from *Deus Ex* (Ion Storm Austin, 2000-2002) in which the player's decision – to visit the ladies' toilets as a male protagonist – is rebuked but without further consequences. This example also highlights that what is possible is not always permissible: the transgression of social conventions is executed as a metareflexive *anything goes* move which ought to be possible in a game, and yet is not tolerated by the game system. Such complex moments of decision remain rare, and even the example of *The Stanley Parable* (Galactic Cafe, 2012), with its mass of literal "dead ends", only proves that it is impossible to escape the system.

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described as *What's Next* based on *Where Next*. (cf. Kato/Bauer "Hansel and Gretel" in this volume).

15 More component parts mean more frequent upgrades to more effective weapons.

## The Player as Puppet

Just as players are constantly required to make decisions, the game itself needs to confront the players which those kinds of decisions that do not make them completely feel like puppets in the process. The challenges have to be appropriate, i.e. not too easy, not too difficult, staying well within a player's frustration threshold, and at the same time, the predetermined nature of alternative results should, ideally, not become apparent in the moment of decision. However, not even AAA titles always succeed at this. Sticking with the example of *The Last of Us*, at the end of the game, which is set in a postapocalyptic North America threatened by humans who have largely turned into cannibals through a virus, Joel, the protagonist, needs to make a decision about his protégé Ellie. Together they have lived through all kinds of dangers, and she is the only person immune to the virus. So will he sacrifice her for the sake of creating a vaccine against the virus? And yet, this tragic decision is not in the hands of the player – the player's avatar is Joel and in the case of VintageBeef, for instance, there is a clear sense of identification (see above, L01: "*I am* exploring a little bit", our emphasis). The moment of decision is embedded into a long cutscene and dramatically intensified as the choice made by Joel is not shown immediately (he either needs to shoot Marlene who stands in his way as he escapes from the hospital, or give up the anaesthetized Ellie). Instead, there is a cut, and Joel is seen leaving the city. VintageBeef's initial reaction to this scene reflects his incomprehension at the prefabricated ending: "What? Uhm.. what choice did I make?" (VintageBeef 2013b, at 19:00) His following statement – "Joel turned into a kind of a Monster, I think" – is characterized by a change of perspective and shows that he has been deprived of making his own decision. In fact, as the discussion at the end of the *Let's Play* reveals, he would have decided differently ("if it was me in that position, I don't know if I would have done made [sic!] the same decision") – and there is a danger here, especially since the game as a whole has been experienced positively ("but regardless, the game was awesome, and I loved every second of it"), that the player is made to look like a puppet. This is supported by the response of another Let's Player, PewDiePie, at the end of the same game. Confronted with the decision, over which he has no influence, to lie to Ellie, he exclaims: "Ah my brain! I don't know what I feel about this. That is such a ... aah that ending. Why did you have to aah! Aah! Why did you have to end it on a lie!?" (PewDiePie 2013c, at 18:45) So has the player ultimately been lied to as well, as he is prevented from making the really important decisions?

# VISUALIZED DECISIONS: CASES

## Degrees and Factors of Intensification

The examples from *The Last of Us* show that moments of decision can differ in terms of their degree of intensity, no matter whether the decision is with the player or not. Many occur almost automatically and are, as such, unspectacular: they are about wandering through rooms, opening drawers, making bots wait (see above). Other moments are more intense, for instance when a player decides whether to sneak up on an enemy in stealth mode or to shoot at them with an arrow from a distance. Intensity can be brought to culmination point, with the intention of making players literally break into a sweat, even when they are not able to make their own decision (see above).

As can also be seen from these examples, there are factors which play an important part in intensifying the moments of decisions in a game. We want to explore two factors in more detail: time pressure on the one hand, and the emotional tie to the avatar on the other.[16] While time pressure as a factor is imposed solely by the game system (and is a fundamental part of many of the examples discussed in the following), the emotional tie to a player's own avatar, and to other characters in the game, is of a more complex nature. It is normally the case in games that this tie can become stronger as the game progresses, or in the words of PewDiePie at the end of his *Let's Play* of *The Last of Us*: "I'm gonna miss Ellie. And I'm gonna miss Joel. A lot." (PewDiePie 2013c, at 24:04) This bond can, however, be there from the beginning – more recently, it has become more and more the norm in games of different genres for players to mold their avatar strictly on their own ideas. (cf. X-ONE Magazine 2014) The oppressive factor of time is suspended here, and VintageBeef (2014, from 02:25), for instance, takes a long time to create his avatar in *Dragon Age: Inquisition* (BioWare, 2014). Significantly, comparatively little time is spent on choosing the race (i.e. human vs. dwarf) and classification (e.g. magician vs. warrior), or on contemplating possible combinations. In fact, he uses most of his time to adapt the look of his avatar.[17] So as the sequence begins, with VintageBeef's avatar slowly raising himself off the floor, it makes perfect sense when VintageBeef

16 Britta Neitzel, following Hennion (2011), would use the term "Anhänglichkeit", or "close attachment" (cf. Neitzel 2012: 103).

17 VintageBeef even goes so far as to make the more detailed settings with the camera turned off. (VintageBeef 2014. at 09:00)

declares: “That’s me”. The numerous decisions which follow and which are all commented by the Let’s Player, stem from motivations that are based on projected or desired similarities to the player’s own self (cf. transcript, especially L04 and L05):

```
01  VB: o: the FRECKles look kind of !COOL!,
02      i like FRECKles.
03      freckles are SO GOOD.
04      <<p> i don’t HAve any frEckles.=
05      =maybe it’s because (--) maybe that_s the REAson
        i like frEckles-
06      i am JEAlous of the frEckles;>
(...)
07      i don’t know if i !WANT! gold_PLAted though;=
08      =we are not like we are not !FAN!cy quanari;
09      we_re we_re (-) WORking CLASS quaNARi PEOple.
(...)
10      he looks MEnacing yet- (--)
11      <<len>^GENtle and <<p> ^DOcile.>>
12      <<p> let_s acCEPT the changes.
13      O (-) his name is> <<croaking>KAAras>?
14      NO (-) let_s call him !DA!niel.
15      whY because that is <<len> ^MY NAme>.
16      and it still sounds meaDIvely.
17      SORT of.
```

The character specifications by the game also come into play (L07-L09, with some interesting individual stresses in the descriptions of social class). When the player has finished assembling the look, he describes the avatar as “menacing yet – gentle and docile” (L10 and L11) and even gives it his own name (L14 and L15, with a noticeable change of pitch). This menacing yet gentle avatar is clearly a figure of identification, and by adopting it, VintageBeef will play the game in a way that will always reveal his own moral sense behind his decisions (cf. section *Moral Decisions*).

## ENDO- AND EXOGAME DECISIONS

In our *Let’s Play* examples there is a strong identification with the avatar which is expressed by a first-person commentary on the action of the game. In terms of decision-making, the relationship between the player and the game world appears to be more subtle. As the example from *The Last of Us* has shown, preprogrammed decisions may torpedo the player’s identification with the avatar and force a change of perspective. Even in very intense moments of decision, which occur frequently, for instance, in *Heavy Rain*, there can be a clear distinction between decisions made in the game world as or for the avatar (*endogame decisions*), and decisions which individual players would make for themselves (*exogame decisions*).

This becomes apparent in the commentary of Let's Player Danny Jesden (2013): there is a scene in which the character Ethan Mars is supposed to cut off one of his fingers to rescue his kidnapped son, and Jesden evidently struggles with the decision.[18] While other Let's Players immediately turn to pragmatic thoughts, about how to alleviate the pain or disinfect the wound after the event, and swiftly look out for suitable aids (alcohol, hot iron rod) before proceeding, Jesden spends several minutes just pondering the question whether or not he should rise to the challenge. He also repeatedly states that he is not able to do it. "Why do I have to decide" (with the stress on "have to") and "I hate these shitty decisions" – these statements vividly depict how pressurized the player feels in these moments of decision. The fact that he had failed in an earlier challenge and thus worries about the consequences, i.e. the punishment meted out by the game mechanics, ultimately makes Jesden cut off his finger. Interestingly, and in contrast to the *Let's Plays* of other players[19], the almost voyeuristic look at the suffering which directly results from the decision is definitely not uppermost here:[20] instead, this player's focus is on discussing the feasibility of the decision (see transcript, German original with English translation ).[21]

```
01   DJ:   JA ich tU:_s einfach ich tU:_s jetzt einfach
           yes I just do it I just do it now
           \___/
             \
             DJ looks back and forth between the camera and the
           screen
02         ich w_NUR damit ihr es wisst,
           I w_just so you know
03   FS:   sie haben noch DREI minuten.
           you have three minutes left
                                \___/
                                  \
           DJ grimaces and sharply moves the controller, Ethan
           Mars screams
04         (2.0)
```

18 It is not quite clear of course how much of this may be part of a deliberate dramatization of the moment.

19 Such as in the case of PewDiePie who has given the sequence the title "*IT HURTS! ;_;*" cf. PewDiePie (2012b), at 18:48, or Sarazar (2012), at 16:35.

20 Cf. note 31.

21 The transcript begins at 03:55.

05 DJ: ich würds im echten leben NICHT tun.
*I would not do this in real life*
06 (2.0)
07 tut mir LEID leute aber-
*I'm so sorry guys but*
08 (7.0)
09 ich bin mir sicher die alle anderen die_s let_s played haben haben NICHT dasselbe getan-
*I'm not sure that all the others who've let's played have have not done the same*
10 NIEmand würde sowas tun.
*nobody would do that*
11 (4.0)
12 ja wieso hat sich mein SPIEL aufgehangen.
*yeah why did my game freeze*
13 (1.0)
14 mein SPIEL hat sich aufgehangen.
*my game has frozen*
15 wieso denn DAS-
*why is the*
16 !SPIEL;!
*game*
17 wieso verARSCHST du mich.
*why are you taking the piss*

At the same time as Jesden acts (L03), which he pointedly displays by grimacing and sharply moving the controller, he lets his viewers know (L02) that he would not have acted in this way in "real life" (L05, note the repeated stress on the negative, here and further on). This statement and the following, generalized observation that "nobody would do that" (L10) both mark a clear distinction between endo- and exogame decisions. The pressures exerted by the mechanics of the game, which push the player towards a decision he would personally never have made, ironically manifest themselves in this sequence on yet another level, when the game freezes (L12) and Jesden feels that it is "taking the piss" (L17).

The intensity in this scene of *Heavy Rain* is also heightened by the game design, in the form of suspenseful, sinister music, dramatic sounds such as a heartbeat, a permanently shifting camera perspective and an input design with constantly changing quick time events which relentlessly move about. These are not inputs which require a single pressing of a button, but they often have to be repeated over a longer period in a physical display of the player's apparent determination. Additionally, there is a time allowance of five minutes, which, compared to other games, but also to other scenes within the same game, seems relatively generous. The moment of decision is extended and can be dramatized to the full, as in the case of Jesden. In this respect, the scene represents a different structure to moments of decision in those quick time events which are mostly geared towards a player's responsiveness and skill. The intensity of the moment and thus its visibility are, however, all the more prominent here.[22]

## The story is tailored by how you play

In *The Walking Dead*, yet another kind of decision can be observed. Again, time is introduced as a stress factor, when a choice usually between four answers needs to be made within a specific time frame. As opposed to the scene in *Heavy Rain*, the reward does not instantly follow the decision and is rather supposed to function as an influence on how the game unfolds, positively or negatively. "This game series adapts to the choices you make. The story is tailored by how you play": this is the message shown at the beginning of all five episodes of the first season. It firmly reminds players about the importance of their decisions, leading PewDiePie to comment: "Bitch please, we know this".[23] His *Let's Plays* are proof of how a strong bond can develop with the characters over the course of a game. Unlike in *Dragon Age*, this bond is not based on the initial character creation, but on a highly narrative-based invitation to identify with the character, which the player is free to accept. The four possible answers or actions play a key role in filling these blanks: PewDiePie may not fully identify with the characters – he addresses them mainly in the second person (e.g. "take the shotgun, bro!" or "c'mon Clem, don't die!") – and yet, he feels responsible for those characters that mean something to him, and decides accordingly: "Fuck that. You know what, fuck that. Let's try that again, I don't wanna fucking lose Luke, just because – of Luke. (laughs) That's why I have the most subscribers." (PewDiePie 2014a, at 25:14) This is how he reacts to the death of the character Luke in the second season which he tries to salvage by reloading the scene. The futility of his rescue effort – every decision leads to Luke's death, albeit in slightly different ways – shows that there are limits to feasibility in games. Similarly, the ending of the first season, which did not allow a happy ending no matter the decision, revealed the predefined nature of game endings, and the difficulty with stories which can be influenced only up to a certain point.

In the second season of *The Walking Dead* (Telltale Games, 2013-2014), the number of endings is increased. As one of the last decisions is reached, the five

22 Of course this does not mean that those moments of decision which are geared towards a player's responsiveness can not be experienced in a similarly intense way. They can also be integrated into other moments of decision, as is the case in our example of quick time events in *Heavy Rain*.

23 Cf. note 1.

possible options begin to branch out. Interestingly, the choice between four decisions is condensed down to two: within the usual time frame, players needs to decide which of their two companions – who are currently engaged in a deadly fight against another – their avatar Clementine will let live: either Jane, in which case Clementine needs to shoot Kenny (option "Shoot Kenny"), or Kenny who stabs Jane as Clementine turns away (option "Look away").[24] PewDiePie visibly struggles with the decision (PewDiePie 2014a, at 17:42): the cursor goes back and forth four times between these two choices, before he eventually shoots Kenny. He is so overwhelmed by the consequences of his decision that he remains silent and turns away from the game to hide his tears.[25] PewDiePie's explanation, because of time pressure, normally follows the event but here he seems in no condition to do this and gives it later, at the end of the game (ibid):

```
01  PDP:  i real (-) i really FEEL like (--) we made the(-)
           right choice-
02        i dunno if someone_s gonna disagree with me BUT-
03        (1.0)
04        i just feel like kenny_s time was OVer; (--)
05        he_s been through SO much FUCKing SHIT-
06        THAT (.) it would_wouldn_t be a point to keep him
          \__/
            \
            music/background noises stop, blackscreen
07         alive;
08        AND (-) he just needed to see it then; (--)
09        that_s why (.) i !DID! it;
10        and the game really !FOR!ced you to !DO! it and that_s
          why it was so HARD to dO it.
11        i FEEL like.
```

In his rationale for having decided to not let Kenny live, PewDiePie states that the character's time "was over" and that he had "been through so much" (L04-L06), thus using feelings rather than rational arguments to explain his decision ("feel" is mentioned three times, cf. L01, L04 and L11 with two focal stresses). As both the decision and the acceptance of the consequences have proved difficult for him, his rationale seems to shift from explanation towards justification. There is a clear stress on the making of the decision (L09), and he even blames the game for pushing him (or rather: "you", the player in general) into a decision: "The Game really forced you to do it" (L10, with similarly strong focal

24 The second option also comes into effect when the time runs out without a decision having been made.

25 Cf. Isbister (2016: 22), who also observes and discusses the attachment of players to their companions in the games.

stresses). Later on, PewDiePie even admits that he feels ashamed because of his decision ("It's embarrassing – I feel so embarrassed, I don't know why") (ibid., at 26:45). Again, this raises the question to what extent players begin to perceive themselves as puppets within the game as a decision machine[26] – and yet, these intense, emotional moments most certainly are what makes these almost exclusively decision-based games so attractive.

## MORAL DECISIONS

> Gaming does not liberate us from constraints (since we accept the far stricter constraint of the rules), but it delivers us from freedom. We lose freedom if we live it merely as reality.
>
> *(Baudrillard 2001: 66)*

In our analog reality, decisions in most cases are already complex and difficult. They are characterized by moral, social and economic considerations. They can make us feel uncertain, as we are not always sure how the rules of the system work and what kind of a decision we are actually making. What other options are there? Is there a solution, and what is really important for it? What are the expected consequences? And is the decision morally justifiable? Games, on the other hand, usually do everything to eliminate such uncertainties, and they make decisions easier – as decision machines, they provide a designed logic of consequences and are therefore simpler in their make-up. In the majority of cases players are even relieved of these moral considerations. It is the only way to allow players to act fast, and it also enables a structured and easy integration of the

26 This is especially the case when players have the possibility to play through all the different endings, which is exactly what PewDiePie (2014b) did in response to many comments from his community in his *Let's Play* entitled *The Walking Dead: Season 2 – All Endings – ALL OUT OF TEARS* …: "I really don't want to shoot Ken again, after all of this. I feel awful!" (at 15:12). After having tried out all possible endings, he still insists that his decision was the one that made the most sense (at 27:33). At the very end of the video he does, however, admit: "I probably keep going with the end where we keep going with Ken, just for the for the [sic] sake of it" (at 27:50). "[T]he player seems to expect that there will be one single, perfect solution" (Juul 2011: 112) – what Juul observes for the puzzle genre seems to be especially vital for these kind of multiple ending games.

game system into game design. For this purpose, and to bypass the problem of moral decisions, game design offers a range of tactics on different levels: for instance, the choice of abstract themes (e.g. *Tetris*. [Alexei Paschitnow 1984]: jigsaw pieces; *Diablo 3* [Blizzard Entertainment 2012-2014]: green blood), human opponents being replaced by aliens (e.g. *Doom* [Id Software, 1993]), or a deformation beyond the point of recognition (e.g. *The Last of Us*).[27] The story can also be laid out specifically to put players on the spot in an often seemingly primitive, black-and-white situation in which they are allowed to lose all their inhibitions, and hence are freed from any moral concerns for the sake of enjoying the game (e.g. *Battlefield* series [Digital Illusions CE, 2002-2015], cf. Kocher/Bauer/Suter 2009).

Despite these precautions, there have usually been attempts to introduce reality in the form of moral aspects by means of settings or sets of rules.[28] There are many reasons for this, ranging from an increase of attention that comes with the transgression of boundaries, to the possibility of raising the value of the decisions. (cf. Costikyan 2013) The introduction of questions of morality is also a way of expanding the game design, both in terms of the setting (which themes may be addressed?) and in terms of rules (what is permissible in a game?). By creating a connection with reality, the basic repository of concrete decisions can be extended as well. For the players this means that they are once more confronted with a moment of uncertainty,[29] but this time, it is amplified by the question in which sphere the respective system of moral values is actually valid: does the decision apply to the game, or reality? In other words: is a game really just a simulation of the real world, and its catalyst for moral reflections? Introducing questions of morality automatically means that decisions are magnified. They do not necessarily become more meaningful as a result, but they certainly have more of a real-life quality. This suggests a possible case of reversal, in the sense that not only is reality introduced into the game, but the game also enters reality. Yet it remains unclear who rates the decisions, by which criteria, and for which

27 The visibly human aspect in these cases adds to the tragic element (e.g. Clementine's parents in *The Walking Dead Season 1*).

28 Cf. also Sicart (2009), who discusses games such as *Deus Ex*, *GTA* or *Battlefield 1942*.

29 This "realistic" uncertainty can be increased by leaving open what the consequences might be further along in the game, such as in *This War of Mine* (2014).

of the worlds. These moral decisions are, however, clearly connected to reality by their design – and we therefore experience a loss of freedom.[30]

In the *GTA* game series, numerous moral boundaries are crossed, but the infamous torture scene in *GTA V* does not involve any ethical decisions, as the game clearly makes torture a necessity here.[31] The players themselves decide individually to what extent they want to adjust their endogame decisions to their exogame system of values. In one player's case, there is maximum if belated adjustment, when, in a notorious scene in *GTA IV* (Rockstar North, 2008), he runs over the prostitute whose services he has just used, and utters the words: "I'm a hired killer and I pay for sex. My mother would be ashamed". (CriJulian0094 2008, at 02:08) This appears even more dubious because, in contrast to the torture scene in *GTA V* (Rockstar North, 2013), the immoral decision here has not been forced on the player by the game so the story can continue – the adoption of a gangster-style attitude is solely the player's choice. The question remains whether it is acceptable to justify this decision as a lived consequence of the setting which is predefined by the game design. When players fail to recognize that criminals inhabit social (in this case mafia-like) structures (*The Wire*, 2002-2008, *Gomorra*, 2008, etc.), much like everyone else, it is evident that such decisions, or their consequences, must be factored in by the game and must be playable.

Often it is not obvious whether these immoral decisions are recognized as such, and accepted as part of the game by a player. It would mean that the player would expect a reward from the game, which seems to be at odds with the notion of immoral decisions. PewDiePie's *Let's Play* of *Gretel & Hansel* (Armor Games, 2010), a point-and-click short game, supports this assumption. (cf.

30 Looking at texts or films for comparison, the impossibility of making decisions in these media is mainly regarded as a disadvantage. Yet in certain cases it can be seen as an advantage: readers/viewers can not advance or prevent anything; they experience the rules of these fictional worlds at close range, but at the same time they are not subject to any (moral) responsibility.

31 Interestingly, once again the pressure exerted by the game is mentioned, for example by VintageBeef (2013c, at 19:11): "That was horrible. The torture and stuff. C'mon game?!" A scene from *God of War 3* (Sony Computer Entertainment, 2010) is similarly provocative and unavoidable: the quick time sequence requires an input via L1 and R1 which results in the victim's eyes being gouged out, from the victim's perspective. This action leaves Let's Players speechless. (e.g. TheWolverous 2013, at 07:38) Despite being listed as number one in the "most brutal kills" video for this game, this L1/R1 sequence is actually not shown. (Assassamasta 2010, at 03:58).

PewDiePie 2013a) The player, whose avatar is Gretel, is given a sling as one of his first props. This leads PewDiePie to stage a kind of role play (cf. transcript below):[32] he likes the way Hansel moves (L03, L13), which is why he repeatedly uses Gretel to fire at Hansel, in order to make him "dance" ("make the dance", L04-Z08). Just like in a puppet show, he switches between a falsetto voice (Hansel) and a loud, commandeering voice (Gretel). The first shot leaves Hansel with a black eye, and PewDiePie notices this ("oh shit", L02), but still keeps going. Hansel is increasingly injured ("holy shit, we can really fuck him up, huh?", L09 and L10) and eventually drops dead (L19). PewDiePie's reaction is one of shocked surprise and amusement in equal measure (L20).

```
01  PDP:  <<ff> fuck !YOU!;>
02        that_s the LAme <<len> o: SHIT.>
03        NIce dude make the DANce;
04        <<falsetto> no pits> <<ff> make the !DAN!ce;>
05        MAke it;
06        <<falsetto> here we go YEAH.>
07        do you <<falsetto> see the> <<ff> shut !UP!
          make the !DAN!ce;>
08        <<falsetto> ele heats pits> <<ff> make the !DAN!ce.>
09        <<len> HOly shit.>
10        we can REALly fuck him up HUH?
11        ((laughs))
((…))
12        ((laughs))
13        HANS is fucking Awesome.=
14        =look at him he is like <<denasal> do you see this
          MOves;
15        do you see this MOves>;
16        <<ff> !NO! i don_t see> them <<falsetto> sorry pits;>
17        Idiot-
18        (0.5)
          \__/
            \
           Hansel sways
19        what (.) what HAPpened;
                   \__/
                     \
                    Hansel drops dead
20        <<ff> i !KIL!led him-> ((laughs))
21        <<croaking and high-voiced> i_m !SOR!RY->
22        (2.5)
23        <<disguised voice> i didn_t MEAN to do> ok i actually
          meant to do it.
```

Initially, PewDiePie launches into a justification – his voice still in disguise, playing another role – but because of his prior knowledge (L09 and L10) he

32 Ibid. The transcript starts at 04:14.

quickly concedes that he had been expecting Hansel's death (L23). It escapes him that this fits exactly into the concept of the game, and that, in fact, it triggered a reward, but he will have noticed by that stage that this sweet fairy-tale world has his own surprising (im-)morality. *Gretel & Hansel* reveals itself as a highly sophisticated game, which, starting with the title, employs postmodern tactics of reversal to take the game-over situation to the point of absurdity (cf also Williams 2010): the more deaths occur, the more medals are collected – with the ultimate goal of being awarded the title "Grimm Master". The means of death, stoning one's brother to death – the respective medal is suitably labelled "Cain" – has been accidentally triggered by PewDiePie when he made the immoral decision to fire at Hansel who anxiously tries to duck each shot; a decision which probably sprang from favorable circumstances and perhaps a naïve notion (of a sling as a child's weapon), but is mostly "owed" to an overwhelming enjoyment of the game that went a little out of hand and turned into a slightly grotesque spectacle (making Hansel dance) – which entirely befits the game.[33]

To make immoral decisions in a playful manner, simulations seem a particularly suitable strategy. However, there are games which lend themselves to being played in an ethically correct way, as our last example will show. It is a *Let's Play* of the game *Little Computer People* (Activision, 1985) in which the YouTuber SpiderMwa presents the version *House-on-a-Disk*: "This is a very very very weird game at least as some people say it, but it's actually a simulation game". (SpiderMwa 2012, at 00:12) Based on the concept that every computer has a "resident" – a *Little Computer Person* (LCP) – a house is shown into which that person can move. To ensure they live a happy life, they need to be given food, something to do and the opportunity to interact with the outside world. This means that the player needs to type orders, which must be phrased correctly: "You always have to type please before giving him orders, just to be nice"[34]. SpiderMwa's style of play is markedly friendly, and he always takes care that the activities of his LCP named Russell are varied and interesting. He could make immoral decisions if he wanted to: for instance, no longer waking the LCP, letting him go hungry or refusing any kind of interaction with him. (cf. "Little

33 An animated potato, which is supposed to signify that there is not enough food, is the origin of the game's recurring theme of dancing. "The potato will dance", as PewDiePie comments. (PewDiePie 2013b, at 01:20) He returns to the theme several times later on, for instance, at 09:37, when he makes Gretel dance to the banjo music of the old man and beatboxes along to it.

34 Ibid. at 05:57. LCPs consent to these orders by nodding, but they can also ignore them.

Computer Manual") The game of course provides for these eventualities and includes the option to show the LCP turning green in bed – an option which perhaps would have been even more obvious in the original version carrying the subtitle *Research Project*. Yet SpiderMwa, who refers to himself as "your friendly neighborhood let's player" (SpiderMwa 2012, at 27:23), not only treats Russell fairly throughout the game, but he also completely ignores the possibility of acting immorally, which is reflected by his statement at the end: "that's pretty much it that there is to this game, I have pretty much shown everything" (Ibid. at 26:22).

SpiderMwa's style of play vividly shows that not everything that is preprogrammed in a game, particularly regarding immoral decisions, must be accepted and followed through. Games as a system lay down the rules in the form of challenges, options, a choice of actions and valuated consequences, and they invite players to create, as a concrete actualization of these rules, a decision tree – which is nothing less than the prefabricated result of numerous, long game design decisions. As ludic decision machines, games are geared towards perfecting the moment of decision by an intrinsically motivational design (guiding principles), and as such they leave it to the players whether they want to make their decisions based on criteria from the endo- or exogame worlds. This opens up all manner of possibilities – including the well-intended assimilation to the game world (as in the case of the naïve killer in *GTA IV*), the staging of a *Let's Play* role (VintageBeef, SpiderMwa), the introduction of preferences and notions of morality (PewDiePie), and the deliberate dramatization of the moment of decision or the clarification of a player's own point of view (DannyJesden). This rich palette of moments of decision, factored in and offered by the game and accepted by the players, can become visible and observable as a tangible experience by means of *Let's Plays*.

## KEY TO GAT2 TRANSCRIPTIONS

(the list below only contains the conventions relevant to this article)

| | |
|---|---|
| `[ ]`<br>`[ ]` | overlaps and speaking simultaneously |
| `°h` | breathing in |
| `(.)` | micropause, estimate, up to approx. 0.2 seconds |
| `(-)` | brief pause, estimate, approx. 0.2 to 0.5 seconds |
| `(--)` | medium-length pause, estimate, approx. 0.5 to 0.8 seconds |
| `(1.0)` | timed pauses |

| | |
|---|---|
| `robert_s` | words joined together within units |
| `((coughs))` | para- and extralinguistic actions and events |
| `<<whispers>>` | para- and extralinguistic actions, events accompanying speech |
| `((...))` | gap in transcript |
| `=` | fast, immediate follow-on contribution by speaker |
| `:` | extending, lengthening by approx. 0.2 to 0.5 seconds |
| `acCENT` | focal stress, accentuation |
| `accEnt` | secondary stress |
| `ac!CENT!` | pronounced stress |

Fluctuations in pitch at the end of intonational phrases:

| | |
|---|---|
| `?` | steep rise |
| `,` | medium rise |
| `-` | even level |
| `;` | medium drop |
| `.` | steep drop |

Intralinear notation of fluctuations in stress and pitch

| | |
|---|---|
| `^SO` | rising-falling |

Changes in volume and pace of speech:

| | |
|---|---|
| `<<ff> >` | fortissimo, very loud |
| `<<p> >` | piano, quiet |
| `<<acc> >` | accelerando, becoming faster |
| `<<len> >` | lento, slow |

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# The Ethical Avatar

*Wolfgang Walk and Mark L. Barrett*

Don't panic! This article is not about making games that have a political agenda or a politically correct message. It is also not about feminism, racism, climate change, refugees, or any other political problem that might be addressed in a game. Instead, it is about using a set of design tools to greatly enhance the player's participation in, and sense of participation in, the game world. We call this set of tools the "Ethical Avatar" (EA), and this article explains in detail how to employ an EA in your own work, how it functions in the design, and the kind of games it works best with. In order to do all that, however, we also need to cover some basics first, so please bear with us.

To generate the effects we want the player to experience, it is axiomatic that we must design for those effects. That's as true in interactive entertainment as it is in painting, film, theater or any other medium of expression. In order to generate emotional involvement or just plain fun, we have to organize and execute designs, which are aimed at generating those effects in the mind of the player.

In the article "Ethics as game mechanics" (cf. Walk, in this volume) Wolfgang talked about the *player subject* being the actual agent of interaction in the mind of the player. For more on the player subject, see *Miguel Sicart: Ethics of Computer Games* (2009). Relative to the player subject, then, an Ethical Avatar is defined by two things:

1. The ability of the player subject to express its will in confronting the ethical and moral rules of the game world
2. The ability of the game world to react to the player subject's expressions via:
   a) narration
   b) game mechanics
   c) player challenges

In order to implement an Ethical Avatar, both points 1 *and* 2 must be fulfilled, and all three parts of point 2 must be fulfilled. Even one missing component at the design level will render the player's avatar non-ethical. (Not *un*ethical, but *non*-ethical – as in incapable of generating and sustaining an ethical context for play.)

So what are ethics in this context? Well, we're not talking about striving for Beauty, Good or Truth, as in Plato's ideology. Relative to game design, the ethics of a game world represent the states or behaviors that are currently considered reasonable or normal at a given in-game moment. In that sense in-game ethics may have no connection to real-world ethics, hanging instead – as they should – on the socio-economic circumstances of the game world, within which there may be many different cultures, climates, territories and economies, all of them reflecting different ethical parameters of that world.

(In the mentioned article Wolfgang wrote about the difference between morals on one hand and ethics as a *reasoned and reflected* moral system on the other. It turns out that the ethics of a society – or of individuals in that society – can be at war with the morals of that same society or a sub-group of it, which is a great hook for intense narrative conflict. And if that doesn't make sense, watch the news for five minutes.)

## WHEN A GAME RISES INTO THE AREAS OF REALISM, AN ETHICAL AVATAR WILL IMPROVE IT

Consider the following affirmative claim, which we will examine in its details shortly:

*When a game rises above a certain degree of abstraction, into the arena of realism, an Ethical Avatar will improve it.*

The problem from the perspective of design is that an Ethical Avatar does not simply appear when a game rises into the arena of realism. Like every other aspect of a game, an Ethical Avatar must be *designed*, and that means adjustments must also be made to the production process, the team architecture, and even the comprehension of the design team. In order to function, an Ethical Avatar must be integrated as a normative part of the game's vision, and everyone on the development team must understand that an Ethical Avatar is part of the premise of the design. Ethically resonant cutscenes or a few ethical choices here and there will not work.

To be clear, by ethics we do *not* mean that a game must allow the player to do anything they want. In fact, it is possible for ethical expression to be generated by very few gameplay features, yet still create a strong Ethical Avatar. *Papers, please* (2013) is a perfect example.

So we are not necessarily talking about games with tons of features or a realistic simulation of complex societal behavior, although some simulation of societal behavior *is* critical for an Ethical Avatar. Even if a game puts huge obstacles in the path of the player subject's free will – even if it completely blocks the player from doing what they want to do – that does not mean that an Ethical Avatar fails as an aspect of design. Again, *Papers, please* (2013) shows how you can lead the player subject into a cul-de-sac of bad options, and how that in itself can produce a strong feeling of ethical gameplay. *Spec Ops – The Line* (2012) is another example.

In designing an Ethical Avatar it is also not necessary or even beneficial to guarantee a positive outcome, or to try to anticipate each individual player's preferences. Quite often, difficulty in expressing the ethical preference of the player subject within the context of a game can actually amplify the ethical context of the gameplay. Instead of being perceived as winning or losing, oppression creates resistance in the mind of the player subject relative to the game world.

To engineer that productive tension, however, opposition to the player subject's preferred ethical expression must be embodied in and communicated by the game world. It is not enough to dictate terms and conditions via a written script, no matter how eloquent. Instead, the context for an Ethical Avatar must be incorporated into the setting and the game mechanics – and, subsequently, into the challenges by which the game itself becomes the player's antagonist. A loss of freedom becomes evocative when understood by the player subject *as* a loss, instead of a design constraint. The way both *Papers, please* (2013) and *Spec Ops – The Line* (2012) take away player freedom as a consequence of player actions makes the player *feel* that loss, and amplifies the desperation of ethical dilemmas in which there are no good options.

While such choices might be frustrating in the context of victory-oriented gameplay, in combination with a player's willing suspension of disbelief the filter of the player subject allows the player to experience such obstacles in context. Because the player subject exists in the mind of the player, but is not the player, that distinction allows the player to make choices and experience the results of those choices *in* the game – including choices they might never make in real life. While that can certainly lead to game designs which seek to shock or horrify, as noted in 1) above, the capacity of the player to separate themselves from reality – via the player subject, in much the same way that an audience adopts suspension of disbelief while watching a film or stage play – is the foundation of any game's ability to exploit an Ethical Avatar. The consequent condition, as noted in 2), is the ability of the game design to accept the choices of the player subject as an operative force in the game's mechanics and challenges. In combination, those two design decisions elevate the in-game avatar from a deterministic robot to an entity that acts from moral reasoning – an Ethical Avatar.

Along with the capacity for suspension of disbelief, the desire to express free will exists in almost every player, so we do not need to generate that impulse. If we do not allow the player to express free will in a game world, however, then the player is revealed to be nothing more than a foil for the narrative manipulations of the game's authors. Despite the player's desire to make choices and have an effect, all attempts to change the game world will be in vain.

Again, it is one thing to prevent a player from winning, and quite another to prevent a player from achieving the ethical end they would prefer. In the former case, frustration *with* the game is inevitable. In the latter case, constraints within the game world may – indeed should – promote frustration *within* the game, even as the player subject may remain resolved to resist those constraints. Even when resistance is futile, the game world must still respond to the player's resistance, else none of the player's choices matter in an ethical context.

For example, a game world, which does not react to the player's decision to take a life, or to preserve a life, is, in most cases, a game without an Ethical Avatar. In such a game – even if there is a narrative response to the player's choices – the player remains little more than a deterministic robot. In such games the only achievable objectives come from mastering the mechanics and overcoming in-game obstacles. Such games can still be great fun, and nothing in this article should be construed as denouncing such games. Instead, this article is about how to go beyond mere mechanics and embrace the player's capacity for experiencing so much more.

## THE ETHICAL AVATAR, ONCE IT HAS BECOME DESIGN GOAL, BECOMES A DESIGN PREMISE

All of the above should make clear that this article is not about a political demand for ethics in games or an Ethical Avatar per se. Instead, designing for an EA is solely about advancing and deepening the potential of interactive entertainment as an art form. The need for ethical gameplay that is often proclaimed by politicians, teachers and worried parents is in fact an attempt to constrain artistic freedom, when such constraints are either not imposed on other art forms or are already generally adopted as an expression of basic human decency.

To the contrary, an Ethical Avatar is an *aesthetic goal* designed to unlock areas of artistic expression and freedom which – even today – are hard for game designers to explore, whether because of lack of awareness of the possibilities, or fear of instilling a cultural backlash. In that sense, embracing the Ethical Avatar as a design premise is less like a parental advisory sticker and more like embracing the advance from mono to stereo in audio recordings. The very concept of an Ethical Avatar widens the designer's options considerably, while at the same time it intensifies the interactive experience for the player.

As a practical matter, aesthetic ideas can of course be political as well. In fact, an *un*political aesthetic – if such a thing could possibly exist – would necessarily exclude itself from public discourse, and as such would not need to be seriously engaged. Ironically, however, in looking back at the first few decades of game design we can also see that attempts at remaining apolitical invited confrontations with the political and cultural sphere, precisely because moralizing was expected if not insisted upon. In a beautiful demonstration of the term *dialectical movement*, the attempt to embrace and define a non-political game aesthetic became riotously political, albeit inadvertently.

Whether in a cultural or political context, it is not possible to avoid the ethical consequence of any work, whether that consequence is deemed legitimate or opportunistic. What is possible, however – indeed critical within the context of game design – is deliberately deciding whether an Ethical Avatar will be implemented in a given design. Failing to consciously make that choice has nothing to do with ethics, but simply betrays failure at the design stage. By the same token, however, consciously omitting an Ethical Avatar is no guarantee that a game will avoid political or cultural pushback – a problem the *Division* (2016) designers had to face, for good reason.

Including an Ethical Avatar in a game also does not and need not necessarily reflect some commentary on the real world. Rather, an Ethical Avatar creates the potential for wrestling with ethical dilemmas *within* a game world. Internally, as an expression of a game's design, including an Ethical Avatar takes a position toward the game in which its data representation operates as a political entity, as a set of cultural rules, and as a set of expectations, yet all of that may be unrelated to the real world. (Again, an Ethical Avatar is a representation not of the player but of the player subject, which in turn facilitates a deepening of the player experience.)

The whole point of interactive entertainment – what separates it from every other medium – is that the audience, the *player*, gets to participate by making (or not making) choices. The ideal goal in any interactive work is for the choices that players make to determine the outcome in some way, as opposed to simply revealing a predesigned outcome. Unfortunately, in terms of narratives a maddening truth has held since the inception of the interactive medium. If you want to tell a story in an interactive work, you have to pre-design those elements and impose them on the player in order to generate an effect commensurate with passive mediums.

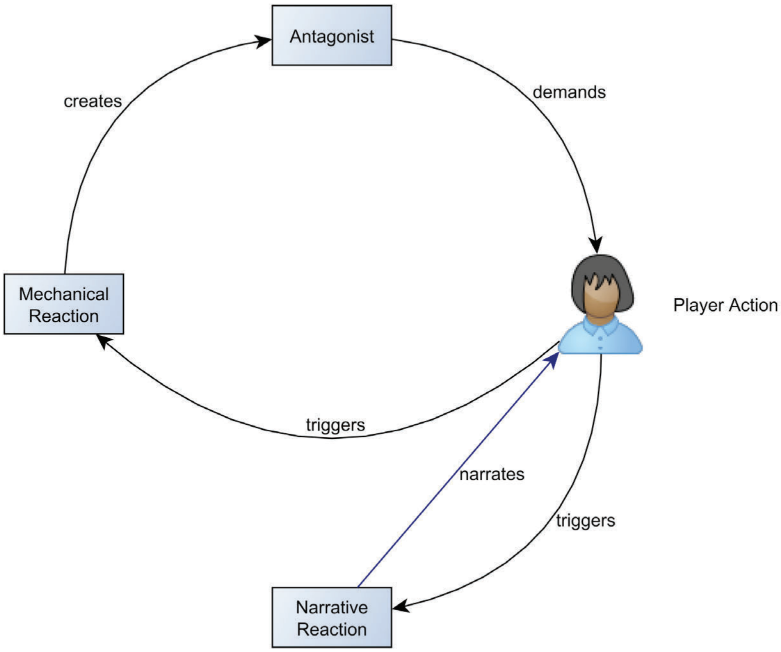
The whole point of including an Ethical Avatar, then, is not to impose ethics, but to avoid that perpetual frustration on the part of both the designer and the player. That is accomplished by providing a context in which ethical choices – which are inherently narrative – *do* matter, not just to the player, but to the game. Providing choices is one thing, providing choices which affect the game world is another, and providing choices which affect the game world in an ethical context is still another.

By its very conception, an Ethical Avatar generates and enhances feelings in the player that their choices have influence – agency – within the game world. It's not just about completing another mission and raking in rewards in the form of game resources. It's not just about arriving at the next cutscene, then, watching a story play out that was prepared in advance. Instead, the reaction *of* the game world generates emotions, which become part of an organic *narrative experience.* (cf. Walk, Görlich, Barrett 2017) No more heavy-handed plot designs limiting the player's experience, at a consequent savings in development time and money that might help keep an indie studio up and running for several years.

## THE NON-ETHICAL AVATAR SUPPRESSES TWO OF THE THREE NARRATIVE FEEDBACK PATHS

Over the past few decades, even as designers and players alike have come to terms with intractable limits in the telling of truly interactive stories, the perception and expectation of game worlds has changed. It is no longer acceptable to excuse such limits by saying that a work is only a game, which means designers are now obligated to defend their design choices in the context of in-game ethics and narrative effect. Today, any game world which is even partly realistic, but which does not reflect its own ethics in its design mechanics, is seen as cold or unsatisfying, and rightly so. Even if a game is meant to be fun and nothing else, an ever-increasing segment of the market expects coherence between a game's mechanics and ethics, if only to facilitate enjoyment, to say nothing of suspension of disbelief.

*Figure 1: The Non-Ethical Avatar*




Source: Walk, Barrett

The reason for dissatisfaction becomes immediately clear when looking at *Figure 1*, which depicts how many if not most games are currently designed. It is important to note that the "antagonist" in the diagram is not a narrative bad guy or player opponent, but the sum and sequence of all challenges a game has to offer, and ideally evolves over time in response to the players' choices and accomplishments. As you can see, however, in *Figure 1* there is no narrative feedback loop with the game as an antagonist, and without that narrative component no ethical questions can be raised on the level of gameplay.

The same goes for the game mechanics, which simply serve to compel state changes that are then perceived through the antagonist. Only the narrative reaction provides feedback about any ethical or narrative component, but as previously noted, in many games that feedback is often predesigned. Even when branching pathways are created in order to respond to carefully constrained player choices, those orchestrated responses are not reflected in the game's mechanics or in the game as the player's antagonist.

If you are striving for a rich, believable game world using a design similar to *Figure 1*, not only will you face stiff competition in the marketplace, but you will also face the difficult aesthetic problem of generating a convincing narrative. As *Doom* (1993) clearly proves there is nothing wrong with keeping your game world simple and producing a work that aspires only to fun. Because *Doom* doesn't need the game world of *The Witcher 3* (2015) to be enjoyable, it can get by with a simplistic narrative that no *Witcher* player would ever accept.

Conversely, however, that's also why complex narratives work much better in games designed around an Ethical Avatar, as opposed to a Non-Ethical Avatar (nEA). With an nEA the narratives and mechanics are managed as separate entities, as in *Figure 1* – meaning choices and consequences in one area are not reflected in the other. For example, if you fail to protect a merchant's daughter, that merchant will still sell you what you need at the same prices as before. Even if a narrative thread is created in advance and responds to that failure, that response will never affect the game mechanics, or the game as your antagonist.

In the worst case, the mechanics, antagonist and game narratives all communicate different narrative states to the player subject, thus creating the famous ludo-narrative dissonance. (cf. Hocking 2007) Many designers are so concerned about that dissonance that they actually keep the narrative of the game world on a short leash – and justifiably so. In fact, if your design calls for an nEA that's exactly the way to go, because the player will have no expectation of a connection between the game and the story – and thus between the mechanics and the game world.

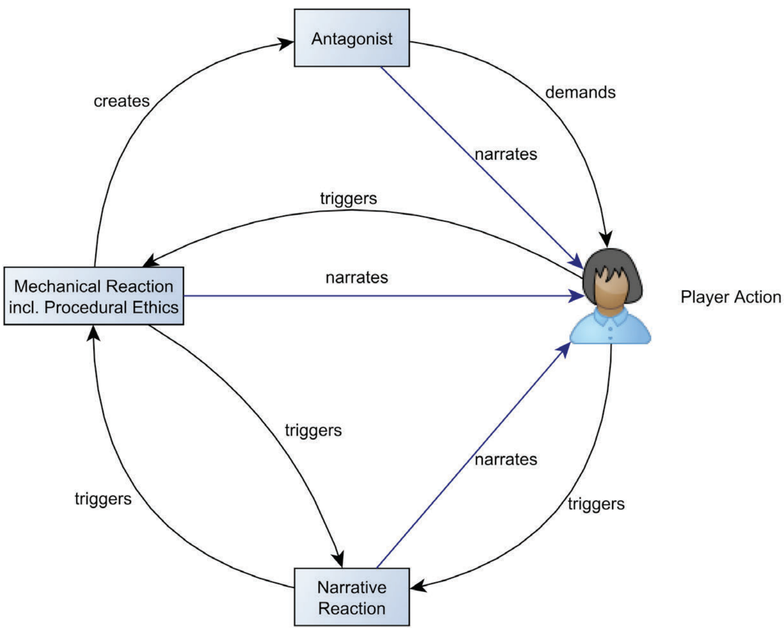
As noted, however, the freedom of designers (and producers and publishers) to implement a Non-Ethical Avatar in games that should have an Ethical Avatar is gone. And there is now really no excuse for doing so other than habit or laziness. The factors that determine whether a game should or should not have an EA are no longer technological, genre-driven or even constrained by the topic of the game. Instead, audience-expectations dictate that the level of the game world's abstraction is the main parameter in making that design decision.

The reason *Candy Crush* (2012) does not need an Ethical Avatar is not because it's a simple game, but because the rules defining the game world are too abstract to create ethical ramifications. On an aesthetic level, *Candy Crush* does not include a socio-economic context that will prompt ethical questions even in the mind of the most ethically inclined player. Again, this is not a limitation and does not make *Candy Crush* a bad game or even less of a game when compared to games that include an Ethical Avatar. The same holds true for *Doom* (1993), while limiting the design of *This War of Mine* (2014) in the same way would not have simply made that game bad, it would have made that game hateful.

## THE ETHICAL AVATAR FACILITATES ALL THREE NARRATIVE FEEDBACK PATHS

Designing a game so it responds to player choices with a funny or snarky remark is better than nothing, and may help immersion if it's done well, but it's no longer enough if the game world itself is more realistic than that level of response. If predesigned comments vanish in the Orcus of game mechanics without further consequence, the player will learn to ignore them other than for their entertainment value, and that in turn will defeat immersion and erode suspension of disbelief. In such instances, what's needed is a narrative reaction that is reflected in the game mechanics, which is also then communicated back to the player by the game-as-antagonist. If the player subject can instigate a chain reaction that cascades through the entire game design, leading to new and appropriate challenges, then immersion, suspension of disbelief and tension with the antagonist will all be reinforced.

*Figure 2: The Ethical Avatar*




Source: Walk, Barrett

In *Figure 2,* the game mechanics encompass a code unit that handles parameters coming from the narrative level of the game. In a game with an Ethical Avatar, the merchant whose daughter you could not protect will stop selling you stuff – or at least triple his prices, but only for you. That decision will then also propagate throughout the design, such that after the merchant has stopped selling to you, other members of your tribe may stop buying goods from him. If that embargo persists, the merchant may have to go out of business or move away to stay in business, which would leave you without someone to buy goods from – at least until a another merchant with a slightly different choice of goods opened up shop nearby, or perhaps even in the same building. (For a more complex implementation, study the subtle mechanics of *This War of Mine* (2014).

Because there is a mechanical reaction feeding into the game as antagonist, and there is a feedback loop between the narrative and mechanical reactions, the mechanical reaction can carry the narrative of the world reaction, leading to a much more diegetic narrative design, and a much more organic evolution of the game challenges.

Over time, those changes in the game world will require adaptations in our decisions as a player, yet the reason for all of those changes will still make sense in the context of the ethics of the game world. As a result, the game's narrative becomes more powerful because it is delivered *procedurally* from three directions: as a classical narrative happening in the game world – often at a significant reduction in development costs, as a mechanical reaction, and as a change in the game-world-as-antagonist.

As you can easily see from both diagrams, neither the Non-Ethical nor Ethical Avatar defines what is often called a heroic character or journey. Instead, the only intent of the diagrams is to show how player actions trigger feedback from the game's design. Even the common conception of a hero's journey is a narrative conceit, not a design construct, meaning that ideal must be moved along a predesigned arc as opposed to organically generated from interactive choices.

The specific terms in the diagrams describe the relationship between the player subject/avatar on one hand, and the narrative reactions of the game world, game mechanics and antagonist on the other. Because an Ethical Avatar generates and receives feedback from the design in three ways, it provides the increased depth of response that is necessary in games, which are more realistic and less abstract. As a model, *Figure 2* does not dictate ethical behavior or choices, but describes a system in which the game's ethics are *procedural* – and that is not some theoretical ideal.

One of the earliest implementations of such a system dates back to 2005, when Russian developer Icepick Lodge released *Pathologic*. (We may be missing an earlier game, but it's not about who did it first – it's about what we do with that potential.) In the past there were serious hardware and software limitations that prevented implementation of an Ethical Avatar, but those limits no longer exist. We can calculate and render everything we want, from the most delicate facial animations to complex simulations of society. As *Pathologic* (2005) showed (Smith 2014), we can use *phronesis*, sound judgement, as a design tool to integrate the narrative and mechanics in many games.

## THE ETHICAL AVATAR CREATES A FAR-REACHING PARADIGM SHIFT IN GAME DESIGN THAT EVEN GOES INTO QUESTIONS OF PRODUCTION WORKFLOW

If instead of an abstracted world, a game presents a rich and detailed world including societies, laws, religion and morals, the question of why a player might want to influence that world is trivial. Because no society is ever perfect, a player with any empathy will see opportunities to make any game world better, if perhaps only in their own little town or neighborhood or social sphere. Even on a local scale, however, chances are that initiating change will inherently involve conflict with the existing ethical or moral system of the game world, which in itself describes both a game mechanic and a concurrent narrative thread. (A perfect society would actually be the worst possible setting for a good game.)

Today, rich, realistic game worlds – even if set in a fantasy universe – demand an Ethical Avatar, in the same way that audio recordings demanded stereo production after 1967. Once listeners could hear the fullness of the space created by separate audio channels, no one wanted to return to the mono sound of 1966. In that same way, now that players have had a taste of the depth of gameplay and intensification of narrative that comes from procedural paradigms, scripted games seem unsatisfying and one-dimensional in comparison.

As noted earlier, however, an Ethical Avatar does not necessarily promise *more* instances of narrative conflict than a world with a Non-Ethical Avatar. The difference is not in the amount of conflict, but in how conflict is handled by the game system, and the effect the game system then has on the player subject. *The Division* (2016) promises a lot of potential conflict because it includes a detailed societal background, but because it was designed around a Non-Ethical Avatar that background is not woven into the mechanics or challenges. Instead, in *The Division* the game world as antagonist remains unaffected by the complexity of its design or its natural moments of conflict.

An Ethical Avatar, on the other hand, would translate those same narrative moments into conflicts inside the game mechanic (and vice versa) – and consequently create meaningful challenges, which spring from situations the player subject initiated. Game mechanics (and their limitations) would thus spring from a narratized game world: from its laws, rules and rulers, and from the tensions defining that world. As the player subject the player will submit to those rules, but will also comprehend that submission in the context of the game world, as opposed to being constrained by fiendish game mechanics that a game designer threw at them. Again, *phronesis* intensifies immersion, and any urge the player has to change the world is echoed by procedural ethics, which reinforce the world *and* its mechanics.

In terms of production, all of the above means that design teams can no longer segment development into gameplay and narrative. Instead of throwing a story at a finished game in the last couple of weeks, hoping it will stick somehow, a fully integrated Ethical Avatar reaches deep into questions of development workflow. Instead of alternating narrative and gameplay, design (or system design) becomes an iterative process in which each part feeds into and responds to the other. At the design stage, developers must ask how game mechanics will react to changes in the world, and vice versa – and how that will affect the game as an antagonist. How can interactions and effects be communicated so they don't require a lot of non-diegetic interface elements, or expensive assets in order to be intuitively understood by the player? How does the game communicate changes in the game's challenges?

All of these questions spring not from a story imposed on the game, but from the game as a functional machine. In that sense, thematic questions are still valid, but the focus is not on a predesigned story. Asking what a game (or game design) is about leads not to questions of narrative, but to game resources and the mechanics that support their manipulation. From that spring inevitable questions about strategies and conflict, player choices and options, and even the game's flow. How is progress communicated? When is the game won or finished?

## THE ETHICAL AVATAR FREES NARRATIVE DESIGNERS FROM IMPOSING A HERO'S JOURNEY

For a long time game designers were taught (and Wolfgang is guilty of teaching this as well) that they should base a game's narrative on the iconic hero's journey famously described by Joseph Campbell (1949), and replicated over millennia in cultures all over the world. By deepening our understanding of how to implement an Ethical Avatar we free ourselves from this constraint for a very simple reason. Instead of imposing a hero's journey *on* the player subject, we allow the player subject to experience a hero's journey organically through his own interactive choices.

Almost any game world will present opportunities for interaction. As realism increases, the game mechanics themselves create the call to adventure, and that includes mechanics, which deny, refuse or frustrate the player as long as those impediments make sense in the game world. Today, narrative designers must rely on and exploit game mechanics as much as they do a clever turn of phrase – and perhaps more so, because game mechanics and the power of real interactivity holds exponentially more narrative potential.

While an Ethical Avatar intensifies feelings of immersion and reinforces suspension of disbelief, it does so not by imposing a narrative on the game, but by deriving a narrative *from* the game. Instead of being motivated to advance the story by triggering a cutscene or completing a specific quest, through interaction with the game world players aspire to personally meaningful goals. This non-narrative motivation to play and achieve in itself becomes a narrative over time, and thus becomes the player subject's own heroic journey.

For narrative designers an Ethical Avatar also requires a paradigm shift. Instead of dictating a hero's journey to the player, narrative designers must – like everyone else on the team – work to ensure that a game's mechanics make the effect of player choices resonant with the world in a way that is coherent and meaningful. (In this it should be equally clear that narrative designers must be involved at the earliest stages of design and production.)

Any fully integrated implementation of an Ethical Avatar creates feedback loops between mechanics, narratives and challenges. Because those feedback loops are driven by the player subject's representation in the game, however, an Ethical Avatar is more than just an ethical feedback system, it's an ethical experience simulator. (We could also create a simulation with no opportunity for external input, but that wouldn't constitute an Ethical Avatar.)

While a predesigned narrative in any medium needs an audience, most predesigned narratives in interactive works are no more interactive than a book, where the reader must turn each page to get new information. The pageturning in many games is much more complex, requiring the completion of quests or long-term objectives, but still only *reveals* information. An Ethical Avatar requires player input in order to function and generate narrative moments in the overarching player journey, and to constantly recalibrate the game as a worthy antagonist.

The Ethical Avatar is a critical advance – as a set of design tools – toward the goal of telling interactive stories. With its numerous and consequential opportunities for meaningful player choice, an Ethical Avatar presents us with the ability to deliver an on-the-fly narratization of a game's world, mechanics and challenges. It is simply up to us to identify as many of these tools as possible, and learn how to best use them to advantage.

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# Game Spaces

# Rules Shape Spaces – Spaces Shape Rules

*Ulrich Götz*

## THE CONTROL ROOM

The set of rules in video games provides an opportunity to study the effects of rules on their environment. The clearly defined framework of a game world constitutes some sort of laboratory situation in which regulative dependencies have been set and the consequences and ramifications of their laws can be observed.

The narrative motifs of these regulated, synthetic cycles are often derived from real world circumstances, though without reproducing their original complex dynamics. In the course of a game, however, sets of rules can be gradually extended until their fabrics reach the level of simulations of real-world systems – and these constructions may then be deconstructed again, with their fragments becoming material for further experiments.

For the practical implementation in the development of a game, but also for the playful toying with sets of rules, it is of central importance that controllable situations are created in order to allow for the free creation of individual routines or approaches. This requirement is important both for the developers and for the users of a game. Developers have to tackle the challenge of creating systems, which can be mastered by building up skills over time, and they also have to provide a reservoir of diversified, and sometimes surprising options for action. If the developers succeed, players will be encouraged to slowly master these systems, but they must also be able to develop their own strategies and methods, and to gain individual possession of the virtual space. *As they say, every good game needs an element of play*.

## THE PLAYING FIELD AS A SPATIAL SET OF RULES

Studies on game mechanics describe rules and their effects on gameplay. However, such analyses often do not focus on the layout of the playing field[1], which is a prerequisite for experiencing the set of rules during gameplay. Without a detailed description of the nature of the virtual spaces in which rules unfold their effects, a thorough reflection on game mechanics cannot be achieved.

Even though the spatial design of video games often makes references to real environments, the development of such game spaces is set up quite differently compared to the process of creating spatial designs in the real world. In games, the design of rules is neither a reaction to already existing spatial conditions of the environment, nor would it directly depend on any already existing behavioral patterns. Instead, the two complementary areas of game rules and game spaces are synchronized and form a necessary condition for each other: to achieve optimal balance, game rules are developed simultaneously to the development of (test) environments, i.e. in direct dependence to the virtual world for which they are intended, and in accordance with its design paradigms.

In the successful development of a video game, the mechanics of rules are closely intertwined with the design of the game space. Despite this mutual dependency, it is clear that the design of rules is usually superordinate to the design of space. Accordingly, new "levels" or "maps" can easily be added to a game, but essential changes to the basic rules cannot be made during the course of a game. This leads to the view that the prevailing rules in games govern the nature of virtual environments – and not the other way round.

## DESIGNED ENVIRONMENTS – REGULATED ENVIRONMENTS

In order to further illustrate the mutual dependence between rules and spaces and their iteratively achieved balance in virtual reality, it is worth comparing them to analogies of the real world, thus revealing new perspectives.

From this angle, our artificially designed environment appears as a set of rules, reflected in the spatial design. We live in a fabric of agreements and de-

1 The term "playing field" is used comprehensively here, including all possible types of playing fields, two-dimensional as well as three-dimensional ones, figurative as well as non-figurative ones, etc. To denote this expanded meaning, the term "game space" is applied further on in this article.

pendencies on functional, physical, cultural, economic and social rules. The interaction of these rules manifests itself in our environment, which is shaped by its use, conventions, adaptations and traditions. The designed environment can be compared with the design of a playing field for cultural, social, economic and other rules that exist simultaneously or in parallel, in harmony or in conflict with each other.

In the real world, the emergence of regulations and the design of the environment also mutually affect each other, even though this happens with considerable delay: for example, social change only gradually shapes the artificial construction of the environment, and vice versa social action finds its optimal response to local conditions only over long periods of time. However, due to this connection, cultural practices, social orders, geographical features, etc. can be clearly detected in the designed environment.

Very similar dependencies exist in the relationship between the design of game rules and the design of game spaces in virtual environments, but with one important difference. The immediate connection between these two does not arise as a consequence but as a simultaneous correspondence – game spaces represent a spatial expression of the set of rules. The various options for action in games can only be performed if the design of the game space supports their application as well as possible: a hide-and-seek game needs hiding places, and an adventure game needs an environment worth discovering.

## WHERE COULD WE PLAY HIDE-AND-SEEK?

The matching of game rules and game spaces is direct and immediate. It is one of the prerequisites for the much cited game flow, and it contributes significantly to an immersive gaming experience. But which typologies of game spaces can be traced back to their connection with game rules? Do not games impress with entirely unique worlds, which seemingly only follow imaginative and detail-obsessed creative ideas? How could these worlds be traced back to a restrictive catalogue of shapes that depend on game rules?

Even very limited options for action allow for a wide variety of design solutions of the game space. The impression may occur that the different levels of a game each follow a free creative approach, and yet they are all shaped by the set of rules in the same way. This results in a general self-similarity and modular uniformity of spatial design.

Just remember *Tomb Raider I* (1996), in which Lara Croft explored overwhelmingly highly embellished environments (compared to other games at that time). But the structural uniformity of the game space was evident: a limited complexity of renderable textures, along with Lara Croft's limited range of motion, resulted in a clear-cut block structure of the environmental design. Here, Lara Croft climbed from ledge to ledge, leapt over gaps, or jumped down without being injured – the shapes of walkable paths could be clearly detected in the design of the environment.

Today it is common for games, and especially those with an exploratory character, to put a lot of effort into disguising the limitations of their game spaces, since it obviously contradicts the idea of playfully free choices when predetermined plot options are already apparent in the way the environment is laid out. At the same time, it should not be forgotten that playable areas are not limited to 3D-modelings of game levels, but also extend to all kinds of peripheral in-game interaction options such as menus, chat and communication functions, the enabling of trading and exchange etc., which open up individual game patterns for the player.

These expanded areas of game interaction ensure that, for example, the multiplayer universe *E.V.E. Online* (2003) allows for calling on the 'Space Pope' – a player who gained a certain fame in the game by behaving very differently to the vast majority of other players. While many of *E.V.E. Online*'s game plots are focused on the planning and execution of interstellar campaigns and battles, the Space Pope stands ready when players seek help, mediation, or advice. The rules of *E.V.E. Online* enable such user behavior and open up the game space in which a mediating space pastor can exist.

The complexity of the design of game spaces is growing steadily. The biggest challenges so far are Open World Games, in which huge continuous areas can be traversed, with goals individually set and with seemingly free decisions. The virtual topographies of a variety of landscapes blend into each other seamlessly, referencing the most precise nature studies. Where could the formal principles of game rules be spotted in such overwhelming spatial designs?

The answer is provided by the narrative of this genre which features the tension between curious exploration and surprising conflict: in support of this concept, such virtual landscapes are precisely scaled to bridge the narrative distance between one event location and the next, while the radii in between provide the necessary relaxation and respectively serve to build up the suspense for the next event. When the arrangements of such game spaces are examined from a bird's eye view, the homogenous distribution of narrative focus points (settlements, landmarks, cave entrances, etc.) immediately stands out.

Such design principles are particularly evident in so-called 'Battle Royal Games', a sub-genre of Open World Games that intensifies the dependencies between game rules and game spaces (Fortnite 2017; Playerunknown's Battlegrounds 2017). Here, dozens of opponents compete in an open world terrain, with the goal of the game being the "Last Man Standing" – only the player or the team wins that survives all in-game conflicts until the end of the gaming session. A dramatic escalation of the gameplay is achieved by two conflicting conditions: the equipment necessary to win the conflicts must first be found, and it is scattered over a large playing area at the beginning of the game. There is a circular playing area, which, after a while, continuously becomes smaller and slowly shrinks to a random point. Consequently, the conflict becomes more and more inevitable until, at the end of the game, the remaining best players confront each other at close range.

How could this dramatic game genre be set up if the design of the game space was not exactly matched with the design of the game rules? The finely balanced set of offensive and defensive options would be completely useless if the design of the environment did not provide a unique typology of surprising covers or mercilessly defenseless areas.

## THE PLAYER'S EXPERIENCE, COURTESY OF THE DIRECTOR OF PHOTOGRAPHY

The experience of game spaces does not only depend on the spatial layout of game levels. A further, particularly determining effect results from the way in which the (spatial) model of a game world is converted into a visual experience.

To create this experience, does the game use pre-produced images with exactly arranged graphical layouts? Does the experience depend on a continuous, individually determinable stream of images, which is rendered by the computer at the moment of action? Do the images obey the geometric laws of an axonometric or perspective projection – or do they follow another visual logic? Does the camera have a sort of life of its own, automatically reacting to player actions with pans, zooms and other optical effects – or can it be controlled as precisely as the game avatar itself? What stylistic means did the virtual lens inherit from photography or film – or why else would you experience the 'Vertigo Effect' as soon as you step on the gas pedal during a racing game? Which hybrid aesthetics emerge from the combination of two-dimensional with three-dimensional visualizations, and to what extent do they follow on from technology used in animated cartoons?

The experience of the close relationship between game rules and game spaces is defined by yet another factor. It is subject to the form of visual presentation, which ultimately determines the quality of the interactive experience.

It is easy to get an idea of how much game genres depend on their visual representation, if you swap or combine typical visual representations of different game genres in your mind. Who would ever have played a racing game in the form of a point'n'click game? A strategy game without a general overview? A horror game from a bird's eye perspective?

In the social simulation game *Sims 4* (2014), the game space functions as the carrier of a complex set of rules for creative, narrative, social and economic gameplay. Which methods of visualization typical of the genre did the virtual camera of *Sims 4* borrow from the strategy game or from the film drama, and how does it unite these different aspects?

## FROM EXPERIMENT THROUGH PERFECTION TO BOREDOM – AND BACK?

It is tempting to conclude that topics, plots and visualizations of games are getting ever closer connected to each other and, eventually, will lead to a clearly defined range of game experiences: game rules depend on the plots and are closely related to the design of game spaces, which in turn must be presented in a certain way to guarantee their playability. The present technologies provide visually stunning, almost hermetically perfect examples for this assumption. These compelling imageries seem to be the result of optimized combinations of game genre, game rules and game spaces.

However, this conclusion contradicts the fact that the still rather young medium of video games has developed rapidly in a very short time, today offering possibilities that would have been unthinkable just a few years ago. But relying on the sheer power of visual persuasion of the seemingly perfect imagery also seems to harbor a certain danger for the development of games, because it diminishes the vital feed of curiosity and experimentation. Could that be the reason behind the formal similarities of many of today's games, even though their productions are getting more and more elaborate?

How can future game design open up once again the tight connection between game rules and game spaces, to make way for unknown combinations instead of simply refining well-known clichés? Indeed, a puzzle adventure doesn't always need to take place in a quiet, contemplative setting, it could also be hectic and stressful. A shooter doesn't always need to be set up in a three-dimensional space with direct lines of sight between the opponents. A setting such as ‘speed competition’ doesn’t naturally need to result in a high-speed racetrack, with players training their drifting skills.

The question is whether breaking up such conventions is in fact an impossible task or whether it only appears to make no sense at first sight. If the latter is the case it might simply be the typical start of a new design task in which creative solutions must be sought until new purposes and user cases arise. To return once more to comparing the design of virtual worlds with real environments: here too, the aim is to shape behavioral standards through innovative design, which then leads to a new code of conduct.

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# Game Mechanics of Serious Urban Games

Designing for the Ludic City

*Mela Kocher*

## THE PROMISE OF SERIOUS URBAN GAMES

Arguing that both serious and urban games are new game genres would certainly be an exaggeration, since both genres have a design tradition of more than a decade to look back on. Digital urban games experienced a big boost in the Western world in the early 2000s with alternate reality games such as *I love bees* (Szulborski 2005) or with ubiquitous computing technology, e.g. GPS-based geocaching (Dave 2000). Digital serious or learning games date back even further into the last millennium with learning software series such as the German *Addy* brand, or, for an early educational Apple II game, with *Oregon Trail* (1982).

Since then, both urban and serious games have become more elegantly refined and also commercialized in their continuing development. Urban games turned mainstream globally with the advent of *Pokémon Go* in 2016, and also gained momentum on a national level in Switzerland. In 2015 in Zurich, 2,000 players ran through the streets for the game event *Urban Hunt,* a year later there were more than 7,000. Furthermore, the common treasure hunt theme proves to be very low-level entry, and successful in general for group outings, such as business events or touristic formats, and it is also becoming increasingly more widespread – even though (or maybe, because) it might not represent the most innovative game mechanics.

Similarly, the serious games genre has been growing ever since, producing some massively multiplayer showcases such as the participatory science game *Foldit*. In general, the demand for serious games is even greater than for urban games, not only in today's academic game studies conference scene (no conference without serious games track!), but also in the industry and in education: there is, or is a call for, a serious game for every need.

In that way, both genres – serious and urban games – seem promising for correcting societal deficiencies with super-power solutions: urban games shall bring back nature, physical activity and social responsibility to people and help them regain awareness of their every-day (urban) environment. And serious games are a kind of "holy grail": with serious games, cancer shall be cured, housework will be fun, odd behavior can be corrected. "Gamepocalypse" is what this development is provocatively called by gamification expert Jesse Schell (Schell 2010). In that sense, people attest games a magic power (to save the world, for better or worse) – which, in a way, might be close to the religious power of the "Magic Circle", a term used by Johan Huizinga to denominate one of the metaphors for the symbolic game space (Huizinga 1949).

Now, what could promise to be more powerful than merging those two genres into a new subgenre? Just a few years ago, in 2013, Ferri and Coppock identified the rise of digital and non-digital "ludic practices in urban spaces" called "serious urban games": "In that context, a small but promising research area deals with interactions between game design, urban planning and socially relevant issues such as urban rehabilitation, innovation, integration, inclusion and civic engagement." (Ferri and Coppock 2013: 120). It seems that serious urban games are developing into an area that is relevant for both design and research. Real-world topics from urban spaces are no longer only simulated on the screen (such as urban planning games like *SimCity* or energy-saving games such as the EU Horizon 2020 funded *Domino*), but played out, tested and experienced right on-site, in the city.

There are a few indicators that suggest the potential of this new subgenre. Since the players play outdoors, maybe even at larger events, they are visible: for the researcher and for the developer to gain feedback on the gameplay, but also for bystanders, therefore raise awareness of the game. Having players perform tasks in the city creates the possibility for outsourcing data generation, a task which otherwise might have to be done by researchers. In general, playing games in the city is seen as attractive for non-hardcore, casual players or even people who don't consider themselves players at all. In Switzerland, where playing games is often regarded as childish or a waste of time – unless you learn something – serious urban games carry the positive attribute of teaching something in an easy and fun way, and help to experience the usual work/life environment as a new, ludic (playful) city.

As promising as this area might be in some ways, it nevertheless presents difficulties for production, since urban and serious game genres are both connected with specific design rules, or even constraints, that differ from "common" digital game design. So what challenges and possibilities lie in the combination of those constraints? What are the implications for designing serious games for the ludic city? The next chapter will address the challenges of serious urban game development and lay some theoretical foundations, drawing from the MDA framework by Hunicke, LeBlanc and Zubek (2004), and the expanded DDE model by Wolfgang Walk (2015).

This will prepare the ground for the following discussions of several case studies in the field of serious urban games, which were conducted by the Specialization in Game Design of the Zurich University of the Arts (ZHdK) between 2015-2017 (http://gamedesign.zhdk.ch). During that phase, very different game/play scenarios were designed in the field of intercultural games: *LucyZH* (short for: Ludic City Zurich) is a multiplayer treasure hunt-style, mobile phone-based urban game that has been played twice a year since 2015 to welcome the new international ZHdK students to the city of Zurich. *Dragon Polo* is a small-scale research-oriented play scenario which was developed and played in Hong Kong in 2016 to observe play in non-game areas such as busy public spaces. *Stair Quest* and *Step Up and Play!* are two different game/play formats resulting from the cooperation of ZHdK with the Hong Kong Polytechnic University in an R&D project on the topic of the stair culture of Hong Kong Island, Central and Western District (see for all mentioned projects: http://urbangames.zhdk.ch).

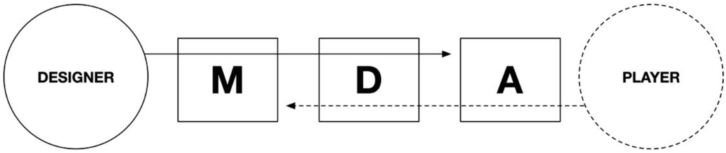
This article will not solely consider a developer's perspective by sharing post-mortem insights, but take the scholarly viewpoint of games studies as well. By analyzing the game mechanics of these different game scenarios and the resulting gameplay, this essay aims to contribute to the research of the motivational design for serious urban games. Motivational design, after all, is about the construction, maintenance and experience of the "Magic Circle": How does a game need to be engineered and envisioned to invite the player to enter, and stay, in this magic circle, and participate in an extraordinary, transformative experience? And which considerations on the level of mechanics and rules (that guard punishment and rewards, affect the possibility range of player's actions) create a well-balanced gameplay?

## MDA FRAMEWORK AND BLANK SPACES OF THE GAME DESIGN PROCESS

The formalistic framework called MDA proves to be extremely helpful for understanding the systemic connections between the affordances of the player (playing a game) and the designer (designing a game). MDA stands for Mechanics, Dynamics and Aesthetics.

"Mechanics" is the "material" of the game: the code, the rules, the data structures.[1] "Aesthetics" are the emotional responses evoked in the player that may be the ultimate target of the designer. "Dynamics" describe what happens when the player interacts with the game; it is the "run-time behavior of the mechanics acting on player inputs and each other's outputs over time." (Hunicke, LeBlanc and Zubek, 2004). In that sense, it is what we understand as gameplay.

*Figure 1: Mechanics, Dynamics and Aesthetics from the perspectives of designer (left) and player (right).*




Source: Kocher

This MDA model describes what happens in the interpretational process between any kind of media and the user/viewer/recipient: it is an interactive engagement between a piece of work and a user. The resulting process – above described as dynamics – is what reader's response theorists call the "true art work" (Iser 1994): it constitutes a different art work in every single reception process, even when the same reader re-reads the same book which (materially) stays exactly the same. The reader still has a (previous) knowledge about the book, has gained new cultural repertoires since the last reading, might be in a different state of mind and receptive frame – thus the whole reading process has a different interpretational and aesthetic effect. Authors are in full control over the books they write ("the mechanics"), and in some way might anticipate what could happen in the "dynamics", the interactive part, especially when there is a contemporary audience in the same cultural sphere. But in no way do authors have control over the effect on the readers and their interpretations; they represent blank spaces (in German discussed with the theoretical aesthetic model of "Leerstellen", cf. Iser 1994).

1 Admittedly, on the level of the "mechanics", there is more than just code and rules: the visuals, the narration, the UI, the worldbuilding – these factors are extensively covered in the further developed DDE model (Walk 2015). For the sake of our argumentation, which focuses on the systemic, mechanical-based approach, we continue discussing the MDA model and refer to DDE where necessary.

In video games, this is even more the case. While a book, or a piece of music or a film, is mostly a linear artwork, video games are in most cases multilinear, and offer numerous ways of interaction and reception. Every time players encounter a rule, engage with a piece of mechanics, initiate an action, interact with a character or another element of narration (all on the level of dynamics in the MDA framework), they literally produce a different piece of "artwork", a different game. One significant implication of the MDA model for the game designer is the need for (paper) prototyping and playtesting these "dynamics". It is a reality check to see if the players can actually play the game, if the rules function, e.g. govern the possibility space of the player's actions the way they should, and which game mechanics are emerging – actually an obvious statement, but nevertheless often neglected due to time and other design constraints.

In short, the MDA model illustrates that on the level of interaction between player and game, there are many blank spaces the designer doesn't know about at the beginning of the development process. If there are certain aesthetics and experiences of the player that the game wishes to evoke, and if there are circumstantial factors, e.g. of the gameplay scenario, that put constraints on the interaction, designers must try to foresee, and later test, with which mechanics they want to answer these challenges.

## DESIGN CONSTRAINTS FOR SERIOUS URBAN GAMES

Designing urban games is very challenging due to specific reasons, and the same applies to designing serious games, but for different reasons. Obviously, those challenges don't cancel each other out, but generate very specific creative constraints.

To start with, the gameplay situation must be considered. For a serious game, it matters greatly to the design process if the participation of the players will be voluntary or compulsory: is the game activity embedded in a compulsory context, e.g. takes place within a school frame or at any kind of institutional event where the player is more or less forced to participate? Or does it have to compete with other leisure time activities, e.g. with commercially available video games? The specific gameplay situation decides the level of necessary perfection of the game. For a game in a school context it may be fine if the graphics aren't the best, while the developer will have trouble finding players if the game doesn't even look good and game participation is voluntary.

Even more important is the role of marketing, especially for serious games taking place during leisure time. If your target community has not heard about your game, it can be as attractive as can be, but it is unlikely to be played. Again, this is quite an obvious statement, but nevertheless not an easy task (see, for example, Schwab 2016 for an analysis of indie game community identification and engagement processes).

At the mechanical level, considerations regarding the reward/punishment system are different for serious games than for purely entertaining ones; especially if some player tasks are more work than fun, the game must be careful when employing smart punishment in order to keep motivating players (which is not the same as avoiding punishment as a whole!).

Within the range of the (desired) outcomes for the player, or the "aesthetics", Hunicke, LeBlanc and Zubek (2004) identify a set of emotions, such as sensation, fantasy, or fellowship, amended by Walk (2015), with organoleptic, emotional and intellectual experiences. Since serious games are games with "an additional purpose" and with game mechanics (in comparison to gamification approaches which have no actual game mechanics, Marczewski 2015), there are a range of additional emotions, experiences or reactions in the players to be considered, since the players are supposed to learn something. And, furthermore, that effect is not only intended to take place inside the magic circle, but is meant to expand the magic circle and be transferred outside of it, into the everyday world.

This has, on the one hand, an effect on how to observe, or control (if the desired experience is actually taking place) at or directly after the game event with (participatory) observation, interviews, data interpretation etc. and, in the case of mid- or long-term learning goals, in follow-up studies. On the other hand, designing for game-based learning already requires a set of compromises (How much fun? How much learning?) on the level of mechanics; these usually involve many discussions between designer/programmer and researcher/customer.

Furthermore, a digital game that will be played in a public space is more difficult to test during the design process. Iterative playtesting of the designer and programmer proves to be much more time and effort consuming since, at some point, they must go outside to get the full experience, even though some of the interplay of the mechanics can be simulated in the game engine. The same applies to playtesting a beta version with voluntary testers, which requires considerably more organizing. Also, designing a game for another cultural context (as we did when designing a Hong Kong-based game in Zurich) is obviously problematic, since the first playtesting takes place at home, e.g. in another environment with different conditions to the actual play space. But even for local urban games, it is difficult to estimate and decide the actual number of players for the specific game event; a decision which will affect the production costs and later the server-related game performance.

In urban games, the city becomes the playground, which has many implications for the designer. For one thing, the designer cannot control the game world: weather conditions (which will probably influence the motivation of the players), day and night (and opening hours of buildings), GPS limitation in closed or dense spaces, removal of buildings or change of their functionality are things to consider, as is playtesting, if possible in every imaginable condition. For example, in direct sunlight it might be impossible to read QR codes on a poster behind shop windows because of the light reflection. Having the city as a playground also has effects on the choice of the game technology. If the designer's aim was to design a purely analog urban game, the problem of game assets would have to be solved: if there is a need to disperse physical objects in the city, the designer might want to hide them (geocashing-style), or attach them solidly to urban infrastructure (treasure hunt-style, such as *FoxTrail*), so they don't get stolen or vandalized, or choose game mechanics that can do without extra assets. From that point of view, it might prove more practical to consider creating a mixed-reality game with mobile phone assistance for the urban space.

Furthermore, the designer must take into account the physical implications that an urban game might have for players and which will affect the gameplay. Players are not represented by digital avatars anymore, but physically walk or run around themselves outside. Player stats such as XP and HP are not virtual but depend on factors that the designer has no control over (physical condition, bodily needs such as food, drinks, toilet). Some players will get tired faster than others and there must be mechanics that make sure both groups of players are still motivated to keep playing.

Also, the usual digital non-player characters (NPCs) are now real human beings. How are they incorporated in the game design? Shall the players interact with them, on a voluntary or compulsory level? Which ethical implications do these decisions have? In this regard, urban games quickly become pervasive games, blurring the boundaries of the magic circle (see also Montola, Stenros and Waern 2009).

We can see that the affordances of both serious and urban games affect all levels of MDA: specific considerations are necessary in the areas of mechanics, dynamics and aesthetics/experience of the player in order to build a good motivational design for the game. At the same time, both genre traits challenge the borders of the magic circle: serious games, because the outcome of the gameplay is not supposed to be purely intrinsic, but must also serve real-world purposes;

urban games, because temporal, spatial and social aspects of the magic circle are not always well defined (Montola 2005).

The following chapter will show how different game/play scenarios have dealt with these constraints and how the resulting motivational design was formed.

## MOTIVATIONAL DESIGN

### LucyZH

*LucyZH* is a mixed-reality urban game for international students. As part of the "Welcome Days" at the Zurich University of the Arts (ZHdK), its function is to replace the traditional sightseeing tour. The game was developed in 2015 for the International Office by Master Alumni students and staff of the Game Design Specialization and has been running twice a year ever since.

As for the development of a serious game, the request from the International Office was clear, but left the developers some freedom: international students, who had just arrived in the country a week before the game were supposed to get a sense of the culture of Switzerland and especially of Zurich in a playful way, for the duration of an afternoon. Formal restrictions proved to be more confining: for each of the play events, the actual number of players could range between 30 and 80, and would not be known before the game.

The design process experienced several iterations. Due to financial reasons we tried to consider an analog approach first and pursued a narrative, ARG-style strategy. Groups of players would receive boxes with tokens at the start and would then go on different missions; their paths would intersect and foster interactions between groups, and by following missions (e.g. sending packages by mail, buying clothes in a thrift store) they would partake and immerse themselves in the culture. Unfortunately, the forecast uncertainty about player numbers proved to be too complex a design factor.

The second concept focused on a – still analog – urban quartet-style card game, where cards would either be hidden and were to be found by players, or handed out by helpers who stood at strategic places in the city. Considerations of vandalism and helper logistics lead to the dismissal of the analog approach.

The third and final concept led to a map-based mobile browser game. This allowed us to tweak the code up to the very last minute, which was needed since production time was less than 6 months at that point.

Dividing the players into different groups with just one sim card-carrying iPad per group allowed us to keep the active player numbers (for the system) small, and thus avoid any server performance problems during the game. Keeping the card-based macro mechanics, we introduced competitive game mechanics: players can pick up virtual cards at 100 places in Zurich (which together form 25 quartets, each card representing an interesting location or cultural event, with pictures and informational text). The group who picks up the first card at a place will get the most points from this card, the second group less, and so on. In the end, the group with most points wins. This ensures different dynamics: some groups always find out that they can take the tram, and start "digging their way" through the city from the other side of the map. The players can either be very lucky and pick up the four cards belonging to one full quartet by chance, or they can switch into a more cooperative game mode and start swapping cards with opponent teams.

Playtesting on a larger scale didn't really happen before the first game event (due to critical time management), apart from the frequent tests among us game designers. In a way, each game run (every half year) has served as playtesting from which we could gain crucial information, allowing us to continuously adapt and refine the game mechanics. An insight we gained from the first game event pointed to the fundamental tension between fun-oriented and purposeful game design. Since players run and aim at catching as many cards as possible, trying to win the game (which was great from a "classical" game design perspective), they would end up not reading the cards and not getting the cultural information (meaning a lack of the desired effect on the player, which was the aim of the serious game). Therefore, as a new menu function we introduced a card archive, where all the cards that the group has picked up were saved. Players could then browse through the archive and read about the places they had visited, a feature that they greatly appreciated (as stated in follow-up interviews).

A group member shared her experiences at the *LucyZH* game event on February 16, 2018: "At the beginning, our experience was all about competition. Getting to the spots first, catching points, achieving a higher ranking. We didn't take time to read what the places were about. Later, when we got a bit more tired, we took the time to read what was written on the cards and really enjoyed that part, too." (player, February 2017).

The introduction of the card archive takes into account the need of some players to take more breaks than others, and ensures that they continue to be motivated and engaged, and not feel punished since the game is basically centered around physical activity.

*Figure 2/3: LucyZH player race across the city by tram, browsing through the virtual card archive/ LucyZH logo with an intercultural fantasy-animal.*

Source: Kocher

Another insight we gained was the fact that the mechanics of urban games had better be kept simple. At first, we were going to implement a complex quartet card system, where each card had different values (how expensive would it be to visit, how well do you have to behave ("Swissness factor"), how many people is the location able to hold, what are the opening hours etc.). If groups would physically meet on the streets, they could exchange cards depending on a value-based "battle of the cards". Due to lack of production time, we drastically reduced this complexity and left this battle mechanics out (but introduced a simple trading mechanic instead). Keeping in mind that urban players walk and look around the city, orientate themselves on the map, try to collect points, and also chat and get to know each other (all being new at the school), this actually gives them enough to do for 3 hours. After the second game event, we introduced an extra set of 20 cultural quiz question cards that pop up on the screen every 5 minutes. That would add an element of surprise and randomness (ludic factor), while at the same time strengthen the aim of intercultural education (serious game factor).

The end of the *LucyZH* game event is usually marked by a small winning ceremony with prizes and a dinner together (pizza delivery inside the school in February, BBQ in the forest in September). The feedback from the International Office is positive: the participants appreciate the game more than the traditional sightseeing tour, which was non-interactive and didn't leave any lasting impressions. In comparison to that, the players of the *LucyZH* game stated that they got a well-balanced and fun introduction to the local culture and architecture, which motivated them to visit those places again. Also, by having covered quite a large area of the city, they felt that they learnt to orient themselves along the axes of the city.

It surely helped the whole design process that the requirements of the serious game side (the client) were so open. It was more important to the International Office that the international students had a good time, felt socially welcome and playfully got a sense of the local culture, rather than requiring a solid knowledge of facts.

Having had a limited production budget and time constraints, we kept the user interface and the graphics very simple. Since the game is conducted within the institutional "Welcome Days" frame of the International Office of the Zurich University of the Arts, we didn't have to worry at all about marketing and competition.

The game works from a purely entertainment-oriented, but also from a serious games perspective, and that is most important. It is definitely expandable: for example, it might be more interesting from a game design perspective to introduce more "play" and more "pervasive game" mechanics, e.g. including the interaction of strangers (locals), to actually have the players experience a more ludic city.

## Dragon Polo

*Dragon Polo* is a small analog research-based play scenario carried out in Hong Kong in July 2016. It was created at the invitation of the Connecting Space – a temporary Hong Kong-based art gallery and intercultural exchange hub of the ZHdK (http://www.connectingspaces.ch). At that time, the Connecting Space had a strategic research interest in urbanism and negotiations of public space through a series of art and game/play happenings, and welcomed contributions in the area of design- or art-based research.

The following research questions guided us in forming a game concept: How do the different game cultures, but also the notion of public and private space in each culture, affect the experience and the design of urban games? What insights can we get from experiments that use those spatial and cultural paradigms, and how can urban games contribute to a different understanding of space, for different parties (players, urban designers, decision makers, further target groups)?

From the perspective of a well-functioning motivation design of a game, "external" constraints of *Dragon Polo*, which were prescribed by the research purpose, were fairly small, and the research goal was explorative and open. In that way the set-up was similar to *LucyZH*, whose external constraints were formed by the intercultural learning purpose.

The challenge of the *Dragon Polo* design process was largely the "remote design" aspect; designing a game for an environment so different from the familiar one presented many blank spaces: What tradition do local players of Hong Kong have in terms of urban games? What playgrounds would be suitable for our project? Especially as far as our research quest was concerned – investigating the notion of public space through play – there was definitely a certain uneasiness regarding the challenging local conditions, maybe even unknowingly breaking laws, in a Chinese city.

We took these considerations into account when planning the development process. The preparation and concept phase at home (Zurich) was to be conducted in active exchange with Hong Kong-based collaborators. Then, during the course of two weeks in Hong Kong, we planned to collaboratively design the game together with our co-players in a few workshops and game events (besides individual location scouting and doing local research).

To hint at the research task on a macro game-mechanical as well as narratological/symbolical level, the game was to be called *Dragon Polo*: Hong Kong as a space heavily influenced by China (dragon symbol) and Great Britain (the sport of polo, actually also being played in Hong Kong), yet still emerging as an entity of its own. As for the game mechanics, it was conceived as a polo spin-off where two players would form groups, one pushing the other in a dragon-style decorated shopping cart or a trolley, the other trying to hit the ball with a bat towards a goal. When we communicated this to our Hong Kong collaborators, their feedback was a reality check: none of the street pavements would be even enough, it would be too dangerous also because of the busy streets, and pushing trolleys would not be allowed in pedestrian areas.

We then agreed, and developed the idea in a product design workshop in Hong Kong with about 10 participants, on a simpler, one-player version, where players would each represent a dragon themselves: a creation consisting of a swimming ring with suspenders, with a colorful dragon mask, flying tapes and ribbons attached to it. As for bats, we used plastic brooms, the ball was a large foam ball – therefore we ended up sweeping the streets in a playful way, which definitely added a humorous element to the game, and also clearly marked us players to be part of a game, in a magic circle. This was important, since our activities in the public space were supposed to be a bit disruptive, and we wanted to be clearly recognizable as players.

We tested this project in two game events. As for the choice of the play area, the planned observation and research of public space was supposed to focus on the pervasive expansion of the magic circle in a spatial and social way. We therefore wanted to play at places not meant for play, and wanted to include strangers.

After playtesting first in the backyard of the gallery and refining some of our rules, we took our equipment and set off. We played in the area of Mong Kok on Kowloon, on a Saturday night at 9 pm. It was a very busy pedestrian area, filled with locals and tourists, street vendors and even some street performers – definitely not an area with a lot of play space. In the middle of the streets we set two goals (giant rubber hoops) about 10 meters apart. Our game team consisted of three Europeans (one of them recorded the action in 360° film) and three Chinese people. The three locals were crucial in attracting people and inviting them to play. While many adult pedestrians stopped and took pictures, children were the only ones we could persuade to enter the game with us. Interestingly, the dragon was easily identified by pedestrians (partly due to a reference to traditional Chinese opera, where masquerading as animals is commonly accepted), and they thought it was very funny. When we played, the ball often rolled out of the designated play area, or pedestrians walked through it, but they always kicked it in our direction, thus helping us to uphold the magic circle.

Only a few individuals disrupted our play: an old street artist asked us to stop the game every 5 minutes for his performance, for which he had to take a 30 meter in-run through our game field (he jumped through a hoop on a mattress). This gave the game a very spontaneous and volatile touch. At another point, a group of old men started a heated discussion with our Chinese team members. They didn't understand why we wouldn't want to play in a park, where we had more space, which should therefore be more fun for us.

*Figure 4/5: Late night engagement in the magic circle of Dragon Polo, Hong Kong (Mong Kok)/ Dragon Polo logo.*

*Source: Kocher*

We also tried to play the game in Victoria Park on a Sunday afternoon. It was nearly 40°C hot, and – understandably – none of the thousands of foreign nannies and house maids who enjoyed their free day talking with their friends in the shade wanted to join. Again, some Western friends who passed by, and some Chinese children, agreed to play, but we soon had to reduce the game rounds to 2-3 minutes due to the heat. Once, the park police stopped us, because we put our goal hoop in the middle of a path intersection. We repositioned it slightly, and the problem was solved.

These ludic interventions gave us a first insight into the play culture of Hong Kong. *Pokémon Go* had just hit the streets in town two weeks prior to our arrival (summer of 2016), and it was a big hit, groups of teenagers swarming out in the evenings on their hunt. Before that, urban games were not very popular in Hong Kong, and they haven't been since. There are a few small scale serious urban game scenarios which are very local and mostly analog, e.g. to foster social or political engagement in the neighborhood. Commercial treasure hunts (such as *HK Hunter*) do not tend to take off as much as they do in Europe. Public space is basically not perceived as a potential area for play – possibly, this is also due to the fact that in Hong Kong people commute to work, sometimes for hours. They take the subway, are underground. On the ground level, busy, narrow streets with lots of traffic are also not particularly inviting to play.

Nevertheless, our playful activities could persuade some strangers to join our magic circle for some lively play. Many bystanders had fun watching, took pictures and smiled. For the development, and also for the duration of the game events, it was vital to have local friends who knew the environment, knew how to get materials for the game, where to advertise the events and how to communicate with bystanders.

Speaking of the game mechanics and the motivational design, it was interesting how the rule system was negotiated with the co-players as co-designers ahead of the game in the product design workshop where we started to build the dragon and playtested in the backyard. In the actual game event, the rules had to be refined, because the (urban) game environment (busy streets, traffic, hot weather) was, in a way, quite hostile and challenging, and shook the boundaries of the magic circle: we had to fight to keep our playground, we had to ensure that we got enough players and that the players we got did not get heat stroke in the park event. Therefore, we did not really have an elaborated punishment and reward system, since we were happy just to keep playing, and the whole humorous set-up with the dragon costume (which, of course, fell apart in the heated play), provided a lot of enjoyment and reward. In that sense, the game *Dragon Polo* was much more "play" than "game".

## Stair Quest

The next two game projects were also developed by the Specialization in Game Design (ZHdK), over the course of 2017, in the context of a research and development project on the topic of "stair culture", conducted for the "Hong Kong Stairs Archive" (HKSA).

This game design project was the most demanding in terms of finding an adequate motivational design, since the constraints of the serious game aspects were so ambitious. In response to these research goals, and also to continuously investigate in the ZHdK's own urban game design quest for innovative game mechanics, we decided to create two projects in this collaboration: the smart phone-based game *Stair Quest* and the analog participatory design festival *Step Up & Play*.

One of the aims of *Stair Quest* was to accompany an exhibition of the HKSA in May 2017 at the Connecting Space gallery in Hong Kong. Titled "Always at the edge of things and between places", this exhibition displayed a variety of artifacts and provided research insights on the stair culture topic. Besides generating awareness for the exhibition, the game also aimed, from the "serious" game perspective, at inviting users to contribute to the research project with creative player content and with research-related data for the 3000+ stairs on Hong Kong Island (Western and Central District), thus aiding in their protection and renovation and raising awareness about their socio-cultural importance.

While the macro game mechanics would have the players repeatedly visit numerous stairs on Hong Kong island with their smartphones, the micro game mechanics then were to be: adding stair related personal stories, confirming/denying the existence of handrails, counting steps and defining the specific type of the 12 possible stair categories (such as Street Stairs, Pier Stairs, Maintenance Stairs etc.). To add a "fun" factor, we decided to allow the most frequent visitor to a certain stair to propose a name for it. For all of these actions players would get points, allowing them to compare their individual progress with others in the leaderboard.

While these parameters had been set quite easily, the motivational design was still unclear. Stairs are in general a mere passing-by-location, certainly not an exciting place to visit at first-hand, and not a primary play area. For what reasons would the players actually want to do all that "work" we would ask them to do? (see for this also the discussion in Kocher 2017).

To meet these challenges, we brought in a defining mythological narrative that turned the players into "Stair Guardians". By "reviving" stairs, they would help set free the soul of the long forgotten protective dragon of Hong Kong –

which had died thousands of years ago in an epic fight. Its shattered body had rained down on the city of Hong Kong, and the pieces became stairs over time (also mentioned in the trailer: https://quest.stairculture.com).

As a second incentive we brought in a collaborative game mechanic and connected it to the level system: even though we kept the leaderboard and the individual ranking, several players would be needed to interact with the same stair in order to complete it. Also, points (or "Dragon Dust") had to be accumulated by a number of players in order to progress in the game and to level-up together. The game progression – tying together narrative and game mechanic – was visualized by the image of a Dragon which was assembled as a jigsaw puzzle in 8 levels (8 being a happy number in Chinese culture). We implemented a "News" function as another community-centered tool, where we could add specific requests for the players, e.g. have weekly topics for them to write about, or shout-out the leading player, etc.

*Figure 6/7: Guided game tour for Stair Quest/ Stair Quest logo.*


*Source: Kocher*

Technically, building an urban game for the city of Hong Kong posed a number of challenges: we initially wanted to build the game as an app, but the risks involved with the slow release process on app stores as well as most users' inertia when it comes to downloading yet another app, led us to build this game as a browser application. This in turn brought about rather severe graphical limitations and the complexity inherent in cross-browser development. In retrospect, we question whether it was the right decision to switch from an app- to a browser-centric approach.

Since the game was developed off-site, finding realistic test conditions was another challenge. We first tested in Zurich during the first development phase, then flew to Hong Kong for a first testing at the real location 2 months before the actual game start. Hong Kong, with its many skyscrapers and narrow streets, turned out to severely impact the precision of GPS location services with precision dropping as low as 300 m. Combined with a high stair density, in the playtests players could often not determine which stair they were visiting, and sometimes they were adding data to the wrong stair on the screen. Adding stair polygons to show the stair's exact dimensions somewhat eased that issue.

To add to this challenging game developing frame, marketing of the game was definitely underestimated. Traditional exhibition visitors were not that interested in the game, even though we exhibited it there and had an accompanying "Hong Kong Game Talk" evening to talk about urban games and present the project. Unfortunately, there was no specific urban game community to address either, and the game lacked the necessary momentum for the collaborative game mechanics to take off, where the community would work together to save the dragon spirit, and where it would be exciting to fully research each and every stair.

Basically, we tried to make a *Pokémon Go* game for hunting stairs with a ridiculously tight budget and severe time constraints, and didn't quite succeed. Our collaborating partners from HSKA still valued the game application as a research tool and paid extra (after the game event) for us to implement a feature to take and upload pictures. The researchers keep using *Stair Quest* to chart stair data: since they connect pictures to each stair data they register, the researchers can manually verify if it corresponds to the actual physical street, and the imprecise player location doesn't matter that much anymore.

From the game designer's perspective, the combination of the urban and serious games restraints of this project were too complex to solve satisfactorily. Creating a GPS-based game in a city like Hong Kong, where the precise mapping of the virtual objects with physical correspondents was crucial, and asking the players to do tasks that were not all that exciting, without actually having a community we could address, plus trying to solve those challenges with a limited in-house ZHdK budget in a time frame of 6 months, was, in retrospect, a mission impossible.

## Step Up and Play

There was also another strategy we pursued for the stair culture research project. With *Step Up and Play!* we created an analog mini-games festival which ran concurrently with the exhibition as a series of events. "Step Up and Play!" celebrated stairs as play-zones in themselves, experimenting with a variety of game genres, also adapting children's games and boardgames to specific staircases.

On a larger scale, the festival project was a cooperative effort between the Zurich University of the Arts (Game Design & Transdisciplinary Studies) and the Hong Kong Polytechnic University School of Design (Game Design). In the study semester prior to the exhibition, each institution had been conducting game design seminars as part of their masterclass coursework to develop and research the topic of analog game design for stairs. Besides developing a set of innovative and fun mini-games on the topic of stairs, we also carved out a set of design rules. Games for this particular section of urban infrastructure – also in the setting of a festival – posed very specific constraints:

1. Duration of a game round: 5-10 Minutes.
2. For 2-10 players.
3. No hurry, no hurting!
4. Keep rules simple! Instant understanding.
5. Easy to join! Accessible for newcomers.
6. Make use of physicality of stairs in your game mechanics! Give the stair meaning.

The core element of the festival was a game design workshop in the Connecting Space gallery in Hong Kong, where we invited participants to first create, then go out and play games revolving around stairs. We brought along a booklet containing the "Best of Stair Games" that we had created together with the Swiss and Hong Kong Master students, so the workshop participants (who were not game designers per se) could get some inspiration.

*Figure 8/9: Randomness of the wind as game mechanic for Step Up & Play/ Step Up & Play Logo.*

*Source: Kocher*

This workshop scenario worked really well and turned out to be a source for great "epistemological fun" – the participants were very motivated, and the discussion on rules, rewards and punishments was lively; even during gameplay on the stairs we debated and changed rules. We really wanted to understand how the concept of games changes when you play them on stairs (in comparison to, for example, a flat surface in the city, or on a board game). What is the (emotional) effect if the players start playing on top vs. on the bottom of stairs? How can you play a pervasive version of snakes and ladders on the stairs while including strangers? How can we work with music (in the loud street), with dice or with other elements of randomness such as balloons or paper planes carried by the wind?

In regard to the serious game aspects, *Step Up and Play* didn't intend to convey knowledge or have a specific impact on the player. It rather aimed at generating awareness of an area of the city that is usually perceived as non-game space. Due to topology ("Watch your step!"), people walk them carefully and anonymously, often without interaction, oblivious to their playful possibilities. To address this missed opportunity, we offered games as a mode of social practice and a means to engage with stairs. Since stairs are such a "resisting" playground (small area for play, busy, high degree of physical activity needed, risk of hurting yourself) they provided a great ground for experimenting with game mechanics and the borders of the magic circle in social and spatial ways.

## AWARENESS GAMES AND A "LUSORY ATTITUDE": SUPPORTING THE MAGIC CIRCLE FOR A LUDIC CITY

Our quest for design insights with relevance to the serious urban game genre concludes with a reflection on what worked well in those projects: Which games had a meaningful motivational design, and which insights did we get into the specific affordances of the magic circle of a serious urban game? And what are the possible implications of serious urban games on larger societal scale?

First of all, designing in/for an intercultural setting in general has been very challenging, on the development level (remote, off-site design) and on the political level as well. Even with the feedback of local experts when communicating during the conceptual phase at the homebase, and the co-development with local participants on-site, the design process within that frame will always be accompanied by a lot of blank spaces, simplification of the unknown, and naivety. In addition to this, there is the ideological aspect of serious games: Which learning content is supposed to be conveyed? How shall culture be represented, which values should be conveyed? Each rule of the game is a statement on how the world is intended to be perceived, which is, in a serious game, not just the fictional, but the “real” world.

Keeping those ideological implications in mind, experimenting iteratively with game mechanics in a foreign city is also a way of gaining insight into the rule system of that urban infrastructure, and creating your own ludic city. From a methodological viewpoint, the different games we created served really well as an epistemological tool, no matter how “successful” the games turned out to be.

For this purpose, the MDA model helps us to understand the complexity of the game design process. Its dynamics unfold, according to the model, in the actual gameplay situation, out of player interaction with the game system (its mechanics). While game designers can control the rule set of a game, decide on macro and micro game mechanics, determine which skills are needed for which task, how success shall be rewarded and failure shall be punished, they cannot fully control what happens in the interaction with the player, let alone what experiences the player takes home from it – whether these are emotional or intellectual, solely fun-based or learning experiences. In video games in general, but even more so in urban games that want to achieve an additional purpose besides entertainment, there are many blank spaces and many constraints.

Constraints are typical for urban games and concern the physical condition of the player and the physical topology of the playground (e.g. the game world), which constantly threaten the stability of the magic circle. Serious game-related requirements are the above-mentioned ideological and methodological challenges (how to make the player learn something), but also a certain basic incompatibility between designing for entertainment and designing for an extra purpose (*Stair Quest*). In a way, game mechanics of serious urban games also serve to avoid the collapse of the magic circle, and to keep motivating the player to play.

Blank spaces of the interaction between game and player can be filled with interpretation, design decisions and with simulation, but not fully: playtesting is key for experiencing the full potential of the game system’s dynamics. Obviously, that is not an easy task to accomplish when developing an urban game with digital components and possibly many players, especially when they are map-based and refer to the physical environment with mapping precision required (*Stair Quest*). It is much easier when the final play space is at home (*LucyZH*) and the game runs regularly, so iterative adaptations are possible.

Speaking of the desired effect on the player (referring to the MDA model once again: within the range of the “aesthetics”), the player has to accept the rules of the game to enter the magic circle. Bernard Suits calls this a “lusory attitude”. (Suits 2005: 54-55, see also for a discussion of this notion Salen and Zimmerman 2004: 98). To keep up this attitude for serious urban games, the motivational design has to be crafted either extremely carefully (*LucyZH*), or be flexible and experimental (*Step Up & Play, Dragon Polo*).

A decade ago, there was an active and spirited ludic urban game scene, with works of Swiss artists such as "and-or" with their project "wardive 1.o" (among others) and of the Austrian artist Gordan Savičić with "Constraint City". They created game/play scenarios on the growing density of (closed-circuit) wireless local area networks (see also Stevens 2007 or Flanagan 2007 for an overview).

Today, on a geo-political scale, we need smart urban games more than ever. Cities become denser, more populated each decade, people spend more and more time commuting, the urban environment increasingly becomes functional and over-regulated. At the same time, serious urban game design becomes seemingly less experimental and more mainstream: games have "to work", they have to solve issues, need to make money. But what is actually needed, are not "serious games", but "awareness games", which tease out the pervasive attitude in the (non-)player, bringing in elements of play and subversion, of participation, of community-building, of competition vs. cooperation, of humor to unfold a rich motivational potential. This essay therefore ends with a call for action: let's put on some lusory, rose-colored glasses, and create more magic circles for the ludic city!

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# NPC And Non-Human Game Design

# NPC and Me

## How to become a Non-Player Character

*Günter Hack*

As everyday life and game mechanics converge in ever new digital media remixes, like Augmented Reality or the “Internet of Things”, it might pay off to have a look at some of the concepts derived from computer game design. One of them is the Non-Player Character (NPC), a more or less complex actor controlled by more or less simple software routines. NPCs are often the most interesting part of the game, shaping interaction between the user and the rest of the game mechanics. But, however autonomous NPCs might appear, they are always an integral part of the system, driving the narrative and producing options.

The first real NPCs were the four ghosts of Pac Man: Shadow (“Blinky”), Speedy (“Pinky”), Bashful (“Inky”) and Pokey (“Clyde”), each with its own individual motion patterns and governed by simple algorithms. Today, in a gamified society, we are all increasingly following them in their tracks – like spectres, as Jacques Derrida (1993) might have put it, of our own humanistic ideals.

In this short essay, two topics at the interface of games and society shall be discussed from the perspective of an NPC. First there is the seamless integration of everyday life with game mechanics, an integration that makes it increasingly difficult to draw distinctions between the former and the latter – distinctions that, none the less need to be drawn. Secondly, I am going to take a pointer from old-fashioned cybernetics and political science in order to suggest how certain noxious aspects of life’s blending with the wrong kind of games can be remedied.

In a contemporary living environment a host of organic and anorganic companions like animals, robots or software agents join the humans. Some of the companions are acting, part of time just like an NPC governed by a tight set of rules and staying mostly within their clearly defined computing environments. But they also appear on mobile devices and on specialized hardware, like the Tamagotchi from a bygone age and thereby are more visible in the physical world. At the same time, their presence is obscured as well as sustained by an ongoing drive for the quantification and gamification of work and the rest of everyday life, which harks back to Frederick Winslow Taylor's (1911) endeavors in the 19th century.

Quantification and gamification are both deeply ingrained in the production methods of industrialism, where time and output are permanently measured. Because they are still asserting dominance over large swaths of everyday life in the presumably disruptive digital workspace this intensifies the perception of structural continuities between industrial and post-industrial societies. Even more so, quantification has entered the private life of a growing number of people via mobile gaming and sports apps. Sports are one of the main driving forces in the gamification of society as a whole, where the success of government policies is permanently measured in countless country rankings.

Command, control and quantification mechanisms have been around for a long time, but now they spread everywhere with the help of cheap networked computer systems and powerful databases. Recently much has been made of the Chinese government's plan to introduce some kind of a "social credit system" linked up with databases kept by national online shopping conglomerates. But this compares to what liberal western societies have historically been doing with their intransparent credit scoring methods or revenue services, which use specialized social web crawlers to identify tax evasion and work similarly towards the same end, ensuring the citizen-consumer's conformity. At the same time, dreary economics invade even the most escapist game worlds via built-in profit-optimizing microtransaction schemes – money presenting itself as the lowest common denominator of all possible realities.

The permanent quantification of his or her actions enmeshes the user with a host of feedback cycles where the user appears to the contemporary social researcher, as one "actor" within a "network" of others, be it animals or machines. Actor-Network Theory (ANT), one of the leading current paradigms in social sciences, levels the playing field (Latour 2005), thus lending some support to the ongoing tendency of cross-penetration of computer game logic and the quantification and evaluation techniques of everyday life. People and their products are enmeshed with each other and connected by a certain logic, which may or may not be equivalent to game mechanics. In such a neutralized and flattened environment, one could ask whether there still is a difference between a scripted human call center agent and a customer service bot running on a weak AI system via Facebook. To a certain extent, we have all become Non-Player Characters, at least temporarily, because only as NPCs can we interface with the other actors and continue functioning in a system where division of labor means sharing work with other human agents and more or less autonomous machine actors.

In this all-encompassing totalitarian context, everybody has become a Pac-Man ghost or a Tamagotchi, even the President of the United States! It's the age of the developers. Everybody has to develop and represent his or her skills and personas and because everything in this flat environment floats on the surface, everybody has to appear as an interface to something else. The ongoing crisis of representation in modern societies, as already stated by Deleuze (1968), doesn't stem from inadequate representation but from an inflationary presence of the same, slowly destroying the notion of representativity itself. If everything is an interface, a gateway to something else, then everything is a representative element without substance. You never know who's in charge and who's just a pawn. This gives rise to a phenomenon one could call Network Paranoia, a turbocharged version of the mechanisms described in Umberto Eco's (1989) conspiracy theory novel "Foucault's Pendulum". While this may simply sound like the dreaded empty signifier from classical postmodern thought, the notion is as old as human dreams of artificial intelligence.

Take the old example of the mechanical turk from 18th century Austria, a chess player hidden within a machine pretending to be an artificial intelligence avant la lettre, while in reality nothing other than a cleverly disguised set of manipulators set in motion by a small man hidden within its casing. Firstly it has to be stated that the mechanical "turk", whatever its nature might be, is not autonomous but acting for the benefit of its owner. This always has to be kept in mind in arguments about contemporary AIs and politically relevant algorithms, as for instance in discussions about what is shown under what circumstances in a Facebook feed. Secondly, there's always the question of "Who is backing whom?" or "Who is really in charge of all this?" – leading down the rabbit hole right into the aforementioned Network Paranoia. Of course, people could use ANT methods to trace back power structures and re-engineer them, especially on the Internet, which is after all a controlled environment naturally presenting itself as a dynamic laboratory condition. But time is often lacking, as are other vital resources needed for this task.

As long as Network Paranoia is perceived as a game, it is harmless, but when it seeps into politics, it becomes a different issue: paranoia and conspiracy theories bloom, and the situation gets dangerous. Game metaphors in politics always signal dangerous developments – a dangerous transgression is taking place. One only has to think of the term "Game Theory" as used by John von Neumann and others in the context of nuclear war technology, or of "The Great Game" as a moniker for ruthless colonial power politics in 19th century Asia.

Where game metaphors and game mechanics seep into the command and control structures of society, the suggestion lingers that nothing is serious or meaningful. In the cited cases of Game Theory or the Great Game they might have been used to create a distance between the ruling class and the unspeakable actions perpetuated by it. What's left is a simple axiom: If it hurts, it isn't a game anymore.

In a democracy, the resulting pain can express itself by creating an atmosphere as described by the British political scientist Colin Crouch (2008) in his book "Postdemocracy". Where the ruling oligarchy increasingly insulates people from meaningful mechanism of power, replacing and undermining working forms of representation with ever more pseudo-direct questionnaires and referenda about pointless side issues, the real decision-making is made by kitchen cabinets and corporate lobbyists. The Internet acts as a living metaphor for this, as it was supposed to be all about cutting out the middleman, but it has only replaced the old local middlemen with new transnational power brokers in an ever-ongoing process of power concentration.

This process could already be perceived in the 1960s when US political scientist Karl Wolfgang Deutsch (1969: 196) wrote about the "Nerves of Government," and how important it would be to keep individuals "in the loop", literally, to preserve their ability to give meaningful feedback to the manifold command and control cycles in which they are trapped. Deutsch wrote that human dignity and integrity can only be secured in the future when people are given the opportunity to learn and increase their knowledge on their own terms, and even then there would be no guarantee for self-sufficiency. In the 1950s Norbert Wiener, founder of Cybernetics had already written: "Let us remember that the automatic machine, whatever we think of any feelings it may or may not have, is the precise economic equivalent of slave labor. "Any labor which competes with slave labor must accept the economic conditions of slave labor." (Wiener 1954: 162) In an age where all the promises of automation from the early days of cybernetics and artificial intelligence finally seem to come to fruition, it is hard to counter the forces of alienation turbocharged by the networked oligarchy.

A Non-Player Character is not out of the loop, but he has no meaningful way of changing its workings, as he is neither the programmer of the game nor his boss. Often, he's not even a gamer, but somebody who has casually agreed to the terms and conditions by clicking "OK". The NPC has no opportunity to give feedback to most of the systems he's strapped into, even if it is the NPC who keeps them running. The difference between the NPC and the traditional alienated man of the industrial age, as described in Marxist classics, may not only be the degree to which the NPC is integrated into increasingly more feedback loops without really being able to engage in them and growing so weak that the most basic acts of resistance like sabotage or joining an organization like a worker's party or a trade union become unthinkable. The decisive force creating an NPC lies hidden within the myriads of immaterial processes shaping its everyday life. Whereas the direct brutality of factory life is so simple that the relationships of power are direct and out in the open, whereas Network Paranoia tends to obscure them in the digital economy. The NPC doesn't really know how computers work; NPCs just supervise or operate them. Whether they still have a well-paid job or not isn't down to their knowledge or wits but rather up to fate.

Of course, most people in industrialized countries are not NPCs all of the time. Often people let themselves sink back into NPC status because it is more convenient to do so. Games and gamified consumer electronics play a vital part in this. The less people understand the tools they are surrounding themselves with, the more responsibility lies with the creators of those systems, including developers, who play a crucial role in creating opportunities for digital self-help by writing free and open source software (FOSS) and educating people so they become well-informed consumers. DIY computing and transparency about algorithms can empower some people to at least claim a little dignity. If the NPC's existence is dominated by scripts, it must be able to rewrite a minimum of them to gain some degree of freedom.

So why might it pay off to use the NPC as a metaphor or as a perspective on contemporary phenomena of alienation? First of all, NPCs are the most important interfaces to a game or a gamified system, so determining their status and studying their behavior makes sense for both social scientists and game designers - even if they work against the notion of people as NPCs. Secondly, as an NPC is determined by game mechanics, its internal logic can be re-engineered within the framework of Actor-Network Theory, reviving this paradigm's productive initial impulse. But in order to follow through with this, one has to first accept oneself as an NPC, to analyze and reconstruct the network of people and tools creating the games of science, and the hurtful breaks separating those games from naked life. It might also serve as an exercise in humility.

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# When Game Mechanics Come Crawling out of Ant Colonies

*Michelle Westerlaken*

## INTRODUCTION

The academic fields of game studies, ethology, and anthropology have argued – in several occasions and contexts – that playfulness is not an attitude or a way of being that is exclusive to human beings (Huizinga 1955 (1950); Bateson 1987 (1972); Burghardt 2006). The awareness of this encompassing quality of playfulness can be easily detected in the number of toys and games that are produced on the basis of the belief that beings other than humans are not only sentient, but express themselves playfully. Taking Miguel Sicart's broad and widely used definition of game mechanics as "methods invoked by agents for interacting with the game world" (2008: 0), we can therefore say that those agents do not necessarily have to be either humans or artificial intelligences (AI) (as initially claimed by Sicart), but can be animals as well. In fact, within the field of games research, several scholars have investigated the design of playful artifacts and games[1] that involve animals. Following Sicart's framework for the analysis of

1 Rather than engaging in the complex and often anthropocentric debate on whether or not the artifacts that involve animals as participants qualify as 'games' according to some definitions on the term (Arjoranta 2014), in this chapter, I will use the term 'playful artifacts' to indicate a broad range of objects that includes those that might imply rules and quantifiable outcomes (Salen/Zimmerman 2003), freely appropriable toy-like objects (Sicart, 2014), and any other hybrid forms through which animals could express themselves playfully. The term 'playful' in turn, does not only refer to 'play' as an activity that can be observed in animal behavior (including signifiers such as, among others, pretend fights and exaggerated movements in low-stress situations)

game mechanics, and paying attention to the way in which animals act as agents appropriating those mechanics (in both digital as well as non-digital playful contexts, with varying levels of abstractions), we could roughly divide these efforts in two different groups: games that involve animals as part of game *systems* and games that involve animals as intended *players*.

## Animals in systems

This category involves the type of games that rely on the (often forceful) inclusion of animals as agents. These games are not designed *for* the animals, but they incorporate animals' interactions with the game-system to allow for human gameplay and/or spectacle. This phenomenon can be observed in a project in which researchers and designers built a simulation of the game *Pac-Man* in which human players could play against real crickets that represent the ghosts in the game (Lamers/Van Eck 2012). Another example includes a redesign of the game *Pong* in which the AI is performed by a cockroach that carries a pixel on her shoulders (Savicic 2005). More toy-like approaches to this forceful inclusion of animals include artificial electrical stimulation in order to control the movements of cockroaches (The RoboRoach Kickstarter n.d.). In some other cases, the animal is given control over the interactive system, such as Garnet Hertz' experimental robotic system in which the bodily movements of a cockroach are translated into the physical locomotion of a three-wheeled robot (Hertz 2008) and an online video stream of a goldfish movement tracking system that acts as the input in a *Pokémon* game (Cunningham 2014). Although the animal's level of control over the artifact is different in all of these examples, the game/toy systems are all designed for human engagement or enjoyment and they generally do not take the wants and needs of the animal into account (besides those that are required for the functioning of the game system or interaction with the artifact). It could be argued that, in most cases, the animal might not be aware of their involvement in the playful artifacts. Within Sicart's definition of game mechanics,

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(Burghardt 2006). Instead, 'playful', here, is meant to indicate a wider ambiguous and self-effacing *attitude* that can be adopted by the animal in the interaction with the artifact (Sicart 2014). This means that playfulness in animals could, for example, arise out of engagements having to do with things like exploration, curiosity, cognitive challenges, destructive behavior, creating chaos, sharing affection, social interaction, or pleasurable sensory experiences. It is with reference to these meanings that the terms 'playful artifacts', 'playful interactions', 'games', 'toys', and 'play(ful)' are used in this chapter.

the agency of the animal in these contexts can thus best be compared to that of an AI with a limited possibility space to interact with the game/toy system and with the purpose to contribute to the (human) player experience. With the important difference that, instead of human-programmed AI entities, we now know that these animals are sentient creatures capable of suffering distress and thus it could be argued that these types of games and toys harmfully contribute to animal oppression and speciesism[2].

## Animals as players

A potentially less oppressive approach to the involvement of animals in playful artifacts includes player experiences that are actually designed *for* animals. In this case, designers are interested in the way animals enjoy certain activities and playfully express themselves and accordingly aim to develop playful systems that mediate these types of interactions. Some examples include projects conducted with touch screen game prototypes for sheltered orangutans (Wirman 2014), a videogame concept that allows humans and farmed pigs to play together (Driessen et al. 2014), a tablet game prototype for humans and domestic cats (Westerlaken/Gualeni 2014), and prototypes that explore interactive toys for captive elephants (French 2015). In these examples, rather than reducing animals to agents within systems, the game/toy mechanics and affordances allow the animals themselves to "appropriate agency within the game world [or playful context] and behave in unpredicted ways" (Sicart 2008: 3). As a research field within game design, taking game/play design *for* animals seriously is a rather recent development that requires a different take on established frameworks we use to analyze and design games for humans. There are no best practices, generally accepted guidelines, textbooks, or lists of existing game mechanics and playful interactions for each animal, to draw from. What all of these examples have in common, is their tentative and iterative approach to designing games and playful artifacts that place the involved animals at the center of the design process. The

2 'Speciesism' is a term that is brought to attention by the field of critical animal studies and refers to the assignment of values and rights to individuals solely on the basis of their species membership. The term first appeared in a pamphlet by Richard D. Ryder in 1970 that was used to protest against animal experimentation (cf. Singer 2015 [1975]). Analogous with discrimination based on race (racism) or sex (sexism), speciesism has intersectional characteristics with other forms of oppression and follows a similar pattern in allowing the interest of one species (usually the human) to override the interests of other (usually non-human) species (ibid).

animals are seen as valuable stakeholders during different phases of the design process as well as factors in the evaluation of the ethical implications of the design outcomes (Westerlaken/Gualeni 2016). In this context, the engagement with animals is defined by ongoing practices of developing new insights and sensitivities that define the ways in which design decisions are made and relationships between the involved humans and animals are continuously reshaped through unexpected encounters. Orangutans rubbing the touch screen with food and body-fluids (Wirman/Jörgensen 2015), elephants destroying hosepipes (French 2015), and piglets following laser-lights (Driessen et al. 2014) are just a few examples of those unexpected insights that could lead to the design of new game mechanics and playful interactions. In working together with animals as participants in the design process, it soon becomes clear that designers are required to adopt flexibility, open-mindedness, and context-specific approaches to game design that can hardly be contained within existing human understandings and frameworks for games/play research.

## DESIGNING INTERACTIONS *FOR* OTHER ENTITIES

In taking a less anthropocentric approach to the design of games and playful interactions, I argue that this second take on the involvement of animals in games (as players) is more respectful and considerate of animals' lives, and therefore favorable over the reducing of animals' agency in playful artifacts as a means for our own enjoyment. Critical Animal Studies scholar Jason Hribal also problematizes our general tendency to overlook agency and selfhood in animals, and argues that this perspective unproductively understands animals as static beings, or as objects devoid of any "real substance" (Hribal 2007: 102). Hribal encourages us, instead, to recognize and appreciate their capacity for responding and resisting to situations and changes (ibid). However, it could also be argued that the research field that includes animals as players has thus far only focused on mammals: animals that visibly adopt playful attitudes in ways that are similar to humans. Whereas the more system-centric approaches seem, up until now, to be focused on animals that display (playful) behavior that is arguably very different from that of human beings. This could lead us to wonder if there are any limitations to the way in which we can design games *for* animals like insects, fish, or reptiles. Animals that arguably have very different ways of experiencing the world are difficult for us to relate to or identify with in the context of play.

Anthropologist Eduardo Kohn takes a more encompassing and compromising ontological stance on the notion of species difference and the moral limitations that these distinctions imply. He focuses on identifying what makes a process 'alive' and argues that capabilities such as those of making choices, responding to stimuli, and adapting to new situations need to be morally accounted for, because if we continue to ignore these aptitudes in other entities, we are always forced to fall back on theories that center around human-like forms of representation and intentionality such as language and reasoning (or ways of playing) when we wish to reflect on our engagements with other entities (Kohn 2013). It is in that basic, shared, and responsive background that transformations and engagements (in the form of reactions, response-ability, and 'attention' towards our design interventions) can take place. Using this theoretical lens is particularly useful as it allows us to distinguish entities that are 'alive' (like a cockroach or a human) from entities that are not (for example a chair or a rock, which do not respond and adapt in the same way that living entities do). To be sure, according to Kohn, these entities are not necessarily part of the animal kingdom, and they do not even have to be endowed with a nervous system to be recognized as 'living' or having a 'self': according to Kohn, plants and mushrooms also qualify (ibid). Additionally, he maintains that selfhood can be distributed over multiple bodies. This is the case, for example of the 'selfhood' of a seminar, a crowd, a forest, or an ant colony (ibid). Starting with this conception of what a 'self' is we might attempt to understand and design *for* other entities with which we can enter into a relationship of response and negotiation that can guide and shape the design as a shared activity in itself. In practice, this means that we could try to engage in a responsive designerly relationship with plants, bacteria, crowds, and arguably even AI's because we could invite these entities to engage with – and adapt to – the game/play mechanics we design, and to interact with the designers in an indexical exchange of responses. In contrast, these kinds of processes could not be achieved in a similar way with non-living entities such as bricks, paper cups, and snowflakes, because these things do not actively respond to the mechanics we propose.[3]

3 From a metaphorical perspective, one could suggest that, non-living entities, such as the materials that are used in a design process, are also capable of responding to the way in which they are used by the designer, for example when materials break down or 'resist' to certain kinds of treatment. Donald Schön labeled this as 'back-talk', "a reflective conversation with the materials of a situation" (Schön 1987: 31). However, in this paper, I am specifically interested in sensitivities and transformations that arise from the practice of engaging with living entities that can actively and dynamically take part in design processes.

In this chapter, I wish to exemplify the consequences of this framework for the design of game mechanics *for* other entities that seem to be very different from us mammals, by discussing a project aimed at developing games *for* an animal we are all familiar with but usually do not relate to within the context of playful interactions: *lasius niger*, the common black ant. More specifically, in order to advocate for the inclusion of animals as players instead of as agents within systems, I will focus on the practice of designing playful artifacts as an activity that can transform our relationships with other species and our anthropocentric preconceptions. With the game design experiment that I will explain and reflect upon in the third section of this paper, I am interested in exploring alternative scenarios in which speciesism can be approached critically and new perspectives on the various and complex relationships between animals and humans can be reframed and reshaped.

With this goal in mind, it is important to clarify that I am not interested in producing academic outputs in the form of instrumental scientific constructs that aspire to universal validity and applicability. More specifically, I am not concerned with demonstrating the playful capabilities of ants and using this as a basis to advocate for game design *for* ants as players. Instead, I wish to focus on Donna Haraway's idea of 'situated knowledges', as partial and critical interpretations of possible world-views that allow for unexpected openings and negotiations with other entities (Haraway 1988). Following this attitude towards contextual engagement with other entities, I argue for the value of paying attention to how local knowledge's arise from game/play design practices, knowledges that could elicit and accompany shifts in our current worldviews, in the development of our sensitivity, and in the way we care for our environment. I believe that the notion of 'situated knowledges' fits particularly well with the practice of experimental and design-driven approaches with animals as a way to prefigure and explore potential futures together with other beings. With the aim to expand the breadth of our moral circle to embrace a wider array of beings (coessential stakeholders of the planet we inhabit and in the interventions we design), I wanted to engage in a design practice that could help us to negotiate and rethink our relationships with ants (or other insects). Together with a group of students, I engaged in the practice of game/play design *for* animals, in order to speculate on the idea of designing playful interactions and mechanics that an ant could actually decide – or refuse – to engage with.

## DESIGN CHALLENGES WITH ANTS

The experimental project that I will describe and account for in this section was motivated and guided by the following question: (how) can we actively involve ants as active agents that can appropriate game mechanics, in the process of designing a playful space or a game? The project spanned over a period of five months and can be divided in three different phases: a fieldwork phase (I) in which I attempted to become familiar with the ants and the behaviors of this very alien 'selfhood', documented through auto-ethnographic methods (including pictures, conversations, and a designer journal), a design phase (II) consisting of a short game jam with 16 interaction/game designers that developed different prototypes, and a playtesting phase (III) in which the interactions of the ants with each of the prototypes were live-streamed and reflected upon as the ants appropriated them. My goal was to use design practices to generate 'situated knowledges' that could encourage transformations and sensitivities among designers themselves, that could propose new ideas about our relationships with these ants as 'selves' that are included in our moral horizon. Additionally, this project allowed us to practically question and reconfigure our understanding of what constitutes 'players'. So instead of defining concepts like 'play' and 'players' as the *a priori* foundations of this experiment, I adopted a 'research through design' approach[4], where doubts and emerging reflections provided the flexibility and the philosophical space to adopt new perspectives and sensitivities on both play and the 'selfhood' of ants, and to respond to the actions and behaviors of the ants themselves.

Furthermore, it is important to point out that this process, was by no means informed by an equal or non-speciesist set-up between the humans and animals that were involved. The ants that were part of this project were obtained by me and (for a part of the process) held in captivity. They were not given a choice to opt out of this process. This means that there is a certain paradox at play here that can be observed in all of the existing 'animals-as-players' research work that was mentioned in the beginning of this chapter: the design of playful artifacts with the aim to enrich the lives of animals that are held in captivity. Even though the intentions of these projects are to improve life experiences of individual animals or to generally expand our moral consideration of animals, the projects

4 With the term 'research through design' I refer to a growing academic field that is characterized by research contributions in which design processes and practical inquiries *themselves* inform and investigate topics that are multistable, complex, and future oriented (Buchanan 2001; Gaver 2012; Löwgren/Larsen/Hobye 2013).

themselves, can *and should* still be labeled as ‘speciesist’, as they are part of a larger system in which animal oppression and exploitation is accepted and normalized (cf. Westerlaken 2016). This paradox has the potential to contribute to a larger discussion about the extent to which the aim of improving the lives of animals on our planet should follow approaches that are either more ‘abolitionist’ (e.g. we should avoid speciesism entirely and in all of our actions) (Weisberg 2009), or more experimental and practical (e.g. rethinking our relationships with other species requires us to get our hands dirty) (Haraway 2016). As these types of reflections were very much part of the research process and the way in which (design) decisions were made, I will get back to this discussion in the last section of this chapter. For now, it is worth noting that these moral observations and questions should not be ignored or brushed aside too easily, no matter how insignificant and unworthy the life of a small insect initially seems to us humans. Once we purposefully start to engage with their lives more seriously they will undoubtedly cause new kinds of sensitivities and respond to us in surprising manners.

## Phase I: fieldwork, or: living with an ant colony

In the first phase of this project, I acquired a black ant colony (including a queen and 15 workers) and set up a living environment for the ants at my workspace for a total of three months. These ant nests are available as commercial products in different sizes and possible configurations (see Figure 1). As expected, the introduction of an ant colony in an office setting was in itself a source of unexpected situations and possibilities for ‘situated knowledges’ to develop. The ant colony became an often-discussed subject among colleagues, and people made a habit of visiting my office to see what the ants were doing. While spending time with the ants on a daily basis, I naturally started caring about the ants at an emotional level, which caused mixed feelings of doubt about the ethical problems with keeping the said ants in captivity. Furthermore, during these three months, I tried out different living arrangements and small design interventions to see how the ants would respond. Based on these experiences, I listed a range of player-centered game mechanics that could potentially inspire the design of playful artifacts and include interactions like building, sliding, crawling, breaking, eating, dragging, gathering, searching, and jumping.

Then, one day, the ants managed to escape from their artificial and confined living space, which qualified as one of the most thought-provoking events of the whole period. Their remarkable escape story involved some ants that found a small opening between two walls of their *Plexiglass* living space, escaped, gathered some pieces of carton from a nearby source, and stacked these pieces in between the *Plexiglass* in order to make the opening bigger and walk in and out more comfortably.

*Figure 1: The confined living environment of the ants (left image) consisted of a plastered nest with different chambers and an outside area made of transparent Plexiglass where the ants gathered resources and brought out garbage from their nest. The attached tubes provide sugary water. The image on the right shows the queen ant, some of the workers, and the (then taped off) part of the Plexiglass that the ants used to escape through.*

Source: Westerlaken

I then started to reflect on how this escape-story could be used as a provocative and speculative starting point for a design context opening that could inspire designers to develop escape room challenges[5] that the ants could potentially play (regardless of whether we are willing to accept their interaction with the prototypes as playful). At the same time, this escape story and the close day-to-day relationship with the ants evoked feelings of doubts and cruelty that I documented in a journal:

"Some days I feel a bit bad about having those ants in possession. […] It seemed like ants could actually be satisfied in captivity, because they have all the resources they need […]. But the more I think about these things, the more I feel that I'm somehow cruel to them,

5 "Escape rooms are live-action team-based games where players discover clues, solve puzzles, and accomplish tasks in one or more rooms in order to accomplish a specific goal (usually escaping from the room) in a limited amount of time." (Nicholson 2015: 1).

especially in relation to their escape adventure and me blocking their way out (after they put so much effort into building their escape route) or using this as an insight into making escape rooms in which we as humans are in control of their life in such an unequal way."

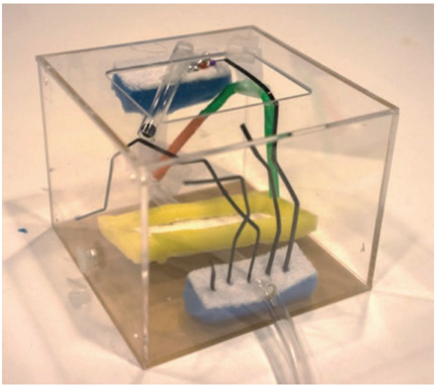
In spite of these doubts, I decided to continue the project while musing over the power dynamics and inequality between the humans and animals that were involved in it. At that point, I wanted to know whether other people would undergo similar transformations once they got involved in a game design process that similarly aimed at engaging ants.

## Phase II: design, or: escape room challenges for ants

With this escape story as inspiration, an "escape room for ants" game jam was organized during the Student Interaction Design and Research (SIDeR) conference at Malmö University (Sweden) in April 2016. During this two-hour jam, 16 interaction and game design students with various international backgrounds developed a total of five different prototypes for a potential escape room challenge designed specifically around the skills and possibilities of ants.

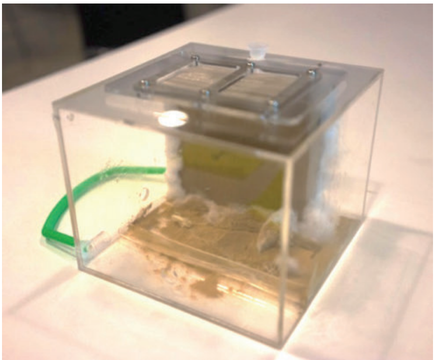
During this design activity, the participants were asked to experiment with the speculative idea of seeing the ants as players and design a challenge that would not be too easy, and not too difficult, for the ants to solve. As expected, some of the designers started their ideation process by crafting metaphors taken from game design with humans and tried out where these could apply to designs for ants. Some groups tried, instead, to envisage and control the effects of their design ideas by designing puzzles and level progression while continuously trying to speculate and discuss how the ants would appropriate the mechanics and materials in their prototypes. The following images show two of the prototypes that the designers built.

*Figure 2: In this prototype, the designers (Ralitsa Plamenova Retkova, Simon Nilsson, Eliel Camargo-Molina, and Pak Lau) propose an escape room with three different stages. First the ants have to choose the correct wire that leads to the next area. Then the ants need to push a ball through the transparent tube. This action will pivot the seesaw after which the ants can exit the room through the straw.*



Source: Westerlaken

*Figure 3: The protoype in this image, made by Marian Vijverberg, Nele Schmidt, and Koen Wijbrands proposes an escape room in which the ants enter into a small room separated with a piece of carton. The ants then have to crawl through the straw on the outside of the room to enter into a bigger area. The ants can escape the room after crossing a small lake by building a bridge using small ropes.*



Source: Westerlaken

More detailed explanations of all five prototype as well as the credits of the other designers that took part in their ideation and assemblage can be found online through *http://wp.me/p2y7bd-dF*.

The player-centered mechanics that were proposed through the different prototypes include: walking, climbing (on ropes and towers), pushing, crawling (through narrow spaces, inside straws and tubes), building (bridges), finding (exits, tubes, dead ends), eating (rewards, obstacles), balancing (on thin ropes), choosing (between different escape options), crossing (a seesaw), sliding (on olive oil), and removing (obstacles).

Additionally, at the end of the workshop, all 16 designers filled in a survey with open questions regarding their experiences. Their answers illustrated how nearly all designers started considering the previously unexplored possibility of ants being curious and perhaps even playful. Furthermore, the participants reflected on ethical interrogatives and implications that should be discussed in the case of pursuing a design intervention that involves ants. Some of their answers:

"It should not be dangerous. We should respect these small animals." (Emphasis in original)
"We should be careful of not ending up killing them or make them suffer."

However, none of the designers considered the activity as an ethically questionable exercise in itself, or refused to participate in it, despite my openness regarding the mixed feelings prior to the beginning of the game jam. In the same survey, the designers were asked if this short activity changed their view on ants or their relationships with them:

"I have never thought that ants possibly could enjoy certain activities, instead of doing it out of instinct or just to survive"
"No…Or maybe a little. We began to give them personalities."
"I never thought that ants are playful. Not that I thought they weren't, I just did not think about it."

Despite the subtle differences in their experiences during the workshop, most designers included a specific reflection on their increased sensitivity and interest towards the ants that were involved in this project. A frequently mentioned topic included the designers' consideration of ants being perhaps 'more playful', 'smarter', or 'more curious' than they had initially expect them to be. Furthermore, most participants seemed to be interested in giving more thought to the idea that ants might do something, such as exploring or manipulating objects, for reasons that are not purely functional or done for immediate survival. These insights remained a topic of conversation during the next days of the SIDeR conference. Additionally, a follow-up survey that was sent out six months after the game jam elicited two replies. In both of these, the participants shared how their experiences changed their encounters with the ants they met after the game jam and made them feel more curious and considerate towards the ants' lives. In the next project phase, I explored how the ants interacted with the prototype and the response this generated.

### Phase III: playtesting and reflections, or: how Twitch closed down the livestream

In this phase I wanted to complete the cycle of this project and invited the ants to react to the designs that were created by observing the ants' interaction with the prototypes. This process was broadcasted on *Twitch* and other online streaming platforms with the aim of generating conversations and furthering reflections concerning the ideas that this project proposes. After the first day of streaming, the platform *Twitch* closed the online broadcast of the ants interacting with the escape room prototypes and labeled it as "non-gaming related content". This event generated mixed feelings among viewers that started arguing online about the potential paradox (and the irony) of designing escape rooms for captive animals and society's concept of gaming understood as an exclusively human activity. This situation produced several online discussions and illustrated different degrees of sensitivity that people perceived in their relationships with these ants while watching them interact with the prototypes. Over a period of five weeks, the ants interacted with each of the five prototypes. During this time, the ants managed to escape from three of the five rooms. Additionally, the ants created an alternative way out of their living environment, directly from their nest, bypassing the connected escape room. After a few prototype tests, this resulted in a situation where the ants entered one of the escape room prototypes from the outside of the room, 'playing' through the room in reverse. However, their reasons for doing so, or their motivations for interacting with the prototypes, remain completely unknown. More details on these escapes, survey quotes, and the ants' interactions with each specific room can be found online via *http://wp.me/p2y7bd-eT*.

## CONCLUSIONS

In this chapter I followed Haraway's notion of 'situated knowledges' and Kohn's wider perspectives on 'selves' as entities that are 'alive' and respond, as a basic approach to the design of game mechanics and playful interactions *for* animals to appropriate. With this framework, I aim to expand our moral concern towards other animals and to critically rethink the agency of other entities on our planet. Specifically related to the discussion on game mechanics, I propose to widen Sicart's definition of mechanics (2008) to deliberately include designing *for* other selves that could actively participate in design processes and respond as potential players to the interactions we create. More specifically, without taking any deliberate sides as to the debate whether the ants are players or not, this exploratory design project with ants spurred multiple conversations (both online and in person) concerning play and player agency. I feel that the current understanding of games as design *by* and *for* humans does not do particular justice to the active role of the ants in this specific project. However, without any detailed information of the ants' perspectives on the prototypes, it will be impossible to determine any insights related to their experiences or understanding as players or participants. Nonetheless, I hope that this project offers an initial springboard for the further exploration of the notion of ants (or other 'selves') as participating to the design and to the functioning of a game and its mechanics without reducing them to agents that are part of a game system for human enjoyment, or labeling them as players in the conventional (anthropocentric) use of the term.

In taking this framework into the practice of design, I discussed how the design *for* (and somewhat together with) ants generated new perspectives and sensitivities concerning our relationships with other animals. Even though the project arguably includes 'speciesist' engagements, the reflections and conversations that emerged during and after the design experiment with the ants constitute fragmented, subjective, and incomplete interpretations of insights that were gained during and after this short exercise. As 'situated knowledges', they do not simply share facts about the lives and behaviors of ants; they also illustrate how the act of getting contextually engaged with the life of other species can be a transformative exercise that generates sensitivities and compassion towards other entities. This process was naturally already influenced by my preconceptions and ideologies, as I organized and guided the different events that took place. However, it is important to note that the ants were not passive entities during this process: by being there, acting, escaping, responding, appropriating artifacts in unexpected ways, and interacting with the game mechanics, they influenced the way in which these transformations took place and the project evolved during all three phases of the project. I argue that, although certain types of speciesism are undeniably involved in this project, these types of reflections and sensitivities could not be obtained at 'distance', without practically engaging with the lives of the ants. More specifically, the deliberate design framing of the encounters with ants facilitated a space in which the ants were openly invited to respond to our interventions. Nonetheless, looking back, I am wondering if these encounters could have been framed around a more equal setting, especially in the case of designing *for* animals that we already form relationships with in our daily lives. In other words, further iterations of this project could perhaps better propose to engage with the 'wild' ants we meet in our homes, the parks we visit, and the picnics we share.

In articulating and practically trying out new perspectives that combine notions of game mechanics and 'selves', I suggest that these efforts merely entail a first experiment in embracing the notion of game mechanics designed *for* the player experience of non-mammals. I argue that the practice of game design that is informed by responses and appropriations of other entities, allows for unexpected situations capable of stimulating new thoughts, alternative points of views, and previously inexperienced forms of engagement that might change our sensitivity and compassion for other beings living on our planet. If nothing else, I hope that the discussion of this playful attempt to design game systems and artifacts specifically *for* ants will affect your next encounter with these surprisingly response-able and inventive animals.

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The most relevant outcomes of Sicart's research are his three books: in 2009 he published The Ethics of Computer Games (The MIT Press), a comprehensive philosophical theory on games and morality, based on his doctoral work, that provides a theoretical foundation for the philosophical study of computer games. In 2013 his book Beyond Choices: The Design of Ethical Gameplay (The MIT Press) extended that research with a focus on the design of playful, ethically relevant experiences. This book combines interviews with developers, experimental game development practices, and design and philosophical theories that analyze how computer games can be designed as moral experiences. His research and teaching on playful design resulted in a new book, Play Matters (MIT Press), that explores the relationship between play, materiality, and space through the analysis of toys, playgrounds, and games. The book also includes reflections on the aesthetic and political capacities of play as a form of expression.

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