



The Study of Computer Games as a Second-Order Cybernetic System

Julian Kücklich
Medienobservationen
Brudermühlstr. 28
81371 München, Germany
+49 89 726 26 808
julian@kuecklich.de

Abstract

The following paper is part of a larger analytical study of various contexts of computer games. Here, I elaborate on the method on which I base my study of the semiotic process constituted by playing a computer game. This method is derived from a critique of earlier approaches to the field from the perspective of literary and media studies. While most of these approaches employ a two-level model with undeniable roots in structuralist narratology, the model suggested here is based on the constructivist concept of viability. This presupposes a change of perspective from “naïve objectivity” to informed subjectivity.

Keywords

Computer games, literary studies, cybernetic system, semiotics, aesthetics

INTRODUCTION

In an earlier paper on the subject of literary theory and computer games [10] I argued that many approaches to computer games from the perspective of literary studies are problematic because they fail to take into account the different textual levels of computer games. Therefore, I suggested regarding computer games as texts that operate on two distinct levels – the level of the code and the level of the interface. Apparently, many students of computer games arrived at similar results, for this concept has been widely adopted

in the field. It is now almost a truism, to say that what you see on the screen is only half the game, if not less. Building on the groundbreaking work of Brenda Laurel, Janet Murray, Espen Aarseth, and Marie-Laure Ryan, a new generation of computer game theorists has learned the lesson that there are always two sides to every “interactive narrative”. The application of this knowledge has produced a wealth of insightful papers on topics ranging from the treatment of time in *Myst* to the production of place in *Quake*.

However, what has been generally overlooked, is the unique feature that sets games apart from other cultural artifacts: this is, of course the fact that we can *play* them. The *playability* of games is a fundamental concept without which we cannot understand the semiotic process in which player and game are engaged. This is exactly what I am trying to analyze. But in order to focus on the interaction of player and game – which consists primarily of the player’s manipulation of the interface – we must discuss whether the two-level model of computer games is still appropriate. Although direct manipulations of a computer game’s code must not be disregarded, the usual mode of interaction with the code is indirect, i.e. mediated through the interface. Since I am primarily interested in the experience of playing a computer game, the code can be neglected here as something that is not part of this experience.

Therefore, I will leave the analysis of the code to computer scientists, and concentrate solely on the signs on the screen. This may seem contrary to my former position, but the change is less radical than it might appear. In order to explain this paradigm shift, I will revise some recent approaches to computer games, suggest a new model of computer games that incorporates the position of the observer, and point out the benefits of this approach. With this, I hope to facilitate the discussion of the aesthetic and hermeneutic dimension of computer games.

Kücklich:
The Study
of Computer
Games as a
Second-Order
Cybernetic
System

TOWARDS POST-STRUCTURALISM

I would like to begin by summarizing some of the most promising approaches to the field of computer games so far. My choice is, of course, biased by my own work – which remains rooted in the discipline of literary studies. Therefore, one of the threads that I will follow in this brief summary is the ongoing discussion of Aristotle’s *Poetics* and its applicability to games. This discussion is directly related to what has been called the “clash between game and narrative”. What I am trying to achieve by this critical overview is a reconsideration of the dominant role of narratology in this field. Furthermore, I aim to introduce a different conceptualization of narrative, and to embed this discussion into the context of computer game philology.

Many attempts to describe computer games according to narratological models refer to Aristotle’s *Poetics* in one way or another. On one hand, there are those who try to conceptualize computer games as narratives with a beginning, a middle, and an end. On the other hand, there are those who think Aristotle’s definition has to be modified, if not done away with

altogether. An early example of the latter can be found in George Landow's influential book *Hypertext*: "Hypertext, which challenges narrative and all literary forms based on linearity, calls into question ideas of plot and story current since Aristotle" [11].

This statement has been taken up by computer game theorists such as Jørgen Kirksæther, who asserts that "computer games can easily be viewed as hypertexts" [9]. Although Kirksæther realizes the need to establish a "compromise [...] between embracing and denouncing Aristotle," he concludes that computer games are generally compatible with Aristotle's description of narrative. Playing a game is not conceived as an end in itself, but "involves manipulating a graphic interface between the player and the game logic." However, in his conclusion, Kirksæther asserts that he "do[es] not think of games as a three-layered system" and he "do[es] not believe that it is possible to separate the graphic interface from the game logic and structure."

The idea of using Aristotle's model in the study of computer-mediated communication can be traced back to Brenda Laurel's book *Computers as Theatre*. Here we can also find the link between this approach and the (structuralist) two-level model of computer games: "In theatrical terms, a program [...] is analogous to a script, including its stage directions" [12]. In other words, Laurel regards the code of a computer program as a system of rules that governs the human-computer interaction. Although the shortcut between Aristotle's Poetics and structuralist narratology is not easy to account for, it is plain to see how this has spawned a structuralist poetics of interactive fiction. The code is assumed to resemble the deep structure of a language that enables the speakers of this language to construct syntactically correct sentences. These sentences, which appear on the surface structure, are assumed to be already virtually contained in the deep structure. Similarly, the code of a computer game is construed to contain all the possible ways of playing the game – or, in literary terminology, its readings.

This conceptualization corresponds to models devised in structuralist narratology such as the Russian formalists' concept of *fabula* and *sjuzet*, or Seymour Chatman's model of story and discourse plane. Accordingly, Espen Aarseth, in his study of the adventure game, employs Chatman's model as the basis of his concept of "ergodic intrigue". However, his addition of a negotiation plane between the progression plane and the event plane goes one step beyond Chatman's static model and adds a certain dynamic element [1].

Janet Murray is arguably one of the strongest advocates of structuralist poetics in the realm of computer game and interactive fiction studies. In her book *Hamlet on the Holodeck* [14] she builds on Chatman's *Story and Discourse* [3] as well as Vladimir Propp's *Morphology of the Folktale* [16]. The latter has been another popular favorite in computer game studies for obvious reasons. The general model of the Russian folk-tale devised by Propp is based on a strict sequence of events that is only rarely changed in the individual folk-tale. Moreover, there are only a limited number of narrative steps, and

these steps are usually linked to an equally limited number of characters, or actants.

One of the few convincing suggestions to overcome this binary schema has been put forth by Marie-Laure Ryan in her latest book *Narrative as Virtual Reality* [18]. She argues that since a printed text already has an actual and a virtual dimension, transposing a text into a virtual medium such as the computer leads to virtualization to a second degree. Thus, there are three textual levels in an electronic text, which Ryan – adopting the terminology of the French media theorist Philippe Bootz – calls *texte écrit* (the text as written), *texte-à-voir* (the text as seen by the reader) and *texte lu* (the text as mentally reconstructed by the reader).

In reader-response criticism, it has always been a controversial issue whether the *texte écrit* – metaphorically speaking, the *code* of a printed text – exists outside of the author's mind. As Stanley Fish [5] has argued, "it is the structure of the reader's experience rather than any structures available on the page that should be the object of description". In fact, I would like to add, we can say nothing about the objective text, and hardly anything about what we read, and almost anything about what we *have* read. This is to say that a text is only intelligible in our reconstruction, or rather our construction, of what we have read. By this I do not mean to deny that there is a form of communication between text and reader, but this process must not be construed as a simple transfer of meaning from the text into the reader's mind.

While we will have to discuss this concept in greater detail later on, what remains to be done to finish my brief summary of theoretical approaches to computer games is to put it into the context of computer game philology, and to discuss the role of narratology in this emerging field. In order to do so, we must understand that Aristotle's narratological model became increasingly harder to apply to narratives the farther literary history moved into the era of modernity, and eventually postmodernity. This holds true for all narrative genres, including the novel and film as well as short stories and novellas. Indeed, it could be argued that the development of the American short story marks the advent of a genre that is *by definition* incompatible with Aristotle's description.

Therefore, attempts to describe computer games from a narratological perspective are facing an epistemological as well as an empirical problem: The attempt to describe computer games as narratives automatically raises the question: which kind of narrative this refers to. In order to answer this question, it will hardly suffice to classify a certain computer game as, say, a mystery novel, if the following aspects are not taken into account:

- a) the development of this genre in literary history
- b) the aberrations from this genre due to the transposition to a new medium
- c) the reasons for incorporating this genre into a game, and the way in which this is accomplished

Kücklich:
The Study
of Computer
Games as a
Second-Order
Cybernetic
System

In other words, what is necessary is a contextualization of computer games. The guiding principle of this approach is the idea that while technically speaking, computer games are a relatively new phenomenon, they are nevertheless part of several distinct traditions. They are first of all part of the history of games (what I call the “ludic context”), a tradition reaching back to the cradle of our culture, or, as some scholars have argued, even comprising that very cradle. Secondly, they are part of a tradition of representation, i.e. they employ methods of narration and depiction that are derived from literary history and art history, respectively. Thirdly, they are embedded in the history of media, insofar as they incorporate different media and transcend their boundaries.

It should be clear from the above that narratology is by no means the most important discipline of literary studies in the field of computer games. From this perspective, narrative must rather be regarded as something that has evolved over a timespan of several centuries and has become increasingly problematic in the 20th century. Interactive narrative is by no means a “fresh start” in the history of narrative, but rather part of this tradition. This theoretical contextualization also draws attention to the fact that we are dealing with a relatively young genre. Although the computer game industry has already produced some “classics,” it cannot be denied that computer game history is still in a very early developmental stage. The fact that the games we are playing now are incredibly fast, graphically brilliant and increasingly complex should not lead us to assume that this genre is already “accomplished”. A theoretical approach with an awareness of these potential fallacies cannot retain a theoretical framework that owes much of its rigidity to a “naïve” structuralism, but must rather strive to deconstruct certain uncontested views about computer games.

A NEW PARADIGM

One question has dominated computer game studies in recent years: Can interactivity and narrativity be reconciled? Jesper Juul has studied this question in great detail and arrived at the conclusion that it is “the strength of the computer game that it doesn’t tell stories” [8]. While I would agree that the *playability* of games is not necessarily dependent on their ability to tell stories, I have nevertheless suggested a way to reconcile narrativity and interactivity. As I have argued elsewhere [10], this could be achieved by supplementing the binary opposition of narrativity and interactivity by a third element that I call *openness*, and by embedding this triad into Janet Murray’s triad of agency, immersion and rapture.

This approach has been partially confirmed by Marie-Laure Ryan’s discussion of the question whether immersion and interactivity can be reconciled. Ryan claims that “[t]he special power of interactive texts to generate a plurality of possible worlds could be regarded as a feature that facilitates the creation of an immersive plot” [18]. Originally, my definition of *openness* referred to the variety of options a player is offered in a computer

game, whereas the level of interactivity indicates the frequency of the player's input. Considering Ryan's conceptualization of an interactive storytelling system, however, this definition must be modified, so that openness now refers to the ability of a computer game to create possible worlds. This new definition does not contradict the definition given above, but it is broader in scope.

I discuss this in such detail here because it is this question that made me realize that a theoretical framework based on binary oppositions does not allow for a convincing solution of this problem. In this regard, my line of argument mimicks the poststructuralist critique of structuralism. While the structuralist approach to computer games might seem very feasible in the light of binary relations such as *protagonist/antagonist*, *winning/losing* and the bifurcations of the plot that are typical for computer games, there are equally convincing arguments for a poststructuralist approach.

The crucial factor in my decision in favor of the latter are structuralism's restrictions in handling ambivalence. The structuralist approach is tailor-made for texts that establish clear-cut oppositions such as fairytales, Enlightenment drama, and Western films. However, computer games challenge such clear-cut borders by questioning the role of the "author," by giving the player far-reaching possibilities of manipulating the text, and by adopting an aesthetics of simulation, rather than mimetic realism. While the narrative structures of computer games might still be rooted in a modernist, rather than a postmodernist, poetics, with a prevalence of epistemological ("Where is Princess Toadstool?") over ontological questions (cf. McHale [13]), they nevertheless have the potential to contest the status of what is construed as the real world.

The employment, or even abuse, of poststructuralist theory in the field of hypertext has raised the awareness for any kind of "theoretical imperialism". Therefore, I will end my plea for a poststructuralist approach to computer games with a *caveat* that will hopefully warrant an approach that is not too easily seduced by the powerful metaphors this theoretical framework supplies. As I have pointed out before, the problems literary studies faced in the 20th century – and the solutions that were devised for them – cannot be ignored in the study of computer games. But phenomena such as multi-linear narration can easily be accounted for *without* recourse to postmodern theory. In studying electronic media, we are easily lured into taking metaphors such as *trace*, *labyrinth*, or *simulacrum* at face value. In order to account for our susceptibility to these concepts, I suggest the integration of the role of the observer into the model of the semiotic process of playing.

THE CONSTRUCTION OF POSSIBLE WORLDS

The model I will present here is designed to account for several idiosyncracies of the study of computer games. First of all, it recognizes the playing of a computer game as a cybernetic system. It should be noted that while a computer game in and of itself may or may not be a cybernetic system,

it is only observable through playing it, just as a novel is only observable by reading it. When a game is being played, however, it not only becomes observable to the player, it also forms a cybernetic system of which both game and player are integral parts. The German philosopher Hans-Georg Gadamer recognized this when he said: “Das eigentliche Subjekt des Spiels ist nicht der Spieler, sondern das Spiel selbst” – the game’s actual subject is not the player, but the game itself. While this has stipulated all sorts of philosophical thought on the subject of games, especially the game of language, my main concern here is stressing the interdependence of game and player.

The second advantage of this model is that it enables us to account for the fact that observing a game necessarily entails influencing it. While reader response theorists are certainly correct in assuming that a printed text is at least in part constructed by its reader, the interactivity of electronic texts refers not only to the text as mentally reconstructed by the reader, but also to the text as seen by the reader. In the light of my decision to concentrate mainly on the surface of the game’s “text,” this might seem like an invalid argument, but since these textual levels correspond to two different modes of interaction, they can be incorporated in the model. If I put myself into a position from which I can observe myself playing, I can differentiate between *aesthetic interaction* and *hermeneutic interaction*, and this is exactly why the study of computer games should be regarded as a second-order cybernetic system.

The first step in understanding this model is to think about the model’s elements in a more abstract way. Up to now, when we were speaking of the player, what we had in mind was an empirical person playing a game. But when I observe myself playing a game, a curious thing happens: The *player* becomes less and less a part of me, and more and more a part of the game. This relocation is not to be understood metaphorically, as the emergence of what has been called the implied reader [7], or narratee [1]. Nor should it be taken literally, as a model presupposing a “split personality” for the student of computer games. Instead, this figure of speech intends to make us aware of the fact that our perception is dependent on our position in relation to what is perceived. From the perspective of the player, his or her actions make sense as a direct response to the fictional world of the game. This is what I call the mode of aesthetic interaction. From the perspective of the observer, the player’s individual interactions with the game are only meaningful as a textual strategy, alternatingly in accord with and directed against another textual strategy of the game. This is what I call the mode of hermeneutic interaction.

When playing a computer game, both of these processes are at work simultaneously. While aesthetic interaction increases the player’s immersion in the game, hermeneutic interaction comprises the “process of demystification” [7] that is part of the experience of playing a computer game. Of course, playing a game is not the same thing as studying it. But in both cases we have access to the game only through playing it. The approach of the student differs from the approach of the player only in its intention to

make sense of the game. Two concepts borrowed from semiotics will help us understand how the player's intention can be incorporated into our model – the concept of possible worlds and the concept of abduction.

Marie-Laure Ryan has outlined the potential of possible world theory for the study of electronic texts in her book *Possible Worlds, Artificial Intelligence, and Narrative Theory* [17]. The theory is based on the assumption that any fictional text can be regarded as a possible world and that a possible world can contain an unlimited number of sub-worlds. These sub-worlds can be embedded stories, as well as the beliefs, wishes, and obligations of the world's inhabitants. It is beyond the scope of this paper to provide a detailed account of possible world theory, but it should be clear from these brief remarks that the sub-worlds within the world of any given text are usually contradictory models of the world they are embedded in. In *The Truman Show*, for instance, Truman's knowledge world is radically at odds with every other inhabitant's (or the viewer's) knowledge about this world.

The concept of abduction has been developed by Charles S. Peirce and adapted for literary studies by Umberto Eco. In his book *The Limits of Interpretation* [4], Eco explains abduction as a form of conclusion that is the opposite of deduction, insofar as deduction starts from a rule, regards an instance of this rule, and concludes the necessary result, and abduction is the construction of an instance and a rule from an observed result. If I know that a) all the beans in a bag are black and b) the beans in my hand are from that bag, I can *deduce* c) that the beans in my hand are black. But if I see a') a handful of black beans next to a bag, I can *abduce* b') that the beans are from the bag and c') that all the beans in the bag are black. This is, of course, a hypothesis that requires verification, but it is also a much more pragmatic way to make sense of the world, because it requires neither a fixed rule nor a large number of results.

In the possible worlds of fiction, we, as the readers of novels or players of games, are constantly required to perform abductions on the information presented to us. Some abductions are trivial – when a car is mentioned in a book, we assume that it has four wheels. Some require the context to be taken into account – a driver can be a motorist or a piece of software – and some are creative. Creative abduction occurs frequently in literature, especially in mystery novels, where we are required to reconstruct a series of events leading to a crime without having access to all the necessary information. It occurs even more frequently, however, in computer games, in which we have to constantly second-guess the “intention” of the game.

The intention of the game corresponds to the *intentio operis* of a literary text – the strategy the text employs to construct its *ideal reader*. Similarly, a computer game constructs an ideal player by putting obstacles in his or her way, and by supplying the means to overcome them. By contrast, the player's intention, or *intentio lectoris*, is a textual strategy that is in a creative conflict with the game's intention. It is creative, insofar as its means are those of creative abduction, but it is also creative because the interplay between the two textual strategies creates the world of the game and makes it accessible

to both game and player. Creative abduction plays such a prominent role in games because there is usually a certain element of deceit involved. Whether we are playing against a person or against the computer, our opponent is usually reluctant to disclose his, her, or its strategy. This holds true even for abstract games such as *Tetris*, where the computer's choice of elements is a crucial factor.

As we have seen, the mode of interaction between game and player is constructive – it results in a fictional world that is accessible to all the parties involved. The crucial factor in this constructive interaction is the fact that the features of its result – such as interactivity and narrativity – cannot be attributed to either game or player. In the model of *computer gameplay* as a cybernetic system, these features are synergetic effects derived from the semiotic process that is at the core of the human-computer interaction. The apparent paradox that interactivity results from interaction is closely related to the paradoxical tendency of semiosis to progress by referring to itself. In order to understand this phenomenon of *re-entry*, we must therefore take a closer look at the semiotics of computer gameplay.

NEVERENDING STORIES

Charles S. Peirce once defined semiosis as “an action, an influence, which is, or involves, a cooperation of three subjects, such as a sign, its object and its interpretant, this tri-relative influence not being in any way resolvable into actions between pairs” [15]. In a computer game, these three subjects can be identified as the game, the player, and the world that is created through their interaction. In this model, the game is the *object*, which can only be experienced through the signs that refer to it, the player is the *sign*, and the world of the game is the *interpretant*. Since signs always mean something *for* someone, the observer makes sense of the game by basing a second semiotic triad on the interpretant, thereby making it the object of this second semiotic step. It should be clear from the above that this operation can be repeated *ad infinitum*, gaining complexity in the process. And it should also be clear that semiosis operates mostly on itself, thereby comprising an *autopoietic* process.

While many students of Peirce's semiotic model have grappled with the implications of an infinite semiosis, we don't have to concern ourselves with this problem for the time being. There is a natural end to most things, even to “unfinishable” games such as *Space Invaders* or *SimCity*, which is usually marked by a pragmatic decision. Or, in the words of the semiotician John Boler: “That I could do something more does not mean I have not finished it” [2]. Instead, I would like to point out some ways in which this semiotic model can be applied. As I have mentioned before, some key characteristics of computer games can be regarded as synergetic effects of the semiotic process of playing. Therefore, I would like to finish this paper by offering a semiotic view on computer games and narrative.

It is hardly a revolutionary thought to regard narrative as a construct of a text's reader. While post-structuralist thinkers such as Roland Barthes have given the reader the freedom to arrange the elements of a text, or its *textons*, virtually at will, even "conservative" reader-response theorists have pointed out the importance of the reader's memory and predictions in constructing a coherent plot. The semiotic take on this matter differs in one important detail. Since semiotics assumes that it is impossible *not* to interpret the text you are reading, the construction of narrative coherence can be regarded as an interpretative strategy. Like every other strategy employed to make sense of a text, this strategy is based on abduction.

What has been said about abduction in general also holds true for *narrative abduction*. It can be trivial, context-dependent, or creative, and its potential is greatly enhanced in electronic texts. In computer games, most narrative abduction is creative, since we have to ascribe meaning to what we do in a game. The key concept to understand this form of narrative abduction is the possible world formed by the player's wishes regarding the outcome of the game. The "wish-world" of the player is a sub-world of the game-world, and contains the ideal outcome of the game along with plans meant to attain this goal. The process of playing a game makes some of these plans seem more feasible than others, which is why the wish-world must be frequently checked against the game world and updated accordingly. While an increase in discrepancy between these two worlds is perceived as a retarding element, an increase in similitude is perceived as narrative progress. This holds true even for games rather short on narrative, such as *Quake*. The narrative potential of such games can be assessed retroactively by comparing the player's plans with the actual action on the screen. The difference between the two results in an asynchronous element that allows for narrative suspense and the use of techniques like "flash-back" and "flash-forward". For an "objective" observer, there is not much to be seen – which explains the hostility of over-protective parents towards computer games – but from the subjective viewpoint of the player, a game of *Quake* is full of dramatic twists and turns.

Kücklich:
The Study
of Computer
Games as a
Second-Order
Cybernetic
System

REFERENCES

1. Aarseth, E. *Cybertext – Perspectives on Ergodic Literature*. Johns Hopkins University Press, Baltimore, 1997.
2. Boler, John: *Habits of Thought*. In *Studies in the Philosophy of C.S. Peirce*. Edited by E.C. More and R.S. Robin. University of Massachusetts Press, Amherst, 1964.
3. Chatman, S. *Story and Discourse*. Cornell University Press, Ithaca, NY, 1978.
4. Eco, U. *The Limits of Interpretation*. Indiana University Press, Bloomington, 1990.
5. Fish, S. "Interpreting the *Variorum*." In *Critical Inquiry* 2 (Spring 1976), University of Chicago Press, Chicago, 465–85.
6. Friedman, T. "Making Sense of Software." In: *Cybersociety*. Edited by S.G. Jones. Sage Publications, Thousand Oaks, 1995.

7. Iser, W. *The Implied Reader: Patterns of Communication in Prose Fiction from Bunyan to Beckett*. Johns Hopkins University Press, Baltimore, 1974.
8. Juul, J. "A Clash between Game and Narrative." M.A. Thesis 1998. Online document available at: <http://www.jesperjuul.dk/thesis>.
9. Kirksæther, J. "The Structure of Video Game Narration." Online document available at: <http://cmc.uib.no/dac98/papers/kirksaether.html> .
10. Kücklich, J. "Literary Theory and Computer Games". In *Cosign Proceedings* (Amsterdam, Spetember 2001), CWI, 51–58
11. Landow, G.P. *Hypertext: The Convergence of Contemporary Literary Theory and Technology*. Johns Hopkins University Press, Baltimore, 1992.
12. Laurel, B.K. *Computers as Theatre*. Addison-Wesley, Reading, Mass.,1991.
13. McHale, B. *Postmodernist Fiction*. Methuen, London, 1987.
14. Murray, J.H. *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*. The Free Press, New York, 1997.
15. Peirce, C.S. *Collected Papers*. Harvard University Press, Cambridge 1934–1948.
16. Propp, V. *Morphology of the Folktale*. 2nd ed. Translated by Laurence Scott. University of Texas Press, Austin, 1968.
17. Ryan, M.L. *Possible Worlds, Artificial Intelligence, and Narrative Theory*. Indiana University Press, Bloomington and Indianapolis, 1991.
18. Ryan, M.L. *Narrative as Virtual Reality. Immersion and Interactivity in Literature and Electronic Media*. Johns Hopkins University Press, Baltimore, 2001.