Gonzalo Frasca

Ludology: From Representation to Simulation

Gonzalo Frasca
www.ludology.org
frasca@ludology.org

ABSTRACT
Most of the current studies of the creative potential of computer games have been done through tools designed for narrative media (literary theory, narratology, film theory). Several attempts have been made by both academics and designers to create "interactive narratives" that would allow players to experience the qualities of narrative while being able to interact with the environment, characters, and events in the "story." Nevertheless, authors have so far failed to provide a compelling example of "interactive fiction." Brenda Laurel, a long-time advocate of this genre, recently described it as "a hypothetical beast in the mythology of computing, an elusive unicorn we can imagine but have yet to capture." [Laurel 2001]

In this paper I argue, following the work of such theorists as Espen Aarseth and Markku Eskelinen, that narrative is not the best paradigm for understanding not only computer games but also cybernetic art and toys, simply because they do not rely on traditional representation but on simulation.

By simulation, I mean an alternative form of describing and understanding reality that is based on the modeling of systems. My semiotic approach to simulation is close to the one developed by computer science's simulation theory, but it differs in that its goal is not necessarily predicting behaviors. Rather, I view it as an alternative representational form that opens a new set of rhetorical possibilities that stress system behavior and user experimentation.

By comparing the similitude and differences between simulation and representation, I will provide a theoretical framework that will allow us to better comprehend the process behind the interpretation of such cybernetic systems as toys, cyberarts, traditional games, and computer games. My ultimate goal is to contribute to the understanding of the rhetorical characteristics of these simulational media.

THE NARRATED COMPUTER

The fact that researchers chose drama and literary theory to understand the video game phenomenon was not simply due to the "narrative" aspirations of the new medium but also the lack of a formal theory of games and play activities – not to be confused with the mathematical "game theory." Historically, academics have been reluctant to incorporate games into their fields of study. While there are several exceptions (Huizinga, Piaget, Wittgenstein, Sutton-Smith) these approaches are far from unified, and they lack the coherence that would have encouraged the development of a ludology, a formal discipline of game studies.

Brenda Laurel's *Computers as Theatre* [Laurel 1993] was one of the first major attempts to understand the computer in general and video games in particular. She basically relied on Aristotelian drama in order to sketch an early poetics of the medium. The next approach that was successful with both the academia and the industry was Janet Murray's [Murray 1997], who viewed the computer as a new medium for storytelling, combining notions of narrative and 19th century literature. More recently, Lev Manovich [Manovich 2001] applied film theory to explain the characteristics of digital art and games. As these examples show, the narrative/drama paradigm has been leading the discussion about the characteristics of the new medium. Espen Aarseth was one of the few researchers who contested this trend, claiming that these objects differ ontologically from narrative and should be treated within a different framework:

> ... the prevailing attempts to rejuvenate and relocate existing theories by insisting on their relevance for the new media and their largely unsuspecting users, is a "colonialist" strategy that is always a demonstration of (unnecessary) power and often a misreading of the theory being used. [Aarseth 1998]

Aarseth viewed electronic texts—and games—as cybernetic systems "where nontrivial effort is required to allow the reader to traverse the text." [Aarseth 1997] While Aarseth's work is revolutionary, it has not yet attained the mainstream attention that it deserves among the video game community. One of the possible reasons may be that Aarseth's *Cybertext* was an answer to the mainstream hypertext criticism of the mid-1990s, and, therefore, it heavily relies on literary examples.

My goal in this paper is to expand Aarseth's cybernetic paradigm while applying it to toys and games, which, unlike literature, are generally less "contaminated" by narrative assumptions. Once I review the particular characteristics of simulation as opposed to representation, I will analyze the process of interpretation on simulated systems. The next step will be to situate simulation within play and games. To conclude this introduction to the basis of ludology, I will review some of the rhetorical differences between representation and simulation.

REPRESENTATION/SIMULATION

As a civilization, we have been taking representation for granted. Our culture breathes signs, and we structure them into stories in order to both explain and understand our world. Nevertheless, simulation is probably as old as representation as an alternative way of accomplishing those same tasks.

Simulation—not understood here simply as the computer-science technique but rather as a representational form—is "[the representation of] the dynamic responses of one system by the behaviour of another system modeled after it." [Britannica 2002] Unlike representation, simulation focuses on the systems' behaviors. A drawing represents a car: it tells us about its shape and color. A toy car not only mimics a real car's shape and color, but also reproduces some of its behaviors: the wheels turn, the car moves, the doors can be opened and closed. Certainly, just like it happens with representation, the relationship between the "real" object and its model is arbitrary: the toy car is not a real car, but just a limited, subjective approximation based on social convention.

As I said, simulation has always been an alternative to representation. Humans have developed several forms of simulation such as mechanical automata that model the behavior of animals and even humans. The military has always relied on modeling in order to plan battles. Both scientists and educators have also drawn upon it for explaining and understanding the behavior of systems. In spite of the existence of these and many other examples, the fact is that representation—and its structured version: narrative—has prevailed as the form of choice for our civilization to understand the world. The proof is that all traditional mass media (press, cinema, television, radio) rely on representation.

However, the situation is changing. The reason why simulation has not played a more important role in the representational arena is merely technological. Unlike representation, which is exclusively based on signs, simulation needs a cybernetic model to work. There is a limit of what gears and cogwheels can do for modeling complex systems. Until the invention of the electronic computer, simulation lacked a medium that provided the required mathematical and data-crunching abilities for modeling complex systems. Both the military and scientists were among the first to apply computational resources to simulation. However, it was a far less "serious" application that popularized simulation into a mass medium. Obviously, I am referring to video games.

INTRODUCTION TO "SIMIOTICS" OR SIMULATION SEMIOTICS

Finnish artist and theorist Markku Eskelinen goes straight to the point: "Outside academic theory, people are usually excellent at making distinctions between narrative, drama, and games. If I throw a ball at you, I don't expect you to drop it and wait until it starts telling stories." [Eskelinen 2000] There are probably many reasons that explain why most academics fail to discern between narrative and simulation. One is that "narrative" has become an overused metaphor that has lost most of its meaning and is usually applied to any structured gathering of signs, disregarding both their production mechanisms and phenomenology. Most of the problems of the advocates of "interactive narrative" are due to the fact that they usually fail at providing a coherent definition of narrative to start with. I personally subscribe to Gerald Prince's definition:

> "The recounting (as product and process, object and act, structure and structuration) of one or more real or fictitious EVENTS communicated by one, two, or several (more or less overt) NARRATORS to one, two, or several (more or less overt) NARRATEES." [Prince 1987]

According to this definition, a doll is not a narrative, simply because it is a system with no events. Surely, a player could manipulate it, creating events that could be viewed as a narrative—or drama—by a third person. However, this is just a consequence of the player's actions and not really the act of playing. Most games could be viewed as sequences of events and could therefore be interpreted as narratives, but as Aarseth points out, watching and playing a soccer game are essentially different activities. Certainly, some people do play games to create narratives (some Quake players record their performances as movies in order to later show them to their friends). Apart from these exceptions, games are about performing within a constrained environment. The main goal of the player is either to win or to enjoy the match and not simply to "recount events."

A computer game like Quake is a system with a set of rules, and those rules can produce different outcomes. On the other hand, a narrative is not a system with potential outcomes but rather a fixed sequence of events. Here is where the sophisticated literary reader will stand up and say: "Stop! Of course a narrative is a system with potential outcomes, since it will generate as many interpretations as readers are available." Well, the reader is right: a text can be interpreted in infinite ways, but here we are dealing with two different interpretational levels that traditional semiotics is not prepared to deal with. One is conventional interpretation, and the other is a form that deals with what Aarseth calls ergodics (understood as the rules that govern the mechanics of the representation that need to be manipulated by the reader/player).

For the sake of simplicity, let's go back to the example of the doll. If we consider a doll as a sign representing a woman, we know that this sign could be interpreted in several ways. For example, the doll could be interpreted as a religious object or maybe as a depiction of a cultural stereotype of beauty. But this doll could also be interpreted on the ergodic level, according to its systemic behavioral rules. Ergodic interpretation is the process that creates a mental model, a concept introduced by Philip Johnson-Laid. [Johnson-Laid 1995] Basically, the user's mental model is her idea of the rules of the simulated model. These two models may or not match, and that explains why different users may "interpret" the ergodic level differently. Depending on the experience that the user had with the doll, he may have learned some of its rules: "if the doll lies horizontally, it will close its eyes," "the doll will make a noise every time that her tummy is pressed," or "the doll's legs and arms will move if manipulated."

Traditional semiotic models can easily explain "traditional" interpretation, but fail to provide the tools for understanding how the mental model is created. This is a problem that has arisen several times, particularly among works of art that trespass the limits of representation and start simulating. These are what Umberto Eco called "open works": cybernetic works such as Cortazar's combinatorial texts or even kinetic sculptures such as Calder's mobiles. If I want to interpret a doll, it is not enough to construct meaning from it, but I also need to understand how it works. A mobile by Calder is not an object, but a system that will produce different instances depending on the forces that are applied to it. It is not about a shape, but about all the potential shapes and sequences of positions that are allowed by its systemic constraints. Imagine that two observers are presented with a mobile. The first views it from a distance, on a day without wind, while the second appreciates its movement on a windy day. Both observers could have the same interpretation about its "meaning." For example, both could agree that the sculpture depicts a tree. However, if the first one is not familiar with the work of Calder, she may think that it is a static sculpture. The latter learned something that the former did not: the sculpture has behavioral rules; it has moving parts that can be manipulated by the wind. As a sign, the sculpture was interpreted similarly. However, the ergodic interpretation differed when the sculpture was viewed as a system; the mental model crafted by each observer was different.

Ergodic interpretation is about interpreting the rules. A reader who is not familiar with computers may face a hypertext but believe it is a simple text because he is not aware of the rule: "click on the links to view another piece of text." This has nothing to do with the interpretation of the text itself. The same applies to games, and particularly video games. Games are not only interpreted for their signs, but also for their rules. Some rules may be explicit (explained in a manual), while others are discovered by the player through her interaction with the system.

The failure to distinguish between traditional and ergodic interpretation usually leads to the belief that the multiple outcomes produced by cybernetic systems such as games, toys, or cyberarts are simply due to the fact that they also support multiple interpretations. Certainly, narrative is constructed in the reader's mind, and there are laws that rule its interpretation. The difference is that narrative cannot be interpreted at the ergodic level because it is not a cybernetic system. Narrative is about fixed sequences of signs, while simulations are about rules for combining signs. Simulation builders are not simply concerned with conveying "meaning," but also with conveying the rules for manipulating their works.

"IT'S A STORY. IT'S A PLAY. IT'S A SIMULATION!"

Basically, simulations can be discriminated into two groups: "play" and "game" or, to use Roger Caillois' terminology, as paidea and ludus. [Caillois 1967] I will use these two terms in a slightly different way

than Caillois, who described them extensively but failed to provide a structural rule to differentiate them. According to my definition, ludus can be understood as simulations where the users can either win or lose. Ludus can easily be recognized because they have a set of rules that states the result of the game. These rules are social: an agreement is needed for them to be effective, and the player cannot change them without the consent of other players. This is why Piaget argues that before socialization, children do not understand the concept of "winning" and "losing." [Piaget 1991] Paidea, on the other hand, are all playing activities that do not have these rules. Examples of the former are chess and soccer; among the latter I can mention playing with dolls or building objects with Lego bricks.

Probably the best way to realize the differences between simulation and narrative is to consider their respective rhetorical characteristics. A narrative author, like Balzac, had a particular mental model of 19th century Paris. As an artist, he was able to find patterns and rules of behavior among individual citizens, families, and social classes. He could have chosen infinite ways to describe this system through narrative. Instead, he chose a large but finite number of stories to convey his observations. Each of those stories could also have been presented in infinite ways, but among all those "narrative possibilities," [Bremond 1973] he chose a finite sequence of events.

Video game designer Will Wright also had particular ideas about society and urbanism. But instead of writing stories, he created a simulator that allowed people to build models of either fictitious or real cities. He did not craft fixed sequences of events, neither textual nor audiovisual. There is no narrative in his "Sim City" that says: "Workers needed a recreational space, so the mayor built a park next to their houses." Instead, Wright coded rules such as: "If people do not get recreational spaces, they will complain." These are subtle, but essential, rhetorical differences.

The rules of the system could be explicit (written in a manual) or implicit (meant to be discovered through experimentation). Of course, Balzac's stories also depicted characters with behavioral rules, but those rules were not part of the final product but rather resided in the reader's head, where they were inferred. The reader can conclude that a character has a good heart because of the way the character behaves within the story. But that rule is created by the reader from her personal interpretation. It does not reside within the system, and, more importantly, it is not dynamic so it can not be manipulated. On the other hand, a simulation like "Sim City" can be interpreted on the ergodic level. We may learn that building communities too close to factories is not a good thing, not because we read a story about the tragic fate of some poor Sim-citizens, but rather because the experienced player will realize it through experimentation. This kind of information has nothing to do with traditional interpretation such as "factories are bad," "the author is an ecologist," etc. Ergodic interpretation only deals with the rules of the system.

Unlike narrative, simulations encourage experimentation. The pleasure does not lie on "what will happen next," but rather on "what will happen if." Narrative and simulation are two disparate ways of looking at reality: the first focuses on the particular while the latter focuses on generalities.

The rhetoric of these forms is closely tied to their ideology. As Marxist drama theorist Augusto Boal explains, narrative is a form that is based on causality and fate [Boal 1998]: stories carry the ideology of inexorability, of what cannot be changed. On the other hand, simulation requires change to exist. Simulation is not about "what happened to Mister X based on his particular actions," but rather "what could happen to Mister X based on his potential behavior." It is not surprising that Boal, an artist who seeks social and personal change, has embraced simulation over narrative as the main means for attaining his goals.

Still, it is essential to keep in mind that even if simulation carries the flag of change and freedom of action, this is mainly an illusion. Simulations do have authors who define the rules of the system, and players always have a constrained degree of freedom. While it is true that simulation is less tyrannical than narrative, we should always be aware that it still is a construction which carries a very concrete bias. This was the error of early hypertext theorists [Landow 1992] who believed hypertext blurred the limits between author and reader. Simulations do have authors, but they are different from the traditional ones: they are lawmakers rather than judges.

WHY THE DIFFERENCE MATTERS

For an external observer, the debate over whether video games are narratives may seem irrelevant. But the fact is that it is essential, not only for the sake of creating more compelling games, but also in order to truly understand the potential of this form. The applications of simulations are not limited to entertainment, but also to all kinds of communication, including art, education, philosophy, politics, advertising, religion, and a long etcetera. But we cannot reach the full potential of this representational form unless we drop the narrative paradigm and focus on understanding the particular mechanics of ludology.

For the first time in human history, we have access to a technology that gives us the chance to portray complex systems, with thousands of interrelated variables. Our civilization has heavily relied on narrative —myths, grand narratives—to explain itself. Now, it has created a new, powerful tool that can provide different kinds of explanations. The question here is not if simulation is worse or better, or even if it will replace narrative, but rather: "What can we learn through simulation?" If we keep trying to accommodate simulation into narrative, its potential will remain suffocated. The hard task of unveiling the power of simulation probably relies on two disparate agents with important messages to convey: artists and advertisers. By the former I specifically think about visual artists, who are less likely to be constrained by the narrative corset. The latter, because they make a living through rhetoric and because the recent development of advergames—a mixed breed of online advertising and video games—may popularize the idea that video games have something to say, even if their message is simply "buy this soap." Maybe some day, after the public gets used to the rhetorical capacities of simulation, a social theorist will decide that instead of building her philosophical work upon a narrative, she may deliver it as a simulation or a game. After all, it is not impossible to speculate that, for example, Marx could have built a simulator that explored the economic and social rules behind socialism instead of just writing a book about it. Probably, such "Sim-Kapital" would not have been any good at predicting the problems of "real socialism." But if it had been addressed to a mass of people raised on video games, who knows whether it may not have been more appealing, and convincing, than several hundred pages of obscure terminology. The only way to know how our civilization will react to simulation is by building models of our realities and developing a strong set of ludological tools. And this is the reason why these are such exciting times for anybody who has both a computer and something compelling to say.

REFERENCES

AARSETH, E. 1998. Aporia and Epiphany in Doom and The Speaking Clock: Temporality in Ergodic Art. In Marie-Laure Ryan (ed.) *Cyberspace Textuality*. Bloomington and Indianapolis: University of Indiana Press, 1-14.

BOAL, A. 1998. *Theatre of the Oppressed*. New York: TCG.

BREMOND, C. 1973. *Logique du récit*. Paris: Seuil.

CAILLOIS, R. 1967. *Les jeux et les hommes. Le masque et le vertige*. Paris: Gallimard, Cher.

ESKELINEN, M. 2001. The gaming situation. In Gamestudies #1. cmc.uib.no/gamestudies/0101/eskelinen/

JOHNSON-LAID, P. 1995. *Simulation Model Design and Execution: Building Digital Worlds*. New York: Prentice Hall.

JOHNSON-LAID, P. 1997. *Cybertext: Perspectives on Ergodic Literature*. Baltimore: Johns Hopkins.

LANDOW, G. P. 1992. *Hypertext: The convergence of contemporary critical theory and technology*. Baltimore: Johns Hopkins.

LAUREL, B. 2000. *Utopian Entrepreneur*. Cambridge: MIT Press.

LAUREL, B. 1993. *Computers as Theatre*. London: Addison-Wesley.

MANOVICH, L. 2001. *The language of new media*. Cambridge, Mass: MIT Press.

MURRAY, J. 1997. *Hamlet on the Holodeck*. New York: Free Press.

PIAGET, J. 1991. *La formación del símbolo en el niño. Imitación, juego y sueño. Imagen y representación*. Buenos Aires: Fondo de Cultura Económica.

PRINCE, G. 1987. *The Dictionary of Narratology*. Lincoln and London: University of Nebraska Press.

SAFRA, J. E. 2002. Ed. Britannica 2002. Standard CD-ROM version.

WRIGHT, W. 1995. Sim City 2000. *Electronic Arts.* 1995.