GAME DESIGN AND MEANINGFUL PLAY

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We have only to watch young dogs to see that all the essentials of human play are present in their merry gambols. They invite one another to play by a certain ceremoniousness of attitude and gesture. They keep to the rule that you shall not bite, or not bite hard, your brother's ear. They pretend to get terribly angry. And—what is most important—in all these doings they plainly experience tremendous fun and enjoyment. Such rompings of young dogs are only one of the simpler forms of animal play. There are other, much more highly developed forms, including regular contests and beautiful performances before an admiring public.

. . .

Even it its simplest forms on the animal level, play is more than a mere physiological phenomenon or a psychological reflex. It goes beyond the confines of purely physical or purely biological activity. It is a significant function—that is to say, there is some sense to it. In play there is something "at play" which transcends the immediate needs of life and imparts meaning to the action. All play means something. (Huizinga, 1955, p. 446, emphasis added)

Johan Huizinga is one of the greatest scholars of play in the twentieth century. His groundbreaking book, *Homo Ludens*, is a unique investigation of the role of play in human civilization. The title is a play on *Homo sapiens*, translated as *Man the Player*. According to Huizinga, play and games, which have been maligned in recent history as trivial and frivolous, are in fact at the very center of what makes us human. "Play is older than culture," as Huizinga puts it, and *Homo Ludens* is a celebration of play that links the visceral, combative nature of contest directly to war, poetry, art, religion, and other essential elements of culture. *Homo Ludens* is, in many ways, an attempt to redefine and elevate the significance of play.

Huizinga's vision of play offers a perfect point of departure for our development of the concept of meaningful play. Let us begin with a close reading of one section of the opening passage from *Homo Ludens*:

"It [play] is a significant function—that is to say, there is some sense to it. In play there is something "at play" which transcends the immediate needs of life and imparts meaning to the action. All play means something."

Huizinga emphasizes the fact that all play *means* something, that there is "sense" to play, that it transcends. The idea that "all play means something" is a wonderfully complex statement we can interpret in a variety of ways. In fact, all of the following are possible readings of the text:

- Huizinga says that play is a *significant function*. Does this mean that play is an important (and possibly unrecognized) force in culture—that it is significant in the way that art and literature are? Or does he mean that play *signifies*—that it is a symbolic act of communication?
- He mentions that there is *some sense* to play. Does he mean that play isn't solely chaotic, but is instead an event that can be understood and analyzed if one looks closely enough? Or is he implying that sense itself (the opposite of nonsense) is something intrinsically related to play?
- There's the complex statement: *In play there is something "at play."* Does Huizinga mean that there is always something deeper "at play," which constitutes any instance of play we observe in the real world? Or that in play something is always in motion, never fixed, and in a constant state of transformation?
- This "at play" quality of play *transcends the immediate needs of life*. Does the word "transcend" imply something spiritual? Or does Huizinga simply mean that play creates an artificial space beyond that of ordinary life?
- The same "at play" characteristic of play *imparts meaning to the action*. Does the fact that play is always "at play" relate to the meaning of the action? Or does it imply that play must be understood as one

element of a more general system out of which meaning grows?

· The passage concludes with the sentence, *All play means something*. But what does play mean? To who or what is it meaningful? What is the process by which meaning emerges from play?

These are complex and multilayered questions, lacking definitive answers. In some sense, each of the interpretations posed are implied in Huizinga's statement, and all of them point to key aspects of play and play's participation in the creation of meaning. These important questions, and their possible answers, contain all of the main themes of this essay. We will, in the pages that follow, investigate the intricate relationships among game design, play, and meaning.

Meaning and Play

Learning to create great game experiences for players—experiences that have meaning and are meaningful—is one of the goals of successful game design, perhaps the most important one. We call this goal the design of *meaningful play*, the core concept of our approach. This concept is so critical to the rest of this chapter that we are going to repeat ourselves: *the goal of successful game design is the creation of meaningful play*. Meaningful play is that concept which can address all of the "unanswerable" questions raised by Huizinga. It is also a concept that raises questions of its own, challenging assumptions we might have about the role of design in shaping play.

One of the difficulties in identifying meaningful play in games is the near-infinite variety of forms that play can take. Here are some examples:

· the intellectual dueling of two players in a well-met game of Chess
· the improvisational, team-based balletics of Basketball
· the dynamic shifting of individual and communal identities in the online role-playing game *Everquest*
· the lifestyle-invading game Assassin, played on a college campus

What do all of these examples have in common? Each situates play within the context of a game. Play doesn't just come from the game itself, but from the way that players interact with the game in order to play it. In other words, the board, the pieces, and even the rules of Chess can't alone constitute meaningful

play. Meaningful play emerges from the interaction between players and the system of the game, as well as from the context in which the game is played. Understanding this interaction helps us to see just what is going on when a game is played.

One way of framing what players do when they play a game is to say that they are making choices. They are deciding how to move their pieces, how to move their bodies, what cards to play, what options to select, what strategies to take, how to interact with other players. They even have to make the choice whether or not to play!

When a player makes a choice within a game, the action that results from the choice has an outcome. In Chess, if a player moves a piece on the board, this action affects the relationships of all of the other pieces: one piece might be captured, or a king might suddenly find itself in check. In Assassin, if a player stealthily stalks her target and manages to shoot him with a dart gun, the overall game changes as a result of this action: a hit is scored, the victim is out for the rest of the game, and he must give *his* target name to the player that just shot him. In *EverQuest*, if you engage with and kill a monster, the stats and equipment of your character can change; and the larger game-world is affected as well, even if it simply means that for the moment there is one less monster.

Playing a game means making choices and taking actions. All of this activity occurs within a game system designed to support meaningful kinds of choice making. Every action taken results in a change affecting the overall system of the game. Another way of stating this point is that an action a player takes in a game results in the creation of new meanings within the system. For example, after you move a piece in chess, the newly established relationships between chess pieces gives rise to a new set of meanings—meanings created by the player's action.

Two Kinds of Meaningful Play

We define meaningful play in two separate but related ways. The first sense of meaningful play refers to the way game actions result in game outcomes to create meaning. Framing the concept in this way, we offer the following definition:

Meaningful play *in a game emerges from the relationship between player action and system outcome; it is the process by which a player takes action within the designed system of a game and the system responds to the action. The* meaning

of an action in a game resides in the relationship between action and outcome.

Think about an informal game of "Gross-Out" played during an elementary school recess. One by one, players tell a gross-out story, each tale more disgusting than the last. When a story is finished the group spontaneously and collectively responds, confirming or denying the player's position as master of the playground, until such time that an even grosser story is told.

If we look at Gross-Out from the perspective of meaningful play, we see that a player takes an action by telling a story. The *meaning* of the action, as a move in a game, is more than the narrative content of the story. It is also more than the theatrics used to tell the story. The outcome of the storytelling action depends on the other players and their own voting actions. Meaningful play emerges from the collective action of players telling and rating stories. The *meaning* of the story, in the sense of meaningful play, is not just that Hampton told a whopper about his little brother eating a live beetle—it is that Hampton's story has beaten the others and he is now the undisputed Gross-Out king.

This way of understanding meaningful play refers to the way *all* games generate meaning through play. Every game lets players take actions, and assigns outcomes to those actions. We therefore call this definition of meaningful play *descriptive*, because it describes what happens in every game. This is our first understanding of meaningful play.

At the same time, some games create more meaningful play than other games: the design of some games generates truly meaningful experiences for players, whereas other, less successful game designs result in experiences that somehow fall short. Even if meaningful play is a goal that we strive to achieve in our games, sometimes we don't quite get it right. So, in addition to our descriptive understanding of meaningful play, which describes what happens in all games, we need something that will help us be more selective in determining when meaningful play occurs.

This is the second sense of meaningful play. Instead of being a description of the way games operate, it refers to the goal of successful game design. This sense of meaningful play is *evaluative*: it helps us critically evaluate the relationships between actions and outcomes, and decide whether they are meaningful enough within the designed system of the game:

Meaningful play *occurs when the relationships between actions and outcomes in a game are both* discernable *and* integrated *into the larger context of the game. Creating meaningful play is the goal of successful game design.*

The word "meaningful" in this sense is less about the semiotic construction of meaning (how meaning is made) and more about the emotional and psychological experience of inhabiting a well-designed system of play. In order to understand why some play in games is more meaningful than others, we need to understand the key terms in the definition: *discernable* and *integrated*.

Discernable

Discernable means that the result of the game action is communicated to the player in a perceivable way. In the following excerpt from *Game Design: Theory and Practice*, Richard Rouse III points out the importance of displaying discernable information to the player within the context of the game-world. His example looks explicitly at computer games where there is an obvious need to condense massive amounts of data into a representative form that can be clearly communicated to the player. The idea of discernable outcomes applies to all games, digital or otherwise. Rouse writes,

Consider a strategy game in which the player has a number of units scattered all over a large map. The map is so large that only a small portion of it can fit on the screen at once. If a group of the player's units happen to be off-screen and are attacked but the player is not made aware of it by the game, the player will become irritated. Consider an RPG where each member of the player's party needs to be fed regularly, but the game does not provide any clear way of communicating how hungry his characters are. Then, if one of the party members suddenly keels over from starvation, the player will become frustrated, and rightly so. Why should the player have to guess at such game-critical information? (Rouse, 2001, p. 141)

If you shoot an asteroid while playing a computer game and the asteroid does not change in any way, you are not going to know if you actually hit it or not. If you do not receive feedback that indicates you are on the right track, the action you took will have very little meaning. On the other hand, if you shoot an asteroid and you hear the sound of impact, or the asteroid shudders violently, or it explodes (or all three!) then the game has effectively communicated the outcome of your action. Similarly, if you move a board game piece

on the board but you have absolutely no idea whether your move was good or bad or if it brought you closer to or farther away from winning—in short, if you don't know the meaning of your action—then the result of your action was not discernable. Each of these examples makes clear that when the relationship between an action and the result of that action is not discernable, meaningful play is difficult or impossible to achieve.

Discernability in a game lets the players know *what* happened when they took an action. Without discernability, the player might as well be randomly pressing buttons or throwing down cards. *With* discernability, a game possesses the building blocks of meaningful play.

Integrated

Another component of meaningful play requires that the relationship between action and outcome is *integrated* into the larger context of the game. This means that an action a player takes not only has immediate significance in the game, but also affects the play experience at a later point in the game. Chess is a deep and meaningful game because the delicate opening moves directly result in the complex trajectories of the middle game—and the middle game grows into the spare and powerful encounters of the end game. Any action taken at one moment will affect possible actions at a later moment.

Imagine a multi-event athletic game, such as the Decathlon. At the start of the game, the players run a footrace. What if the rules of the game dictated that winning the footrace had nothing to do with the larger game? Imagine what would happen: the players would walk the race as slowly as possible, trying to conserve energy for the other, more meaningful events. Why should they do anything else? Although one of them will win the footrace, it will have no bearing on the larger game. On the other hand, if the players receive points depending on how well they rank and these points become part of a cumulative score, then the actions and the outcomes of the footrace are well integrated into the game as a whole.

Whereas discernability of game events tells players *what* happened (*I hit the monster*), integration lets players know *how* it will affect the rest of the game (*If I keep on hitting the monster I will kill it. If I kill enough monsters, I'll gain a level.*) Every action a player takes is woven into the larger fabric of the overall game experience. This is how the play of a game becomes truly meaningful.

Meaningful play can be realized in a number of ways, depending on the design of a particular game.

There is no single formula that works in every case. In the example of the asteroid shooting game, immediate and visceral feedback was needed to make the action discernable. But it might also be the case that in a story-based game, the results of an action taken near the beginning of the game are only understood fully at the very end, when the implications play out in a very unexpected and dramatic way. Both instances require different approaches to designing meaningful play.

Meaningful play engages several aspects of a game simultaneously, giving rise to layers of meaning that accumulate and shape player experience. Meaningful play can occur on the formal, mathematically strategic level of a single move in Chess. It can occur on a social level, as two players use the game as a forum for meaningful communication. And it can occur on larger stages of culture as well, where championship Chess matches can be used as occasions for Cold War political propaganda, or in contemporary philosophical debates about the relative powers of the human mind and artificial intelligence.

The rest of this chapter elaborates on the many ways that game designers construct spaces of meaningful play for players. Among the many topics we might select, we cover three core concepts that form several of the fundamental building blocks of game design: *design*, *systems*, and *interactivity*.

Design

What is the "design" in *game design* and how is it connected to the concept of "meaningful play"? In answer to this question, we offer the following general definition of design: *Design is the process by which a designer creates a* context *to be encountered by a* participant, *from which* meaning *emerges.*

Let us look at each part of this definition in relation to game design:

- The *designer* is the individual game designer or the team of people that create the game. Sometimes, games emerge from folk culture or fan culture, so there may not be an individual designer or design team. In this case, the designer of the game can be considered culture at large.
- The *context* of a game takes the form of spaces, objects, narratives, and behaviors.
- The *participants* of a game are the players. They inhabit, explore, and manipulate these contexts through their play.
- *Meaning* is a concept that we've already begun to explore. In the case of games, meaningful play

is the result of players taking actions in the course of play.

This connection between design and meaning returns us to the earlier discussion of meaningful play. Consider a game of Tag. *Without* design we would have a field of players scampering about, randomly touching each other, screaming, and then running in the other direction. *With* design, we have a carefully crafted experience guided by rules, which make certain forms of interaction explicitly meaningful. *With* design a touch becomes meaningful as a "tag" and whoever is "It" becomes master of the domain. The same is true of computer games as well. As game designer Doug Church puts it, "The design is the game; without it you would have a cd full of data, but no experience" (Church, 1999).

Design and Meaning

When we ask what something "means," particularly in the context of design, we are trying to locate the value or significance of that instance of design in a way that helps us to make sense of it. Questions such as, "What does the use of a particular color mean on a particular product?" or "What does that image represent?" or "What happens when I click on the magic star?" are all questions of *meaning*. Designers are interested in the concept of meaning for a variety of reasons, not least of which is the fact that meaning is one of the basic principles of human interaction. Our passage through life from one moment to the next requires that we make sense of our surroundings—that we engage with, interpret, and construct meaning. This movement toward meaning forms the core of interaction between people, objects, and contexts.

Consider the act of greeting a friend on the street. A wave, a nod, a kiss on the cheek, a pat on the back, a warm hug, a firm handshake, and a gentle punch in the arm are all forms of interaction meaning, "Hello, my friend." As a participant in this scenario, we must make sense of the gesture and respond appropriately. If we fail to make sense of the situation, we have failed to understand the meaning of the interaction. Game designers, in particular, are interested in the concept of meaning because they are involved in the creation of systems of interaction. These systems then give rise to a range of meaning-making activities, from moving a game piece on a board, to waging a bet, to communicating "Hello, my friend" with other online characters in a virtual game world. This question of how users make sense of objects has led some designers, in recent

years, to borrow insights and expertise from other fields. In particular, the field of semiotics has been instructive. Semiotics is the study of meaning and the process by which meaning is made. In the next few pages, we will take a slight detour into semiotics, in order to more carefully build our concept of meaningful play.

Four Semiotic Concepts

The American philosopher and semotician Charles S. Peirce defines a sign as "something that stands for something, to somebody, in some respect or capacity" (Pierce, 1958). This broad definition recognizes four key ideas that constitute the concept of a sign.

1. A sign represents something other than itself.
2. Signs are interpreted.
3. Meaning results when a sign is interpreted.
4. Context shapes interpretation.

A Sign Represents Something Other Than Itself A sign represents something other than itself; it "stands for something." The mark of a circle (O) in the game of tic-tac-toe, for instance, represents not only an action by player "O" (as opposed to player "X") but also the capture of a certain square within the game's nine-square grid. Or consider the interaction between two players in a game of *Assassin*. A tap on the arm might represent "death" or "capture," depending on the rules of the game. In either case, the tap is meaningful to players as something other than a tap.

This concept of a sign representing something other than itself is critical to an understanding of games for several reasons. On one hand, games use signs to denote action and outcome, two components of meaningful play. The marks of an "X" or "O" in tic-tac-toe or the taps on the arms of players in a game of Assassin are actions paired with particular outcomes; these actions gain meaning as part of larger sequences of interaction. These sequences are sometimes referred to as "chains of signifiers," a concept that calls attention to the importance of relations between signs within any sign system.

On the other hand, games use signs to denote the elements of the game world. The universe of Mario, for example, is constructed of a system of signs representing magic coins, stars, pipes, enemies, hidden platforms, and other elements of the game landscape. The signs that make up the game world collectively represent the world to the player—as sounds, interactions, images, and text. Although the signs certainly make reference

to objects that exist in the real world, they gain their symbolic value or meaning from the relationship between signs within the game. We can illustrate the idea of signs deriving meaning from *within* the context of a game with an example drawn from the history of *Scrabble*.

In late 1993, a campaign was initiated against Hasbro, the company that owns and distributes Scrabble, requesting that the company remove racial or ethnic slurs from *The Official Scrabble Players Dictionary* (OSPD). This rulebook of playable or "good" words contained, at that time, words such as "JEW," "KIKE," "DAGO," and "SPIC." As a result of pressure from The Anti Defamation League and the National Council of Jewish Women, Hasbro announced that fifty to one hundred "offensive" words would be removed from the OSPD. As Stefan Fatsis writes in *Word Freak: Heartbreak, Triumph, Genius, and Obsession in the World of Competitive Scrabble Players.*

The Scrabble community went ballistic. A handful of players, notably some devout Christians, backed the decision. But a huge majority led by a number of Jewish players, accused Hasbro of censorship. Words are words, and banning them from a dictionary would not make them go away, they argued. Plus, the players tried to explain, the words as played on a board during a game of Scrabble are without meaning. In the limited context of scoring points, the meaning of HONKIE, deemed offensive in the OSPD, is no more relevant than the meaning of any obscure but commonly played word. (Fatsis, 2001, p. 149)

Within the context of a game of Scrabble, words are reduced to sequences of letters—they literally do not have meaning as *words*. Rather, the letters are signs that have value as puzzle pieces that must be carefully arranged according to the rules of spelling. Thus, although the sequence of letters H-O-N-K-I-E has meaning as a racial slur *outside* of the context of a game of Scrabble, *within* it the sequence has meaning as a six-letter play worth a number of points on the board. Within Scrabble the chain of signifiers represent words stripped of everything except their syntactical relationships. Outside of Scrabble, however, the words represent racial animosity.

Looking at chains of signifiers within a game means dissecting a game in order to view the system at a micro-level to see how the internal machinery operates. But entire games themselves can also be identified as signs. Viewing them from a macro—rather

than micro—perspective allows us to look at games from the outside, seeing them as signs within larger sign systems. The game of Tic-Tac-Toe, for instance, could be seen as a sign representing childhood play, while the game of Assassin might stand for college mischief in the 1980s or the film *The 10th Victim*, which inspired the game.

Signs Are Interpreted Peirce's definition suggests that *signs are interpreted*; they stand for something *to somebody*. It was one of Saussure's fundamental insights that the meanings of signs are arrived at arbitrarily via cultural convention. The idea that the meaning of signs rests not in the signs themselves but in the surrounding system is critical to our study of games. It is people (or players), after all, who bring meaning to signs. As semiotician David Chandler notes,

There is no necessary reason why a pig should be called a pig. It doesn't look sound or smell any more like the sequence of sounds "p-i-g" than a banana looks, smells, tastes or feels like the sequence of sounds "banana." It is only because we in our language group agree that it is called a "pig" that that sequence of sounds refers to the animal in the real world. You and your circle of friends could agree always to refer to pigs as "squerdlishes" if you wanted. As long as there is general agreement, that's no problem—until you start talking about squerdlishes to people who don't share the same convention. (Chandler)

Chandler's point has resonance when we consider players as active interpreters of a game's sign system. Children playing tag during recess may change the sign for "home base" from game to game, or even in the middle of a game, if circumstances allow. A tree in the corner of the playground might be used one day, or a pile of rocks another. Although a home base does have to possess certain functional qualities, such as being a touchable object or place, there is nothing special about the tree or rocks that make them "home base" other than their designation as such by the players of the game. Thus signs are essentially arbitrary, and gain value through a set of agreed upon conventions. Because "there is no simple sign = thing equation between sign systems and reality, it is we who are the active makers of meanings" (Underwood).

Meaning Results When a Sign Is Interpreted Peirce's definition suggests that meaning results when a sign is interpreted; a sign stands for something, to somebody, *in some respect or capacity.* Although this may seem like an obvious point, it is important to note, for it calls at-

tention to the outcome of the process by which signs gain value within a system.

If player A in a game of Rock-Paper-Scissors holds up three fingers in the shape of a "W" instead of two in the shape of a "V," she has failed to create a sign that has value, or meaning, within the rock, paper, scissors sign structure of the game. Player B might say, "What is that supposed to be?" in an attempt to infuse the sign with value within the system of the game. If player A responds, "Scissors," then player B has two choices. She can either accept the new sign as representative of "scissors" or she can reject the interpretation. If she accepts the new representation, the players have, in effect, added a new sign to the system; a sign that now means "scissors."

Context Shapes Interpretation Context is a key component to our general definition of design. It also is a key component in the creation of meaning. Design is "the process by which a *designer* creates a *context* to be encountered by a *participant*, from which *meaning* emerges." This definition makes an explicit connection between context and meaning. When we speak of context in language we are referring to the parts of something written or spoken that immediately precede or follow a word or passage that serve to clarify its meaning. The phrase "I am lost," for example, can mean many different things depending on the context in which it is used. If a player of the text adventure game *Zork* says, "I am trying to install the game and I am lost," we understand that she is having a difficult time making sense of the game's installation instructions. If that same player were to say, "I am in the second chamber and I am lost," we can ascertain that she is actually playing the game, has lost her way, and needs help navigating the fictional game space. In each instance the phrase "I am lost" is given context by the words that follow.

We can also understand context in relation to the idea of *structure*, which in semiotics refers to a set of regulations or guidelines that prescribe how signs, or elements of a system, can be combined. In language, for example, we refer to structure as *grammar*. The grammatical rules of a sentence create a structure that describes how words can and cannot be sequenced. We might refer to these rules as *invisible structure*, as we are not always aware that they are there. In games, this concept of grammar takes the form of game rules, which create a structure for the game, describing how all of the elements of the game interact with one another. Structure (in language or games) operates much

like context, and participates in the meaning-making process. By ordering the elements of a system in very particular ways, structure works to create meaning. The communication theorist David Berlo uses the following example to explain how structure supports interpretation:

Structure:

Most smoogles have comcom

We don't know what smoogles and comcom are, but we still know something about them: we know that a smoogle is something countable and can be referred to in the plural, unlike, say, water or milk. We know that smoogles is a noun and not a verb. We know that more than one smoogle is referred to in this sentence. We know that comcom is a noun and that it is a quality or thing which most smoogles are claimed to have. We still don't know what is referred to, but the formal properties of English grammar have already provided us with a lot of information. (Berlo)

Although the structure of any system does provide information that supports interpretation, context ultimately shapes meaning. In the following example, Berlo shows how structure and context work together to aid interpretation:

Context:

My gyxpyx is broken

From the structure of the language you know that gyxpyx is a noun. You know that it's something that it makes sense to refer to as broken.

One of its keys is stuck

Now we're getting a bit closer—a gyxpyx is maybe a typewriter, calculator, or musical instrument; at any rate it's something that has keys.

and I think it could do with a new ribbon, as well

Well, that pretty well clinches it. We're still left with the question of just what the difference is between a typewriter and a gyxpyx or why this person has the odd habit of referring to typewriters as gyxpyxes, but we can be reasonably sure already that a gyxpyx is something typewriter-like. (Berlo)

Berlo goes on to note that the meaning we have for gyxpyx comes partly from the structure. We know it is a noun and we know it can be broken, that it has keys and a ribbon. But structure can only take us so far in our search for meaning; context must often be called upon to complete the quest. Consider the experience of playing a game of Pictionary with friends. Much of the

guessing that occurs early in a turn relies on structure to provide clues. A player attempting to draw "Frankenstein" may begin by drawing a head and eyes, as a means of establishing the structure of the human form. This structure helps players to make guesses like "eyes," "face," or "head," but it soon becomes clear that more information is needed. In response, the player at the drawing board may begin to create a context for the head by drawing a large body with outstretched "zombie" arms, stitch marks denoting surgical scars, and a Tesla coil crackling in the background. Although players might not initially understand what these marks represent (the stitches might just look like squiggly lines), the context created by the other elements of the drawing supply the marks with the meaning they would otherwise lack. Once the players recognize the context "zombie" or "monster," the stitch marks become "scars" and Frankenstein is brought to life.

This relationship between structure, context, and meaning tells us that the act of interpretation relies, in part, on the movement between known and unknown information. Players of Pictionary, for example, will often come across a sign for which they don't have a meaning (stitch marks) within the context of signs for which they do (zombie or monster). The meanings that are known and familiar generate other meanings due to the formal relations between the known and the unknown signs. Keep in mind that the actual elements that constitute structure and context are fluid. The drawing of a head might operate as structure early in the guessing period (if it is the first thing drawn), but when it serves to help identify the squiggles, it becomes part of context. It is critical that designers not only recognize but also facilitate the relationship between structure and context in the design of their games.

Sign Systems

Games can be characterized as a system of signs. The meaning of any sign (object, action, or condition) in a game arises from the context of the game itself—from a system of relations between signs. This is what we mean when we say that the design of a game is the design of a space of possibility—a space in which rules and play create carefully orchestrated instances of designed interaction.

In *Swords and circuitry: A designer's guide to computer role playing games*, Neal and Jana Hallford (2001) look closely at the way players learn what something "means" through interaction. They describe a player exploring a world in an adventure game. The player

comes across a button set into an otherwise featureless wall. The curious player pushes the button to see what happens, and a secret door opens. Pushing the button gives the player access to a new part of the game world. Hallford and Hallford note that by providing the player with this scenario—push button, open door—the game designer has given the player a "rule" about how the game world works. The action *push button* results in the outcome *open secret door*. Armed with this rule, the player should be able to use this knowledge throughout the game to make informed decisions about how and when to push buttons. The meaning of the button press seems to be both integrated and discernable, two qualities of meaningful play. The interaction is *discernable*, because we clearly see the secret door open as a result of the action of pressing a button. The interaction also appears to be *integrated*, as we feel like we have discovered a rule about how buttons operate in the game.

Hallford and Hallford then ask us to imagine the player in another location somewhere later in the game. The player spies yet another button along the edge of a wall. If the action > outcome meaning of the button were integrated, the player should expect that pushing the button will open a secret door. But when the player pushes the button a fireball of doom comes out instead.

What just happened? Why did the button unleash a lethal fireball, rather than open a secret door? Here is where Hallford's analysis ties directly to the concept of play and representation. They write,

If the designer hasn't provided some kind of clue about what sets this button apart from the door-opening variety, they've just violated a rule that's already been established by the game. The value of choice has been taken away from the player because they have no way of knowing whether pushing the button opens a door or whether it will do some catastrophic amount of damage. While this would certainly add a heightened degree of tension to the pushing of any buttons in the game, it really is nothing more than a way of arbitrarily punishing the player for being curious. Even worse, the value of the things that the player has learned are now worthless, making the winning of the game more a matter of chance than of acquired skill. (Hallford & Hallford, 2001, pp. 152–154)

When the meaning of an action is unclear or ambiguous, meaningful play in a game breaks down. How might meaningful play in this situation be reestablished? Hallford and Hallford suggest one way to rem-

edy the situation is by adding a small visual detail that gives the player some idea of the consequences for pushing a particular type of button. Blue buttons consistently open secret doors. Red buttons unleash fireballs of doom.

This example shows how game meanings can be engineered to create meaningful play. Color-coding buttons to denote consequence establishes a system of meaning. Players are, over time, able to determine which buttons are "good" and "bad," and can make informed choices about their actions in the world. This system implicates the player directly, for the *meaning* of a button is only ever established through player interaction. As Hallford and Hallford (2001) note, this design strategy will also have the added bonus that players will pay a little closer attention to their environment to see if there is anything new found there that may lead to new kinds of experiences. They do so by creating a very specific set of conditions, or context, within which a particular object or action becomes meaningful in the course of play.

Making sense of signs relies, in part, on the movement between known and unknown information. Players in Hallford and Hallfords hypothetical adventure game, for example, might come across a sign for which they don't have meaning (red button) within the context of signs for which they do (blue button). Familiar meanings generate other meanings due to the formal relations between known and unknown signs. Players of a game gain information about the game world by *interacting* with it, by *playing* with signs to see what they might do or what they might mean. This element of play as a mechanism for sense-making is a critical concept for game designers.

Systems

The system is partly a memory of its past, just as in origami, the essence of a bird or a horse is both in the nature and order of the folds made. The question that must be answered when faced with a problem of planning or design of a system, is what exactly is the system? It is therefore necessary to know the nature of the inner structure before plans can be made.—Wolfgang Jonas

Games are intrinsically systemic: all games can be understood as systems. A system is "a group of interacting, interrelated, or interdependent elements forming a complex whole."[1] In a game of soccer, the players, the ball, the goal nets, the playing field, are all individual elements. When a game of soccer begins, these elements gain specific relationships to each other within the larger system of the game. Each player, for example, plays in a certain position on one of two teams. Different player positions have roles that interrelate, both within the system that constitutes a single team (goalie vs. forward vs. halfback), and within the system that constitutes the relationship between teams (the goalie guarding the goal while an opposing forward attempts to score). The complex whole formed by all of these relationships within a system comprises the game of soccer.

As systems, games provide contexts for interaction, which can be spaces, objects, and behaviors that players explore, manipulate, and inhabit. Systems come to us in many forms, from mechanical and mathematical systems to conceptual and cultural ones. One of the challenges of our current discussion is to recognize the many ways a game can be framed as a system. Chess, for example, could be thought of as a strategic mathematical system. It could also be thought of as a system of social interaction between two players, or a system that abstractly simulates war.

The Elements of a System

A *system* is a set of things that affect one another within an environment to form a larger pattern that is different from any of the parts. In his textbook *Theories of human communication*, Stephen W. Littlejohn identifies four elements that constitute a system (1989, p. 41):

- *The first is objects—the parts, elements, or variables within the system. These may be physical or abstract or both, depending on the nature of the system.*
- *Second, a system consists of attributes—the qualities or properties of the system and its objects.*
- *Third, a system has internal relationships among its objects. This characteristic is a crucial aspect (of systems).*
- *Fourth, systems also possess an environment. They do not exist in a vacuum but are affected by their surroundings.*

Let us take a detailed look at a particular game, Chess. We will first think about chess as a strictly strategic and mathematical system. This means considering Chess as a purely formal system of rules. Framed in this way, the four elements of the system of Chess are as follows:

- *Objects*: The objects in Chess are the pieces on the board and the board itself.

- *Attributes*: These are the characteristics the rules give these objects, such as the starting positions of each piece and the specific ways each piece can move and capture.
- *Internal Relationships*: Although the attributes determine the possible movements of the pieces, the internal relationships are the actual positions of the pieces on the board. These spatial relationships on the grid determine strategic relationships: one piece might be threatening another one, or protecting an empty square. Some of the pieces might not even be on the board.
- *Environment*: If we are looking just at the formal system of Chess, then the environment for the interaction of the objects is the play of the game itself. Play provides the context for the formal elements of a game.

But framing the game as a formal system is only one way to think about the system of Chess. We can extend our focus and think of Chess as a system with experiential dimensions as well. This means thinking of chess not just as a mathematical and logical system, but also as a system of interaction between the players and the game. Changing the way that we frame the game affects how we would define the four components of a system. Framed as an experiential system, the elements of the system of Chess are as follows:

- *Objects*: Because we are looking at Chess as the interaction between players, the objects of the system are actually the two players themselves.
- *Attributes*: The attributes of each player are the pieces he or she controls, as well as the current state of the game.
- *Internal Relationships*: Because the players are the objects, their interaction constitutes the internal relationships of the system. These relationships would include not just their strategic interaction, but their social, psychological, and emotional communication as well.
- *Environment*: Considering chess as an experiential system, the total environment would have to include not just the board and pieces of the game, but the immediate environment that contained the two players as well. We might term this the *context of play*. Any part of the environment that facilitated play would be included in this context. For example, if it were a play-by-email game of Chess, the context of play would have to include the software environment in which the players send and receive moves. Any context of play would also include players' preconceptions of Chess, such as

the fact that they think it is cool or nerdy to play. This web of physical, psychological, and cultural associations delineate—not the experience of the game—but rather the context that surrounds the game, the environment in which the experience of play takes place.

Lastly, we can extend our focus and think about Chess as a cultural system. Here the concern is with how the game fits in to culture at large. There are many ways to conceive of games as culture. For example, say that we wanted to look at the game of Chess as a representation of ideological values associated with a particular time and place. We would want to make connections between the design of the game and larger structures of culture. We would be looking, for example, to identify cultural references made in the design of the game pieces (What is the gendered power relationship between King and Queen implied in their visual design?); references made in the structure and rituals of game play (Was playing chess polite and gentlemanly or vulgar and cutthroat?); and references made to the people who play (Who are they—intellectuals, military types, or nerds?).

Note that there are innumerable ways of framing Chess as a cultural system. We could examine the complex historical evolution of the game. Or we could investigate the amateur and professional subcultures (books, websites, competitions, etc.) that surround the game. We could study the culture of Chess variants, in which Chess is redesigned by player-fans, or how Chess is referenced within popular culture, such as the Chess-like game Spock played on the television show *Star Trek*. The list goes on.

Framing Systems

Even though we were talking about the same game each time, as we proceeded from a formal to an experiential to a cultural analysis, our sense of what we considered as part of the system grew. In fact, each analysis integrated the previous system into itself. This integration is made possible by the hierarchical nature of complex systems.

Because of the hierarchical nature of the critical or complex system, with interactions over all scales, we can arbitrarily define what we mean by a unit: In a biological system, one can choose either a single cell, a single individual, such as an ant, the ant's nest, or the ant as a species, as the adaptive unit. In a human social system, one might choose an individual, a family, a company, or a country as the unit. No unit

at any level has the right to claim priority status. (Bek, p. 492)

In a game system, as in a human social system or biological system, hierarchies and interactions are scalable and embedded as complexity theorist Per Bek points out in the quote above. Although no single framing has an inherent priority, there are specific relationships among the kinds of framings given here. The formal system constituting the rules of a game are embedded in its system of play. Likewise, the system of play is embedded in the cultural framing of the game. For example, understanding the cultural connotations of the visual design of a game piece still should take into account the game's rules and play: the relative importance of the pieces and how they are actually used in a game. For example, answering a cultural question, regarding the politics of racial representation would have to include an understanding of the formal way the core rules of the game reference color. What does it mean that white always moves first?

Similarly, when you are designing a game you are not designing just a set of rules, but a set of rules that will always be experienced as play within a cultural context. As a result, you never have the luxury of completely forgetting about context when you are focusing on experience, or on experience and culture when you're focusing on the game's formal structure. It can be useful at times to limit the number of ways you are framing the game, but it is important to remember that a game's formal, experiential, and cultural qualities always exist as integrated phenomena.

Open and Closed Systems
There are two types of systems, *open* and *closed*. In fact, the concept of open and closed systems forms the basis of much of our discussion concerning the formal properties of games and their social and cultural dimensions. This concept speaks not only to games themselves, but also to the relationships games have to players and their contexts. What distinguishes the two types of systems? Littlejohn writes, "One of the most common distinctions [in systems theory] is between closed and open systems. A *closed system* has no interchange with its environment. An *open system* receives matter and energy from its environment and passes matter and energy to its environment" (Littlejohn, 1989, p. 41).

What makes a system open or closed is the relationship between the system and the context, or environment that surrounds it. The "matter and energy" that passes between a system and its environment can take a number of forms, from pure data (a thermometer measuring temperature and passing the information to the system of a computer program that tries to predict the weather), to human interaction (a person operating and interacting with the system of a car in order to drive down a highway). In both examples the system is open because there is some kind of transfer between the system and its environment. The software system passes temperature information from the outside climate. The car system exchanges input and output with the driver in a variety of ways (speedometer, gas pedal, steering wheel, etc).

When we frame a game as a system it is useful to recognize whether it is being treated as an open or closed system. If we look at our three framings of Chess, which framings were open and which were closed?

- *Formal system:* As a formal system of rules, Chess is a closed, self-contained system.
- *Cultural system:* As a cultural system, Chess is clearly an open system, as we are essentially considering the way that the game intersects with other contexts such as society, language, history, etc.
- *Experiential system:* As an experiential system of play, things get tricky. Framing Chess as an experiential system could lead to an understanding of the game as either open or closed. If we only consider the players and their strategic game actions, we could say that once the game starts, the only relevant events are internal to the game. In this sense, the game is a closed system. On the other hand, we could emphasize the emotional and social baggage that players bring into the game, the distractions of the environment, the reputations that are gained or lost after the game is over. In this sense, the play of Chess would be framed as an open system. So framed as play, games can be either open or closed.

In defining and understanding key concepts like design and systems, our aim is to better understand the particular challenges of game design and meaningful play. Game designers do practice design, and they do so by creating *systems*. But other designers create systems as well—so what is so special about games? The systems that game designers create have many peculiar qualities, but one of the most prominent is that they are interactive, that they require direct participation in the form of play. The next section builds directly on our understanding of systems and design to tackle this confounding but crucial concept: the enigmatic *interactivity*.

Interactivity

The word "interactivity" isn't just about giving players choices; it pretty much completely defines the game medium.—Warren Spector[2]

Play implies interactivity: to play with a game, a toy, a person, an idea, is to interact with it. More specifically, playing a game means making choices within a game system designed to support actions and outcomes in meaningful ways. Every action that is taken results in a change affecting the overall system. This process of action and outcome comes about because players interact with the designed system of the game. Interaction takes place across all levels, from the formal interaction of the game's objects and pieces, to the social interaction of players, to the cultural interaction of the game with contexts beyond its space of play.

In games, it is the explicit interaction of the player that allows the game to advance. From the interactivity of choosing a path to selecting a target for destruction to collecting magic stars, the player has agency to initiate and perform a whole range of explicit actions. In some sense, it is these moments of explicit action that define the tone and texture of a specific game experience. To understand this particular quality of games—the element of interaction—we must more completely grasp the slippery terms "interactive," "interaction," and "interactivity."

The following model presents four modes of interactivity, or four different levels of engagement, that a person might have with an interactive system. Most "interactive" activities incorporate some or all of them simultaneously.

Mode 1. *Cognitive interactivity; or interpretive participation:* This is the psychological, emotional, and intellectual participation between a person and a system. Example: the imaginative interaction between a single player and a graphic adventure game.

Mode 2. *Functional interactivity; or utilitarian participation:* Included here: functional, structural interactions with the material components of the system (whether real or virtual). For example, that graphic adventure you played: how was the interface? How "sticky" were the buttons? What was the response time? How legible was the text on your high-resolution monitor? All of these characteristics are part of the total experience of interaction.

Mode 3. *Explicit interactivity; or participation with designed choices and procedures:* This is "interaction" in the obvious sense of the word: overt participation like clicking the non-linear links of a hypertext novel, following the rules of a board game, rearranging the clothing on a set of paper dolls, using the joystick to maneuver Ms. Pac-Man. Included here: choices, random events, dynamic simulations, and other procedures programmed into the interactive experience.

Mode 4. *Beyond the object-interactivity; or cultural participation:* This is interaction outside the experience of a single designed system. The clearest examples come from fan culture, in which participants co-construct communal realities, using designed systems as the raw material. Will Superman come back to life? Does Kirk love Spock?

But Is It "Designed" Interaction?

Interaction comes in many forms. But for the purposes of designing interactivity, it is important to be able to recognize what forms of interactivity designers create. As an example, compare the following two actions: someone dropping an apple on the ground and someone rolling dice on a craps table. Although both are examples of interaction proper, only the second act, rolling the dice, is a form of designed interaction.

What about this action has been designed? First, the dice, unlike the apple, are part of a system (a game) in which the interaction between the player and the dice is made meaningful by a set of rules describing their relationship. This relationship, as defined by the rules of craps, describes the connection between action and outcome—for example, "When the dice are rolled, a player counts the number of dots appearing on the face-up sides of the dice." Even this extremely simple rule demonstrates how the act of rolling has meaning within the designed interactive system of the game. Secondly, the interaction is situated within a specific context: a game. Remember that meaningful play is tied not only to the concept of player action and system outcome, but also to a particular context in which the action occurs.

The description of "someone dropping an apple on the ground," on the other hand, does not contain a designed structure or context. What conditions would have to be present to evolve this simple interaction into a designed interaction? The dropping of the apple does meet baseline criteria for interaction: there is a reciprocal relationship between the elements of this system (such as the person's hand, the apples, and the ground). But is it a designed interaction? Is the interactivity situated within a specific context? Do we have any ideas about what dropping the apple might "mean" as a

form of interaction between a person and an apple? Do we have a sense of the connection between action and outcome?

No. All we know is that an apple has been dropped. What is missing from this description is an explicitly stated context within which the dropping of the apple occurs. If we were to change the scenario a little by adding a second player and asking the two participants to toss the apple back and forth, we move toward a situation of designed interaction. If we were to ask the two apple-tossers to count the number of times in a row they caught the apple before dropping it, we add an even fuller context for the interaction. The simple addition of a rule designating that the players quantify their interaction locates the single act of toss-catch within an overall system. Each element in the system is assigned a meaning: the toss, the catch, and the dropped toss. Even in the simplest of contexts, design creates meaning.

Interaction and Choice

The careful crafting of player experience via a system of interaction is critical to the design of meaningful play. Yet, just what makes an interactive experience "meaningful?" We have argued that in order to create instances of meaningful play, experience has to incorporate not just explicit interactivity, but meaningful *choice*. When a player makes a choice in a game, the system responds in some way. The relationship between the player's choice and the system's response is one way to characterize the depth and quality of interaction. Such a perspective on interactivity supports the descriptive definition of meaningful play presented earlier.

In considering the way that choices are embedded in game activity, we look at the design of choice on two levels: micro and macro. The *micro* level represents the small, moment-to-moment choices a player is confronted with during a game. The *macro* level of choice represents the way in which these micro-choices join together like a chain to form a larger trajectory of experience. For example, this distinction marks the difference between tactics and strategy in a game such as Go. The *tactics* of Go concern the tooth-and-nail battles for individual sectors of the board, as individual pieces and small groups expand across territory, bumping up against each other in conflict and capture. The *strategy* of the game is the larger picture, the overall shape of the board that will ultimately determine the winner. The elegance of the design of Go lies in its ability to effortlessly link the micro and the macro, so

that every move a player makes works simultaneously on both levels. Micro-interaction and macro-interaction are usually intertwined and there are, of course, numerous shades of gray in between.

Keep in mind that "choice" does not necessarily imply *obvious* or *rational* choice, as in the selection of an action from a menu. Choice can take many forms, from an intuitive physical action (such as "twitch" firing of a *Time Crisis* pistol) to the random throw of a die. Below are a few more examples of designed choices in games.

- *The choice of whether or not to take a hit in Blackjack.* A Blackjack player always has a clear set of choices: the micro-choice of taking or not taking a hit will have the eventual outcome of a win or a loss against the house. On the macro-level, each round affects the total amount of money the player gains or loses over the course of the game. Playing each hand separately, according to its probability of beating the house, is like tactics in Go. Counting cards, which links all of a players hands between rounds, is a more long-term, strategic kind of choice-making.
- *The choice of what to type into the flashing cursor of a text adventure.* This is a more open-ended choice context than the simple hit or pass of Blackjack. The micro-choice of typing in a command gives the player feedback about how the player moves through or changes the world. The choice to type the words "Move North" takes the player to another location in the game where different actions are possible—perhaps actions that will eventually solve the multipart puzzles which exist on the macro-level of game play. Even when a player tries to take an action that the program cannot parse (such as typing "grab rock" instead of "get rock"), it is meaningful: the outcome of bumping up against the limits of the program's parsing ability serves to further delineate the boundaries of play.
- *The choice of what play to call in a Football game.* This moment of game-choice is often produced collaboratively among a coaching staff, a quarterback, and the rest of the offensive players. There are a large number of possible plays to call, each with variations, and the choice is always made against the backdrop of the larger game: the score, the clock, the field position, the down, the strengths and weaknesses of both teams. The most macro-level of choices address the long-term movement of the ball across the field and the two teams' overall scores. The most micro-level of choices occur once the play is called and the ball is hiked: every offensive player has the moment-to-moment challenge of

executing the play as the defensive team does its best to put a stop to it.

As these examples demonstrate, choice making is a complex, multilayered process. There is a smooth transition between the micro- and macro-levels of choice making, which play out in an integrated way for the player. When the outcome of every action is discernable and integrated, choice making leads to meaningful play. Game designer Doug Church, in his influential essay "Formal Abstract Design Tools," outlines the way that these levels of choice transition into a complete game experience.

In a fighting game, every controller action is completely consistent and visually represented by the character on-screen. In Tekken, *when Eddy Gordo does a cartwheel kick, you know what you're going to get. As the player learns moves, this consistency allows planning—intention—and the reliability of the world's reactions makes for perceived consequence. If I watch someone play, I can see how and why he or she're better than I am, but all players begin the game on equal footing* (Church, 1999).

As Church points out, the macro-levels of choice making include not only what to do over the course of a game, but also whether or not you want to play a game, and against whom. If you are beaten in a fighting game that doesn't contain clear and meaningful play, you will never know why you lost and you will most likely not play again. On the other hand, if you know why your opponent is better than you are, your loss is meaningful, as it helps you assess your own abilities, gives you ideas for improvement, and spurs on your overall interaction with the game.

Choice Molecules

[The designers of Spacewar!, *a 2D graphical shooter dating back to 1962] identified action as the key ingredient and conceived* Spacewar! *as a game that could provide a good balance between thinking and doing for its players. They regarded the computer as a machine naturally suited for representing things that you could see, control, and play with. Its interesting potential lay not in its ability to perform calculations but in its capacity to represent action in which humans could participate.*—Brenda Laurel

The capacity for games to "represent action in which players participate" forms the basis of our concept of "choice." If we consider that every choice has an out-

come, then it follows that this action > outcome unit is the vehicle through which meaning in a game emerges. Although games can generate meaning in many ways (such as through image, text, sound, etc.), to understand the interactive nature of meaningful play, we focus on the kinds of meaning that grow from player interaction. At the heart of interactive meaning is the action > outcome unit, the molecule out of which larger interactive structures are built.

In order to examine this concept more closely we will look at the classic arcade game Asteroids, a direct discontent of Spacewar!. In Asteroids, a player uses buttons to maneuver a tiny spaceship on the screen, avoiding moving asteroids and UFOs and destroying them by shooting projectiles. The action > outcome interactive units of Asteroids are manipulated through a series of five player commands, each one of them a button on the arcade game's control panel: rotate left, rotate right, thrust, fire, and hyperspace. Within the scope of an individual game, possible player actions map to the five buttons:

1. *Press rotate right button:* spaceship rotates right
2. *Press rotate left button:* spaceship rotates left
3. *Press thrust button:* spaceship accelerates in the direction it is facing
4. *Press fire button:* spaceship fires projectile (up to four on the screen at a time)
5. *Press hyperspace button:* spaceship disappears and reappears in a different location (and occasionally perishes as a result)

Action on the screen is affected through the subtle (and not so subtle!) orchestration of these five controls. As the game progresses, each new moment of choice is a response to the situation onscreen, which is the result of a previous string of action > outcome units. The seamless flow that emerges is one of the reasons why Asteroids is so much fun to play. Rarely are players aware of the hundreds of choices they make each minute as they dodge space rocks and do battle with enemy ships—they perceive only their excitement and participation inside the game.

Anatomy of a Choice
Although the concept of choice may appear basic upon first glance, the way that a choice is actually constructed is surprisingly complex. To dissect our action > outcome molecule, we need to ask the following five questions. Together, they outline the *anatomy of a choice.*

1. *What happened before the player was given the choice?* What is the current state of the pieces on a gameboard, for example, or the level of a player's health? What set of moves were just finished playing out? What is the game status of other players? This question relates to both the micro and macro events of a game, and addresses the context in which a choice is made.

2. *How is the possibility of choice conveyed to the player?* On a game board, the presence of empty squares or a "draw pile" might indicate the possibility of choice, whereas choices in a digital game are often conveyed through the game's controls. In Asteroids, for example, the five buttons on the control panel communicate the opportunity for choice-making to the player.

3. *How did the player make the choice?* Did the player make a choice by playing a card, pressing a button, moving a mouse, running in the opposite direction, or passing on a turn? The mechanisms a player uses to make a choice vary greatly, but all are forms through which players are given the opportunity to take action.

4. *What is the result of the choice? How will it affect future choices?* A player taking action within a system will affect the relationships present in that system. This element of the anatomy of a choice speaks to the outcome of a player action, identifying how a single choice impacts larger events within the game world. The outcome of taking a "hit" in Blackjack impacts whether or not the player wants to take another hit, as well as the outcome of the game.

5. *How is the result of the choice conveyed to the player?* The means by which the results of a choice are represented to a player can assume many guises, and forms of representation are often related to the materiality of the game itself. In a game of Twister, for example, the physical positioning of bodies in space, conveys the results of choices; in Missile Command, the result of the choice to "fire" is conveyed by a slowly moving line of pixels, ending in an explosion; in Mousetrap, the mechanical workings (or non-workings) of the mousetrap convey the results of moving a mouse into the trap space. Note that step 5 leads seamlessly back to step 1, because the result of the choice provides the context for the next choice.

These are the five stages of a choice, the five events that transpire every time an action and outcome occur in a game. Each stage is an event that occurs internal or external to the game. *Internal events* are related to the systemic processing of the choice; *external* events are related to the representation of the choice to the player. These two categories make a distinction between the moment of action as handled by the internal game state and the manifestation of that action to the player.

The idea that a game can have an internal event represented externally implies that games are systems that store information. Jesper Juul, in a lecture titled "Play Time, Event Time, Themability" (2001), describes this idea by thinking of a game as a state machine:

A game is actually what computer science describes as a state machine. It is a system that can be in different states. It contains input and output functions, as well as definitions of what state and what input will lead to what following state. When you play a game, you are interacting with the state machine that is the game. In a board game, this state is stored in the position of the pieces on the board, in computer games the state is stored as variables, and then represented on the screen.[3]

In Juul's example of a board game, the "internal" state of the game is immediately evident to the players in the way that the pieces are arranged on the board. In the case of a computer game, as Juul points out, the internal variables have to be translated into a representation for the player. The distinction between internal and external events helps us to identify and distinguish the components of a choice. Within the action > outcome molecule stages 1, 3, and 4 are internal events, and stages 2 and 5 are external events. These two layers of events form the framework within which the anatomy of a choice must be considered. To see how this all fits together, let us take an even closer look, in table 4.1, at the way choice is constructed in two of our example games, Asteroids and Chess.

Although all five stages of the action > outcome choice event occurred in both games, there are some significant differences. In Asteroids, the available choices and the taking of an action both involve static physical controls. In Chess, the pieces on the board serve this function, even as they convey the current state of the game. The internal and external states of Chess are identical, but in Asteroids, what appears on the screen is only an outward extension of the internal state of the software. Although the "anatomy of a choice" structure occurs in every game, each game will manifest choice in its own way.

This way of understanding choice in a game can be extremely useful in diagnosing game design problems. If your game is failing to deliver meaningful play, it is

Table 4.1
Asteroids and chess

	Asteroids	Chess
1. What happened before the player was given the choice? (internal event)	Represented by the current positions and trajectories of the game elements.	Represented by the current state of the pieces on the board.
2. How is the possibility of choice conveyed to the player? (external event)	The possible actions are conveyed through the persistent button controls as well as the state of the screen, as it displays the relationships of the game elements.	The possible actions are conveyed through the arrangement of pieces on the board, including the empty squares where they can move.
3. How did the player make the choice? (internal event)	The player makes a choice by pressing one of the five buttons.	The players makes a choice by moving a piece.
4. What is the result of the choice? How will it affect future choices? (internal event)	Each button press affects the system in a different way, such as the position or orientation of the player's ship.	Each move affects the overall system, such as capturing a piece or shifting the strategic possibilities of the game.
5. How is the result of the choice conveyed to the player? (external event)	The result of the choice is then represented to player via screen graphics and audio.	The result of the choice is then represented to player via the new arrangement of pieces on the board.

probably because is a break down somewhere in the action > outcome chain. Here is a sample list of common "failure states" and the way that they relate to the stages of a choice.

- *Feeling like decisions are arbitrary.* If you need to play a card from your hand and it always feels like it doesn't matter which card you select, the game probably suffers in stage 4, the affect of the player's choice on the system of the game. The solution is to make sure that player actions have meaningful outcomes in the internal system of the game.
- *Not knowing what to do next.* This can be a common problem in large digital adventure games, where it is not clear how a player can take action to advance the game. The problem is in stage 2, representing choices to the player. These kinds of problems are often solved with additional information display, such as highlights on a map, or an arrow that helps direct the player.
- *Losing a game without knowing why.* You think that you're about to reach the top of the mountain, when your character dies unexpectedly from overexposure. This frustrating experience can come about because a player has not sufficiently been informed about the current state of the game. The problem might be in stage 5, where the new state of the game resulting from a choice is not represented clearly enough to the player.
- *Not knowing if an action even had an outcome.* Although this sounds like something that would never happen, there are many examples of experimental interactivity (such as a gallery-based game with motion sensor inputs) in which the player never receives clear feedback on whether or not an action was taken. In this case, there is a breakdown at stages 3 and 4, when a player is taking an action and receiving feedback on the results.

These examples represent only a small sampling of the kinds of problems a game's design can have. The anatomy of a choice is not a universal tool for fixing problems, but it can be especially useful in cases where the game is breaking down because of a glitch in the player's choice-making process.

Space of Possibility
Creating a game means designing a structure that will play out in complex and unpredictable ways, a space of possible action that players explore as they take part in your game. What possible actions might players take in the course of a game of Musical Chairs? They might push, shove, tickle, poke, or fight for their seat once the music stops and the mad scramble for chairs begins. The game designer must carefully craft a system of play in which these actions have meaning in support of the play of the game, and do not distract or interrupt its play.

But game designers do not directly design play. They only design the structures and contexts in which play takes place, indirectly shaping the actions of the players. We call the space of future action implied by a game design the *space of possibility*. It is the space of all possible actions that might take place in a game, the space of all possible meanings which can emerge from a game design. The concept of the space of possibility not only bridges the distance between the designed

structure and the player experience, but it also combines the key concepts we have presented so far. The space of possibility is *designed* (it is a constructed space, a context), it generates *meaning* (it is the space of all possible meanings), it is a *system* (it is a space implied by the way elements of the system can relate to each other), and it is *interactive* (it is through the interactive functioning of the system that the space is navigated and explored).

The Magic Circle

This is the problem of the way we get into and out of the play or game ... what are the codes which govern these entries and exits?—Brian Sutton-Smith

What does it mean to enter the system of a game? How is it that play begins and ends? What makes up the boundary of a game? At stake is an understanding of the artificiality of games, the way that they create their own time and space separate from ordinary life.

Steve Sniderman, in his excellent essay "The Life of Games" notes that the codes governing entry into a game lack explicit representation. "Players and fans and officials of any game or sport develop an acute awareness of the game's 'frame' or context, but we would be hard pressed to explain in writing, even after careful thought, exactly what the signs are. After all, even an umpire's yelling of 'Play Ball' is not the exact moment the game starts." (Sniderman). He goes on to explain that players (and fans) must rely on intuition and their experience with a particular culture to recognize when a game has begun. During a game, he writes, "a human being is constantly noticing if the conditions for playing the game are still being met, continuously monitoring the 'frame,' the circumstances surrounding play, to determine that the game is still in progress, always aware (if only unconsciously) that the other participants are acting as if the game is 'on'" (Sniderman).

The frame of a game is what communicates that those contained within it are "playing" and that the space of play is separate in some way from that of the real world. Psychologist Michael Apter echoes this idea when he writes,

In the play-state you experience a protective frame which stands between you and the 'real' world and its problems, creating an enchanted zone in which, in the end, you are confident that no harm can come. Although this frame is psychological, interestingly it often has a perceptible physical representation: the proscenium arch of the theater, the railings around the park, the boundary line on the cricket pitch, and so on. But such a frame may also be abstract, such as the rules governing the game being played. (Apter, 1990, p. 15)

In other words, the frame is a concept connected to the question of the "reality" of a game, of the relationship between the artificial world of the game and the "real life" contexts that it intersects. The frame of a game is responsible not only for the unusual relationship between a game and the outside world, but also for many of the internal mechanisms and experiences of a game in play. We call this frame the *magic circle*, a concept inspired by Johan Huizinga's work on play.

Boundaries

What does it mean to say that games take place within set boundaries established by the act of play? Is this really true? Compare, for example, the informal play of a toy with the more formal play of a game. A child approaching a doll, for example, can slowly and gradually enter into a play relationship with the doll. The child might look at the doll from across the room and shoot it a playful glance. Later, the child might pick it up and hold it, then put it down and leave it for a time. The child might carelessly drag the doll around the room, sometimes talking to it and acknowledging it, at other times forgetting it is there.

The boundary between the act of playing with the doll and not playing with the doll is fuzzy and permeable. Within this scenario we can identify concrete play behaviors, such as making the doll move like a puppet. But there are just as many ambiguous behaviors, which might or might not be play, such as idly kneading its head while watching TV. There may be a frame between playing and not playing, but its boundaries are indistinct.

Now compare that kind of informal play with the play of a game—two children playing Tic-Tac-Toe. In order to play, the children must gather the proper materials, draw the four lines that make up the grid of the board, and follow the proper rules each turn as they progress through the game. With a toy, it may be difficult to say exactly when the play begins and ends. But with a game, the activity is richly formalized. The game has a beginning, a middle, and a quantifiable outcome at the end. The game takes place in a precisely defined physical and temporal space of play. Either the children are playing Tic-Tac-Toe or they are not.

There is no ambiguity concerning their action: they are clearly playing a game.

The same analysis can occur within the context of digital media. Compare, for example, a user's casual interaction with a toylike screensaver program to their interaction with a computer game such as Tetris. The screensaver allows the user to wiggle the mouse and make patterns on the screen, an activity that we can casually enter into and then discontinue. The entry and exit of the user is informal and unbound by rules that define a beginning, middle, and end. A game of Tetris, on the other hand, provides a formalized boundary regarding play: the game is either in play or it is not. Players of Tetris do not "casually interact" with it; rather, they are playing a game. It is true that a Tetris player could pause a game in progress and resume it later—just as two tennis players might pause for a drink of water. But in both cases the players are stepping out of the game space, formally suspending the game before stepping back in to resume play.

As a player steps in and out of a game, he or she is crossing that boundary—or frame—that defines the game in time and space. As noted above, we call the boundary of a game the *magic circle*, a term borrowed this from the following passage in Huizinga's book *Homo Ludens*:

All play moves and has its being within a play-ground marked off beforehand either materially or ideally, deliberately or as a matter of course.... 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, p. 10)

Although the magic circle is merely one of the examples in Huizinga's list of "play-grounds," the term is used here as shorthand for the idea of a special place in time and space created by a game. The fact that the magic circle is just that—a circle—is an important feature of the concept. As a closed circle, the space it circumscribes is enclosed and separate from the real world. As a marker of time, the magic circle is like a clock: it simultaneously represents a path with a beginning and end, but one without beginning and end. The magic circle inscribes a space that is repeatable, a space both limited and limitless. In short, a finite space with infinite possibility.

Enter In
Boundaries help separate the game from life. They have a critical function in maintaining the fiction of the game so that the aspects of reality with which we do not choose to play can be left safely outside.—Bernie De Koven

In a very basic sense, the magic circle of a game is where a game takes place. To play a game means entering into a magic circle, or perhaps creating one as a game begins. The magic circle of a game might have a physical component, like the board of a board game or the playing field of an athletic contest. But many games have no physical boundaries—arm wrestling, for example, doesn't require much in the way of special spaces or material. The game simply begins when players decide to play.

The term magic circle is appropriate because there is in fact something genuinely magical that happens when a game begins. A fancy Backgammon set sitting all alone might be a pretty decoration on the coffee table. If this is the function that the game is serving—decoration—it doesn't really matter how the game pieces are arranged, or if some of them are out of place, or even missing. However, once you sit down with a friend to play a game of Backgammon, the arrangement of the pieces suddenly becomes extremely important. The Backgammon board becomes a special space that facilitates the play of the game. The players' attention is intensely focused on the game, which mediates their interaction through play. While the game is in progress, the players do not casually arrange and rearrange the pieces, but move them according to very particular rules.

The Lusory Attitude
So far in the discussion of the magic circle we have outlined the ways that the interior space of a game relates to the real world spaces outside it, how the magic circle frames a distinct space of meaning that is separate from, but still references, the real world. What we have not yet considered is what the magic circle represents from the player's point of view. Because a game demands formalized interaction, it is often a real commitment to decide to play a game. If a player chooses to sit down and play Monopoly, for example, he cannot simply quit playing in the middle without disrupting the game and upsetting the other players. On the other hand, if he ignores this impulse and remains in the game to the bitter end, he might end up a sore loser. Yet, these kinds of obstacles obviously don't keep most people from

playing games. What does it mean to decide to play a game? If the magic circle creates an alternate reality, what psychological attitude is required of a player entering into the play of a game?

Games are curiously inefficient and challenging activities. To play a game is to take on a task that is not easy to accomplish. In his book *Grasshopper: Games, Life, and Utopia*, Bernard Suits uses the example of a boxer to explain this concept. If the goal of a boxing match is to make the other fighter stay down for a count of 10, the easiest way to accomplish this goal would be to take a gun and shoot the other boxer in the head. This, of course, is not the way that the game of Boxing is played. Instead, as Suits points out, boxers put on padded gloves and only strike their opponents in very limited and stylized ways. Similarly, Suits discusses the game of Golf:

Suppose I make it my purpose to get a small round object into a hole in the ground as efficiently as possible. Placing it in the hole with my hand would be a natural means to adopt. But surely I would not take a stick with a piece of metal on one end of it, walk three or four hundred yards away from the hole, and then attempt to propel the ball into the hole with the stick. That would not be technically intelligent. But such an undertaking is an extremely popular game, and the foregoing way of describing it evidently shows how games differ from technical activities. (Suits, 1990, p. 40)

What the boxer and the golfer have in common, according to Suits, is a shared attitude toward the act of game-playing, an openness to the possibility of taking such indirect means to accomplish a goal. "In anything but a game the gratuitous introduction of unnecessary obstacles to the achievement of an end is regarded as a decidedly irrational thing to do, whereas in games it appears to be an absolutely essential thing to do" (Suits, 1990, pp. 38–39). Suits calls this state of mind the *lusory attitude*. The lusory attitude allows players to "adopt rules which require one to employ worse rather than better means for reaching an end" (Suits, 1990, pp. 38–39). Trying to propel a miniature ball with a metal stick into a tiny hole across great distances certainly requires something by way of attitude!

The word "ludo" means *play* in Latin, and the root of "lusory" is the same root as "ludens" in "Homo Ludens." The lusory attitude is an extremely useful concept, as it describes the attitude that is required of game players for them to enter into a game. To play a game is in many ways an act of "faith" that invests the

game with its special meaning—without willing players, the game is a formal system waiting to be inhabited, like a piece of sheet music waiting to be played. This notion can be extended to say that a game is a kind of social contract. To decide to play a game is to create—out of thin air—an arbitrary authority that serves to guide and direct the play of the game. The moment of that decision can be quite magical. Picture a cluster of boys meeting on the street to show each other their marble collections. There is joking, eye-rolling, and then a challenge rings out. One of them chalks a circle on the sidewalk and each one of them puts a marble inside. They are suddenly playing a game, a game that guides and directs their actions, that serves as the arbiter of what they can and cannot do. The boys take the game very seriously, as they are playing for keeps.

Their goal is to win the game and take marbles from their opponents. If that is all they wanted to do, they could just grab each other's marble collections and run. Instead, they play a game. Through a long and dramatic process, they end up either losing their marbles or winning some from others. If all that the boys wanted to do was increase the number of marbles in their collection, the game might seem absurd. But the lusory attitude implies more than a mere acceptance of the limitations prescribed by the rules of the game— it also means accepting the rules because the play of the game is an end in itself. In effect, the lusory attitude ensures that the player accepts the game rules "just so that the activity made possible by such an acceptance can occur" (Suits, 1990, p. 40).

There is a pleasure in this inefficiency. When you fire a missile in *Missile Command*, it doesn't simply zap to the spot underneath the crosshairs. Instead, it slowly climbs up from the bottom of the screen. To knock down a set of bowling pins, you don't carry the bowling ball down the lane; instead you stand a good distance away and let it roll. From somewhere in the gap between action and outcome, in the friction between frustrated desire and the seductive goal of a game, bubbles up the unique enjoyment of game play. Players take on the lusory attitude for the pleasure of play itself.

The magic circle can define a powerful space, investing its authority in the actions of players and creating new and complex meanings that are only possible in the space of play. But it is also remarkably fragile as well, requiring constant maintenance to keep it intact. The lusory attitude goes hand in hand with the magic circle: without the proper state of mind, the magic circle could not exist—and without the magic circle, the actions of the players would be meaningless. As a

game is played, these powerful mechanisms feed each other, permitting meaning to emerge in a game.

We began this essay by discussing that wonderfully rich passage by Johan Huizinga in *Homo Ludens*. "All play means something," he writes, "in play there is always something 'at play' which transcends the immediate needs of life and imparts meaning to the action." Huizinga's words provoke deep questions. We have not, in the course of this brief space, had a chance to explore all of them fully. But we have outlined some of the concepts which have an impact on the design of meaningful play.

Afterword: Game Design in Context

The essay in this volume is based on selections from *Rules of play: Game design fundamentals*. In this afterword, we would like to put the essay in its proper context by outlining some of our larger concerns.

Our project is to understand games. That means all kinds of games: paper-based strategy games and first-person shooters, classical board games and glitzy gambling games; math puzzles and professional sports; austere text adventures and giggly teenage party games. Our goal is to link these diverse play activities within a common framework—a framework based in *game design*.

In *The study of games*, Brian Sutton-Smith writes, "Each person defines games in his own way—the anthropologists and folklorists in terms of historical origins; the military men, businessmen, and educators in terms of usages; the social scientists in terms of psychological and social functions. There is overwhelming evidence in all this that the meaning of games is, in part, a function of the ideas of those who think about them" (Sutton-Smith, 1971b, p. 438).

What meaning, then, does a *game designer* bring to the study of games? What does it mean to look at games from a game design perspective? First and foremost, it means looking at games in and of themselves. Rather than placing games in the service of another discipline such as sociology, literary criticism, or computer science, we study games within their own disciplinary space. Because game design is an emerging area, we often borrow from other areas of knowledge—from mathematics and cognitive science; from semiotics and cultural studies. We may not borrow in the most orthodox manner, but we do so in the service of helping to establish a field of game design proper.

We bridge theoretical and practical concerns by looking closely at games themselves, discovering patterns within their complexity that bring the challenges of game design into full view. But our work is not just

for game designers: our ideas have direct application in fields outside game design. Our concepts, models, and examples can be used by interactive designers, architects, product designers, and other creators of interactive systems. Similarly, our focus on understanding games in and of themselves can benefit the emerging academic study of games in fields as diverse as sociology, media studies, and cultural policy. Engagement with ideas, like engagement with a game, is all about the play the ideas make possible. Feel free to have fun. Even if you are not a game designer, we hope you have found something here that lets you play with your own line of work in a new way.

Notes

1. *The American Heritage® Dictionary of the English Language*, fourth edition. Boston: Houghton Mifflin Company, 2000.
2. Re:Play: Game Design + Game Culture. Online conference. 2000. www.eyebeam.org/replay.
3. Jesper Juul. Computer Games and Digital Textuality, conference at IT University of Copenhagen, March 1–2, 2001.

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