Part I: The Basics

Before You Can Understand interactive storytelling, you need to get a good understanding of two things: *interactivity* and *storytelling*. Then you need to get a grip on what happens when you combine them.

Chapter 1: Storytelling is ancient, much written about, and still not fully understood. I can't add anything to the massive literature about storytelling as art, but in this chapter I offer a unique angle of approach: neurophysiology.

Chapter 2: Here we are 30 years into the personal computer revolution and people still don't understand interactivity. Think of it as a conversation between the user and the computer. Tattoo Crawford's First Law of Software Design onto your navel.

Chapter 3: When you put interactivity and storytelling together, you get interactive storytelling, a completely new medium of expression. It's not cinema with interactivity superglued on; it's not video games with story superglued on; it's a brand spanking new and unique medium.

Chapter 1. Storytelling

Our Iconic Image of Storytelling is a circle of young people around a campfire with an old man regaling them with a story. This image evokes warm and cozy feelings of pleasure and camaraderie. However, humankind did not actually develop storytelling as a leisure activity to while away the hours—storytelling evolved for serious purposes, as a necessary component in the development of human culture.

Imagine two kittens at play. One stalks the other, sneaking up from behind; he pounces and the two kittens roll over each other, batting and kicking. They're so cute that we can't help but laugh and envy the fun they must be having. It's true that the kittens are having fun, but they're not playing like this to pass the time in the months before cat adulthood. This is serious business; they are learning the skills they'll need to survive in the real world. Stalking, pouncing, grappling, clawing, and biting: These are all skills crucial in a cat's life. Do you think it's easy catching mice? I certainly couldn't. Consider this: Your best weapons (your fangs) are only an inch away from the most vulnerable part of your anatomy (your eyes). Should that mouse, in his struggles, succeed in clawing at your eye, you'd be blind in one eye and your hunting—and eating—days would be over. So how do you close in for the kill without risking your eyes?

This is a tricky problem and it requires a lot of practice to get it down pat. In fact, every part of the hunt is tricky and requires lots of practice. That's precisely what kittens do for months on end: They stalk, they pounce, they grapple, they claw, they kick, and they bite, alternating between roles as predator and prey. What we call "kitten play" is first and foremost "cat education." The fact that it's obviously fun is not a coincidence; fun is the emotional driver behind true learning.

Storytelling serves people in a similar way. It's not a waste of time; it's serious education about the complexities of social interaction. We have other forms of play, of course, but storytelling is one of the most important forms of play. In fact, storytelling is so important that we continue to enjoy it throughout our lives. Without storytelling, humans never could have communicated complex information and, therefore, could not have developed culture. Storytelling isn't merely characteristic of the human culture—it's absolutely necessary to the existence of human culture.

The History of Storytelling

Storytelling was a natural, almost inevitable consequence of human evolution. The human brain developed in response to the environmental pressures facing early hominids. Each major problem triggered some sort of change in the human body. If a problem could be solved by mental effort, an existing part of the brain took over that problem, often expanding as a consequence. Most of the time, these new mental abilities were cobbled together from a combination of existing parts of the brain, so they weren't often localized to one region of the brain. As they developed, these *mental modules* were recruited to solve new but related problems.

Because mental modules aren't localized tightly, scientists can't pin them down with anatomical precision. Brain function is so complex that one mental module blends into the next. This makes the job of identifying mental modules a subjective task; every scientist slices the pie a little

differently. Nevertheless, some slices seem to be more popular than others. Following are four basic mental modules: visual-spatial, social reasoning, environmental knowledge, and language.

- **Visual-spatial** handles visual perception and spatial imagination. We use our visual-spatial modules to figure the distance to an object, determine its shape (from its texture), and navigate through the environment. This is the only well-localized mental module; it's concentrated in an area at the rear of the brain, which is why you see stars when you are struck on the back of your head.
- **Social reasoning** allows us to anticipate the likely behavior of others. Here's an example of social reasoning actually observed in chimpanzees: A troop is out foraging, each one searching a different patch of ground. One chimp spies a tasty piece of fruit. He realizes that the dominant chimp nearby will take it away if he sees it, so the discoverer acts as if he's seen nothing. Five minutes later, when the others have moved on and the coast is clear, the discoverer sneaks back to the fruit and starts to eat it. At this point, the dominant chimp, who had noticed the first chimp's odd behavior and anticipated this development, leaps out from behind a tree and robs the first chimp of his fruit. Consider all the computations that went into the thinking of both chimps. Those computations are what we mean by social reasoning.
- **Environmental knowledge** contains our memories of how things work in the real world. Don't think of it as a computer database, however, as it contains no numbers. Instead, it takes the form of long lists of `if-then` statements.
  - `If` the animal's track is sharply defined in soft dirt, `then` the animal passed here recently.
  - `If` the animal's track is sharply defined in dried mud, `then` it passed here some time ago. Even what we think of as recalled images and sounds are actually constructs built of `if-then` facts.
  - `If` the antelope's horns are straight, smooth, and parallel, `then` it's a steenbok.
  - `If` the antelope's horns have a spiral on them, `then` it's an eland.

  There are thousands of these relationships tucked away in our brains.
- **Language** permits complex communication with others. But language has dramatically changed the way our minds work. In the days before language, things were simple. Any problem we encountered was routed to the appropriate mental module, which then solved the problem as best it could and directed our behavioral response. But language had to send its tentacles into every mental module; after all, you can't talk about what you're seeing if your language module doesn't have access to the visual-spatial module. Thus, language links all the modules together. That linkage triggered a quantum leap in human thinking: Instead of a simple one-to-one relationship between a problem and its appropriate mental module, now *any* mental module could put its two cents' worth into the solution. This triggered an explosion of human creativity. It also rendered us less decisive. Nowadays, we can't be certain the first solution that pops into our minds is the best; a better one might emerge from another module in a moment. So we hesitate.

Two Mechanisms of Thinking

There are two profoundly different mechanisms of thinking. The dominant mechanism is pattern based. This is how nervous systems originally developed. Pattern-based thinking is fast and powerful: A pattern of inputs enters the brain; the brain processes the new pattern with its own patterns, producing a pattern of responses. For example, a small animal looks upon a scene and sees a pattern that includes large teeth, eyes, and big claws. The small animal's brain processes that pattern and almost instantly determines an output pattern: It activates different muscles in its body to turn and run.

This pattern-based thinking has a crucial benefit: No matter how vague or indeterminate the input pattern, brains can interpret that pattern in some fashion. We look at clouds and see faces or animals; dark shapes in the night seem like monsters and ghouls. Faint noises in the wind sound like voices.

However, about one or two hundred million years ago, a new mechanism developed: sequential thinking. Pattern-based thinking is instantaneous; it cannot fathom the significance of sequences of events. For example, let's imagine two early rat-like mammals rummaging around on the late Jurassic forest floors of 150 million years ago. One of our ancient rats has a brain with only pattern-based processing. The second rat-mammal, however, is equipped with the latest neural technology: sequential processing. Now, suppose a big nasty dinosaur comes their way, looking for a nice mammal burger. They both hear its footfalls and scurry to hide. The dinosaur looks around, sees nothing, and clomps away. The old-style pattern-processing rat hears heavy footfalls and thinks, "Ack! Heavy footfalls! Danger!" So, he stays in hiding. But the rat with the hot new sequential processing recognizes that the sequence of footfalls shows them growing progressively weaker. He thinks, "Weakening footfalls. He's going away," and emerges from hiding to resume his search for food. The second rat literally eats the first rat's lunch. Guess which rat species goes extinct?

There's a nasty catch here: Neurons in the brain aren't designed to handle sequential reasoning. It takes quite a kludge to get them to carry out sequential tasks and demands a lot of neurons. The advantages of sequential thinking, however, are so great that many animals, most notably mammals, spent millions of years developing ever larger and more complex brains, with most of that expansion handling the expensive sequential processing mechanism. Our monstrously large brains evolved to handle the extremely complex sequential processing in which we humans specialize.

The older visual-spatial and social reasoning mental modules rely entirely on pattern-based thinking. The environmental knowledge module uses a mixture of pattern-based thinking and sequential thinking. But the language module is almost entirely sequential in structure. Think about it: A word is a sequence of sounds, and a sentence is a sequence of words, and this book is a sequence of sentences. Language uses a lot of sequential processing.

Mental Modules Interact

Once the development of language had pulled the mental modules into communication, all sorts of fascinating interactions began between the modules. For example, the environmental knowledge module and the social reasoning module interacted in a surprising fashion. The

environmental knowledge module impelled humans to inquire into the causes of phenomena they observed in their environment, trying to find a simple `if-then` rule to store in memory. But the world is a complicated place, and all too often a clear cause was wanting. For example, an especially important question for the early farmers was, "Why does it rain?" Or, more to the point, "Why does it sometimes fail to rain?"

When language put the environmental knowledge module in touch with the social reasoning module, these two modules interacted to devise an answer that made sense: Powerful people—gods—caused natural phenomena. Whenever a phenomenon lacked an obvious cause, assigning the phenomenon to a god and then explaining the apparently erratic behavior with the deity's mood swings was a simple matter. Not only did the social reasoning module suggest an explanation to the problem, but it also offered the solution: propitiate the god. Every time a new problem cropped up, a priest revealed another new god who controlled that phenomenon. Thus, most ancient societies had a large pantheon of gods, each with his or her own particular physical jurisdiction. In ancient Greece, for example, you made a sacrifice to Poseidon before undertaking a sea voyage; since he ruled the waves, his goodwill was nice to have. Going to war? Better be in good graces with Ares. Problems with your love life? Aphrodite is the one to curry favor with. And so on.

Because the gods seemed so arbitrary, it behooved society to have someone on hand who could communicate with the gods. There was never any shortage of applicants for the position; whoever communicated with the gods was, essentially, in charge of the society.

But the environmental knowledge module also interacted with the language module, producing "sequential thinking environmental knowledge," also known as *science*. Sequential thinking at this level took a long time to develop, but once the ideas of logic and mathematics took hold, science took off. The conflict between science and religion becomes clearer when viewed this way. Both arose from the environmental knowledge module; both attempt to explain the world in which we live. Religion takes the social reasoning route, and science takes the sequential logic route. The choice between them might have more to do with the relative strengths of these two modules inside a person's mind than anything else.

There are four more interactions between modules to consider. I lump two of them together: The combination of the visual-spatial module with the environmental knowledge and social reasoning modules to produce *representational art*.

When visual-spatial reasoning combined with the language module, we got writing, which triggered its own cultural revolution. And when the language module combined with the social reasoning module, it produced storytelling.

For those whose spatial reasoning module is stronger than their verbal reasoning module, **Figure 1.1** shows a summary of these results.

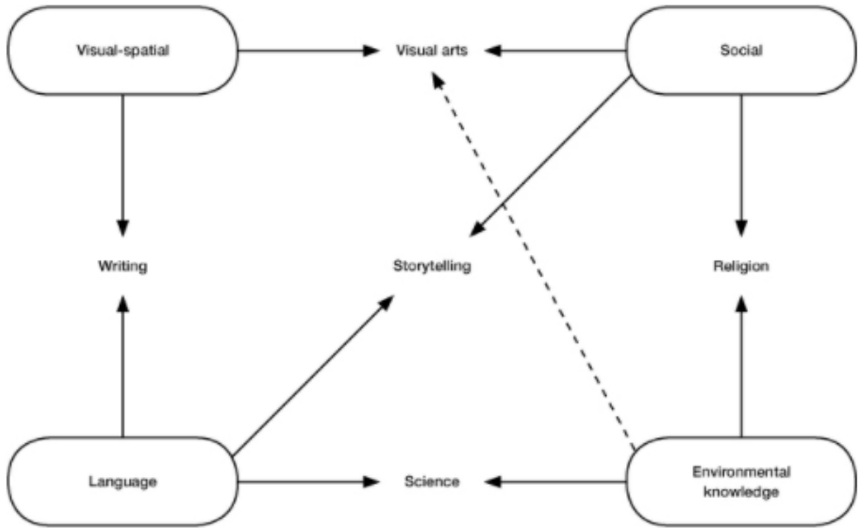

Figure 1.1. The mental modules interact

How Storytelling Arose

Storytelling is a linguistic action, so it should come as no surprise that storytelling arose from language. The smallest meaningful linguistic expression is a sentence; words by themselves communicate little. A sentence communicates important information, such as "The antelope is running away." Put that same sentence into past tense and you have a tiny story. Indeed, it's difficult to disentangle past tense from storytelling. Thus, storytelling was the inevitable result of the development of language.

Storytelling is universal: Anthropologists have never found a culture bereft of a storytelling tradition. Why is storytelling universal? The obvious answer, of course, is that stories are the vehicle by which cultural knowledge is communicated from one generation to the next. They're not the only vehicle, of course, but they certainly play an important role in transferring cultural information. Storytelling, language, and culture developed together.

But why should information be transmitted by stories? Why couldn't cultures simply compile their knowledge into a simple, compact list of important truths—and then impart those truths by requiring every young person to memorize the list? This approach seems quicker and more efficient than the long-winded storytelling system, so why didn't any culture ever adapt such a superior alternative?

The answer has to do with the character of the information transmitted. Most of the informational content of these stories pertains to social reasoning. Some pertains to the environmental knowledge module, but the bulk of these stories concern interpersonal behavior: trustworthiness, faithfulness, perseverance, and so forth. The mental module for social relationships relies on pattern recognition, which raises an ugly problem: How do you communicate pattern-type information to a pattern-recognizing mental module using a sequential medium such as language? In computer terms, it's like trying to send parallel data down a serial cable. It's like speaking Chinese to a Spaniard. The data is in the wrong format!

What's needed is a reformatter—something that converts one thinking mechanism to the other. Storytelling is that reformatter. It's an ad-hoc solution to an interfacing problem that arose early in the development of language.

Consider that a story is a linear sequence of events; its architecture is referred to as a *plotline*. That linearity is the inevitable outcome of using language to relate the story: You can't tell a story all at once. A story must be told step by step, event by event. Yet you can't understand the story

fully until you receive the entire content. If you're downloading your email and the transmission link breaks 90 percent of the way through, you can still read the email and figure out most of its content. But if you're watching a movie in a theater and the projector breaks 90 percent of the way through, you have every right to demand a 100 percent refund; without that last 10 percent, the story never snaps into place.

Stories are patterns broken down into a linear sequence. How does that happen? I'll use a visual metaphor to clarify what happens (well, it's clear to visual thinkers). Imagine your knowledge to consist of a meshwork of connected ideas. A young hunter's knowledge of antelope might look something like the diagram in **Figure 1.2**. The specific positions of the individual ideas are arbitrary; what matters is their pattern of connections.

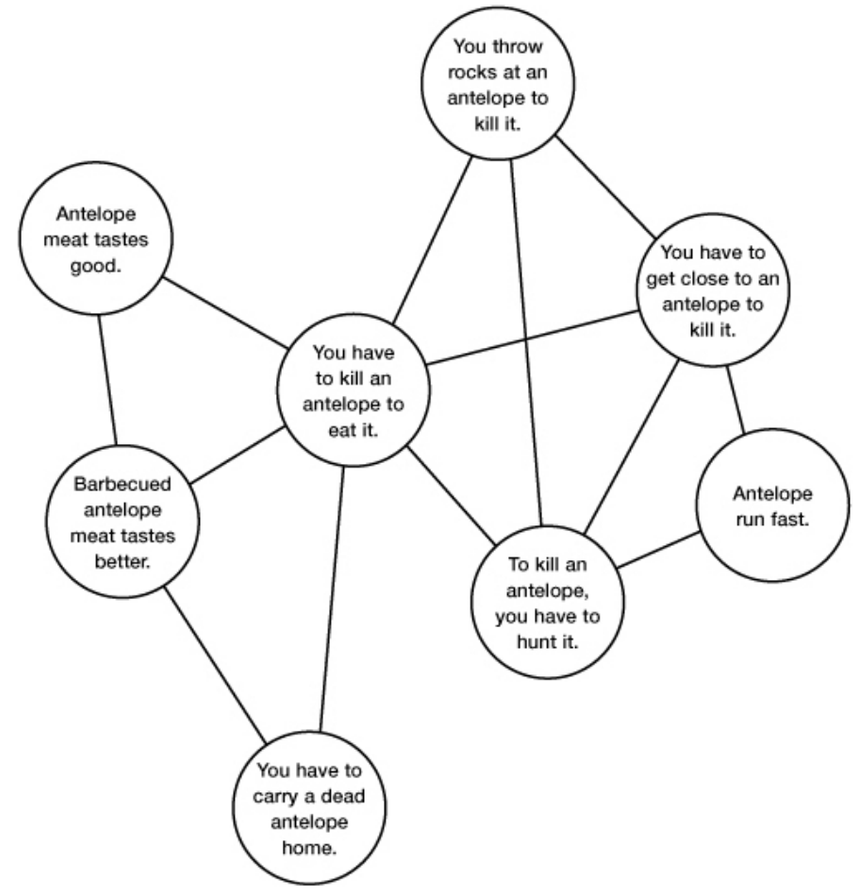

Figure 1.2. Schematic of knowledge in the mind

Now, imagine a hunter telling this story about hunting the antelope:

We were out hunting when we saw some antelope in the distance. We were almost close enough to throw rocks and hit them. But then the wind came up, and it was blowing in the direction from us to them. The antelope smelled us and ran away.

Now, let's draw a schematic diagram of the relationships between the

events of the story (Figure 1.3).

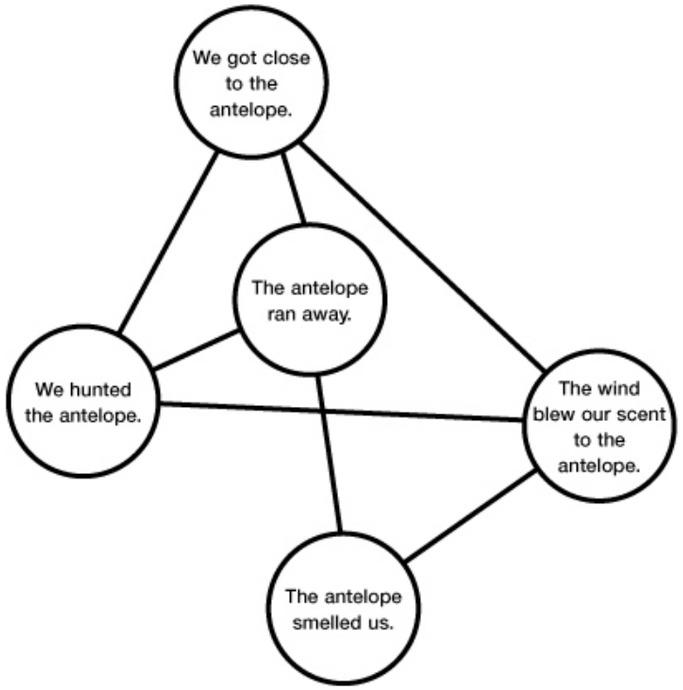

Figure 1.3. **The story of hunting the antelope**

The young hunter superimposes this story onto his existing knowledge of antelope (Figure 1.4).

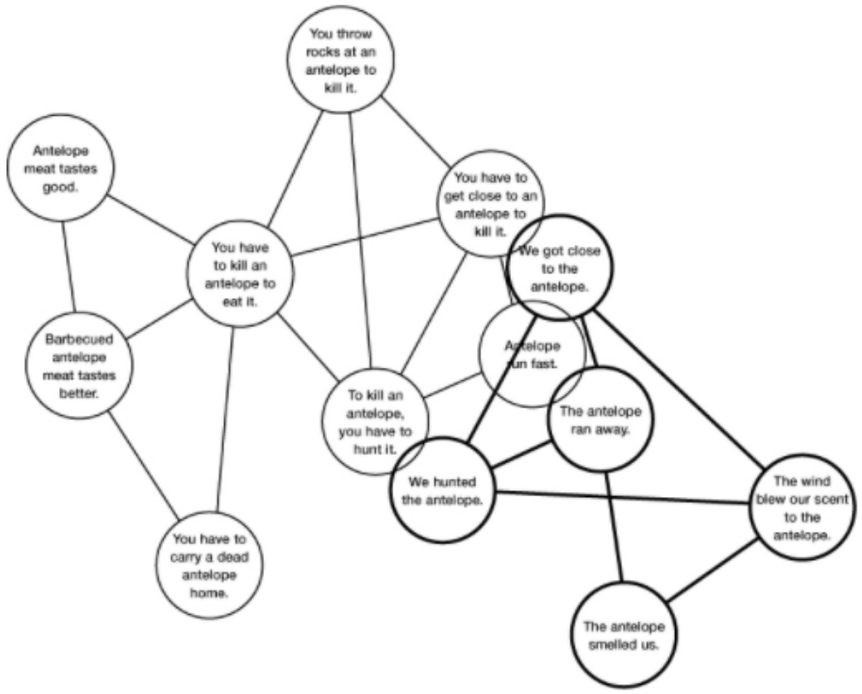

Figure 1.4. **Merging the story with existing knowledge**

The young hunter can readily see the parallels between his own knowledge and the story. However, he's not finished. That night, while he dreams, his brain reorganizes his associative memory to integrate the experiences of the day into the existing knowledge. In the morning, the young hunter will have this new knowledge structure (Figure 1.5).

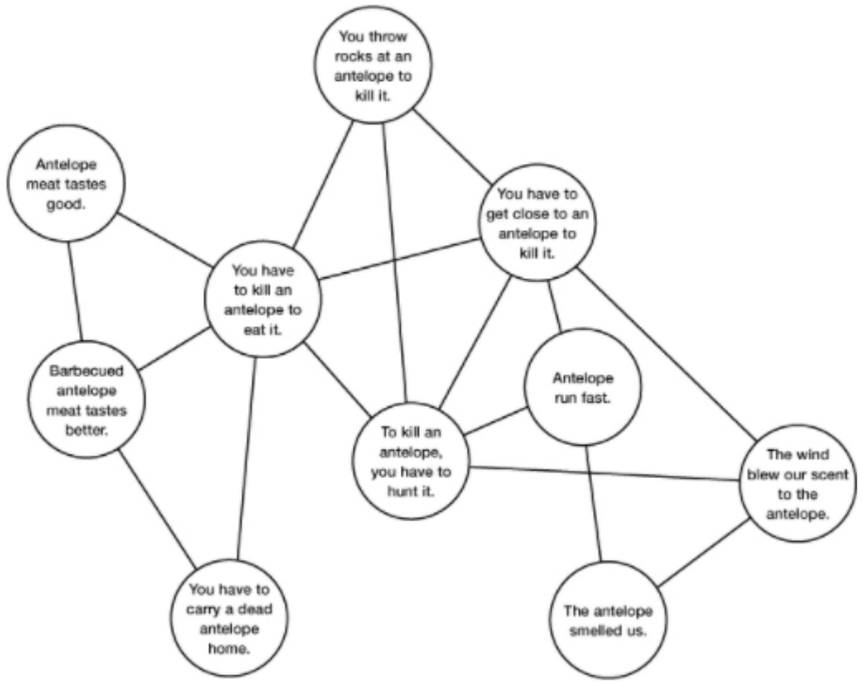

Figure 1.5. After integrating the story into existing knowledge

This is the simplest way we learn from storytelling. But there's another, even more important way that storytelling changes our memories: It can alter existing knowledge.

Now, suppose the young hunter listens to another story. I'll leave out most of the story to focus your attention on the crucial part:

We kept throwing rocks at the antelope and hurt it so it couldn't run as fast. We closed in on the antelope and caught it. We smashed its head with big rocks. That killed it.

Figure 1.6 shows a schematic of what the story fragment might look like.

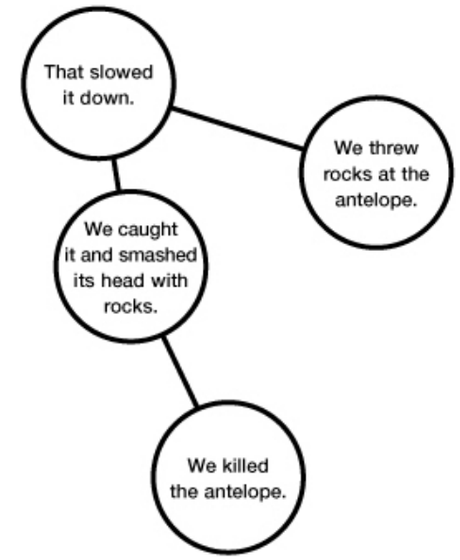

Figure 1.6. A fragment of a story

The young hunter will easily match up the new story with his existing network of knowledge about antelope (Figure 1.7).

Figure 1.7. Superposing the story onto memory

Here's the important part: That night, when the young hunter dreams and integrates the new knowledge into his memory, the brain will also tidy up the memory structure to make it neater.

Note that the previous connection between killing the antelope and throwing rocks at it has been broken: Throwing rocks doesn't kill antelope —it slows them down. Smashing its head with a big rock is how you actually kill an antelope. Two new bits of knowledge have been added to the network. Also note that the positions of the two original bits of knowledge ("you throw rocks..." and "you have to kill...") have shifted somewhat. Some associations have been made more distant while some are now closer. That's what happens whenever you learn something: Everything associated with it in your memory shifts somewhat.

The "Aha!" Insight

This learning process can sometimes produce radical changes in the way we think; sometimes those radical changes take place consciously. Martin Gardner called these *Aha! insights* because we can't help but exclaim something like "Aha!" or "I'll be a monkey's uncle!" (and because *I'll be a monkey's uncle insights* just doesn't sound right).

Aha! insights occur when our network of ideas suddenly transforms into a very different shape. (See Chapter 2, "Interactivity," for more on the "Aha!" insight.)

Storytelling was invented thousands of years ago and remains the most powerful medium for communicating complex interrelated ideas.

The Nature of Stories

So much has been written about the nature of stories that it seems cheeky for me to throw in my own two cents' worth. Nevertheless, there are a few fundamental points I want to emphasize, if only to get you oriented toward the concepts that underlie this book.

Strong Structure

Stories must satisfy tight structural requirements to be acceptable. Many definitions I have seen strike me as too academically broad. Yes, any sequence of statements can be construed to be a story, but only in the

most academic of senses. I can't specify the structure of stories, but I can point out that even a 4-year-old child has a solid grasp of the concept of story. Here are two examples to run past your neighborhood 4-year-old:

> *The itsy-bitsy spider crawled up the water spout.*
> *Down came the rain and washed the spider out.*
> *Out came the sun and dried up all the rain.*
> *And the itsy-bitsy spider crawled up the spout again.*

Here you have a clear, simple story in four lines. It has a protagonist (spider), conflict (the rain), struggle (being washed out), resolution (crawled back up), and even a moral (the value of perseverance).

Here's another story:

> *Once upon a time, there was a handsome young prince who lived in a shining castle. One day he mounted his beautiful white steed and rode out of the castle into the forest. In the forest, his horse fell into a hole and they both died.*

This story has most of the elements of many stories: the classic "Once upon a time" opening, a handsome prince, a beautiful white horse, a castle, and a forest. These elements are quite conventional, but the ending is not at all what's expected. Tell this story to 4-year-olds and they'll cry out, "That's not a story!" They'd be right. Whatever structural elements this pseudo-story has, it can't be called a proper story because it violates some fundamental expectations about stories.

I challenge you to devise a set of rigorous criteria for defining stories, a set that would accept the itsy-bitsy spider story while rejecting the prince who died story. I certainly can't meet that challenge.

Lesson 1

Stories are complex structures that must meet many hard-to-specify requirements.

People

Stories are about people. This is such a simple, basic truth that it's often lost in the high-falutin' analysis of narrative theory. Sometimes the reference to people is indirect or symbolic—as in the case of the itsy-bitsy spider, which isn't a person but is understood by the audience to represent a person. An extreme example of this indirection is offered by the movie *Koyaanisqatsi*, which lacks a protagonist or dialogue. The movie presents an artful sequence of images of nature contrasted with the world of civilization. Yet the story is strong, clear, and beautifully summarized in the final extra-long shot of a rocket ascending higher and higher into the atmosphere and exploding. The camera centers on the largest fragment and follows it down, down, down. The symbolism is intense and powerful; this movie is about what we have become.

In addition to exalting the role of people in stories, storytellers minimize the role of things. You must concentrate your attention on the people in stories and simultaneously reject any significant role for things.

> *But there are plenty of stories that revolve around things. What about* The Maltese Falcon, Raiders of the Lost Ark, *and* The Lord of the Rings?

No, the objects in the cited stories do not play central roles. *The Lord of*

the Rings, for example, is not about the ring, but about Frodo's struggle. Replacing the ring with a magic sock or hat or eyeglasses would not have changed the story much. Replacing Frodo with, say, Han Solo, Don Quixote, or Huck Finn would have changed the story beyond recognition. This simple truth—that stories are about people, not things—explains the utter failure of games to incorporate storytelling in any but the most mechanical and forced manner. Games concern themselves with things: things you acquire, things you use, things you destroy, and so on. That's why they're so emotionally crippled—dramatic power comes from people and their problems, not things. Games aren't antisocial; they're asocial. They just don't bother with people other than as walking dolls that perform mechanical functions.

Lesson 2

People, not things!

Conflict

All stories have some sort of conflict. Sometimes the conflict is direct and violent, as in *Star Wars* or *The Lord of the Rings*. The good guys wear white hats, and the bad guys wear black hats. The good guys are handsome and noble, and the bad guys are missing some teeth and have bad breath. Youngsters with their simplistic view of the universe favor such stories. But there are stories in which the conflict is more indirect as well. Sometimes the conflict is social, sometimes it's symbolic, but there's always some sort of conflict.

The second *Jurassic Park* movie illustrates indirect conflict. The primary conflict is between the mathematician and the soulless businessman; the conflict is established early in the movie when the mathematician tugs at the businessman's sleeve and the businessman warns "Careful. This suit cost more than your education." As the story progresses, dinosaurs rampage with toothy glee, chomping and stomping people in horrifically entertaining ways, but they aren't the antagonists. Indeed, the dinosaurs are presented as something like "noble savages," devoid of evil intent, merely acting out their reptilian instincts with dinosaur integrity. The central conflict of the movie is indirect: The businessman gives orders to his minions, and the mathematician opposes him with vain pleas and dark warnings. Spielberg could have moved all the dinosaurs offstage, saving millions of dollars, without compromising the integrity of the story—although it wouldn't have been nearly as much fun.

Well, here at least is one place where games shine.

Not exactly. It's true that games have plenty of conflict, but it usually takes the simplest and most direct form: violence. Games are deficient in other forms of conflict, such as social conflict. The game designer's spice shelf has lots of sugar and nothing else.

Lesson 3

Stories are about conflict, most commonly social conflict. Violent conflict is for simple stories.

> *What about* Macbeth, Hamlet, *or* Romeo and Juliet? *Those plays end with everybody dying. Would you dismiss them as simplistic?*

The violence in those plays is not part of the conflict—it's part of the resolution. A brutally short summation of all three plays is this: "A profound personal conflict was tragically resolved in violence." In storytelling terms, the violence is the denouement, not the climax.

Puzzles

Stories are not puzzles. It's true that puzzles often form a part of the story; indeed, puzzles play a large role in mystery stories. The puzzles in a mystery story are primarily about people, however. The bulk of the story is devoted to detailing the sleuth's machinations in getting people to reveal crucial clues to the mystery.

> *But there's also plenty of nonsocial sleuthing going on. Take the television series* CSI, *for example. It's about using science rather than interpersonal skills to solve crimes, and it has been a big hit.*

True, but the science is not what gives the stories their power. The gee-whiz technology is certainly fun, but the strong characters and often poignant storylines are the true strengths of the stories. Without those strong character interactions, *CSI* would be a run-of-the-mill whodunit.

A story always contains some kind of problem or challenge: How will the protagonist resolve the conflict of the story? If this problem is an intellectual one requiring a logical solution, it's called a puzzle. Nonetheless, the exercise of intellectual legerdemain is seldom central to stories. Sometimes, the protagonist recruits other characters to assist with the solution of the puzzle or undergoes a major personality change to discover the solution to the puzzle. The greatest stories provide challenges that are personal or social in nature, not logical or intellectual.

Lesson 4

Puzzles are not a necessary component of stories.

Choices

Ultimately, stories concern the choices that characters make. Indeed, the entire point of many stories is revealed through a key choice the protagonist makes. In *Star Wars*, it's "Trust the Force, Luke." In *Macbeth*, it's the decision to murder for ambition. In the third *Matrix* movie, it's Neo's decision to sacrifice himself. In many versions of the Arthurian legends, it's Guinevere's decision to act on her love for Lancelot. In each of these examples, the entire story builds up to or revolves around a key decision.

But the key decision is only the most dramatically salient one; other choices throughout the story establish character. Neo is reluctant to accept his role as the savior of humanity; he expresses that reluctance in a hundred small actions. Slowly Neo comes to accept the truth; again, his acceptance is established by the decisions he makes, demonstrating greater confidence in his skills.

Spectacle

Novel experiences provide a certain amount of entertainment value arising solely from the fact that they're new. Sometimes you try out an exotic food merely for the simple pleasure of tasting something you've never tasted before. A great deal of music, especially popular music, relies on including odd new sounds. Rock music revels in unconventional sounds: The electric guitar, feedback effects, the fuzzbox, and other such acoustic effects play a major role in rock music.

The visual form of this pleasure from novelty is *spectacle,* providing exotic imagery as a form of entertainment. Spectacle dominates the movies these days. The very first movies were spectacles without stories—trains crashing and so forth. *Star Wars* in 1977, *Jurassic Park* in 1991, and *The Matrix* in 1999 exemplify the appeal of spectacle.

Computer games have followed a related course. The earliest computer games offered nothing more than moving squares on a television screen; the evolution of computer games has been dominated by the quest for ever more realistic graphics to provide ever better spectacle. The progress made in the past 25 years is truly astounding. Expect even greater things in the future.

All this fabulous spectacle has engendered in the minds of most younger people an unfortunate confusion between story and spectacle. Many associate spectacle with story so strongly that they believe spectacle is a necessary component of story.

A sad experience of mine forcefully demonstrates the degree to which spectacle has crowded out story in the minds of many. Once upon a time, I acquired a copy of Charlie Chaplin's classic *The Gold Rush*. After watching it, I enthused about the beauty of the story to a young friend, urging him to come watch it with me. With some reluctance, my friend consented. Barely a quarter of the way into the movie, he stood up to leave the room. Chaplin's great work bored him.

The scenes were all "plain," the story's pace was torpid, and the movie was black and white and had no sound. How could I expect him to endure such a boring film? In my friend's opinion, a movie without spectacle simply wasn't worth watching.

But Aristotle, in his classic *Poetics*, ranked spectacle as the least important of the six elements of story. (His priority list was plot, character, thought, diction, song, and spectacle.)

Yeah, well, things have changed a bit in the last two thousand years. Maybe Aristotle gave scant value to spectacle because the computer-generated imagery in those days was really crummy.

It's true that spectacle sells; the top-selling movies usually have great spectacle. But this is correlation, not causation. Some spectacular movies flopped, such as *Final Fantasy, John Carter,* and *Catwoman*. Meanwhile, plenty of movies lacking spectacle made huge profits: *The Sting*, *The Godfather*, and *Forrest Gump* provide good examples of films that were hugely successful because of their stories, not their spectacle.

An even better case is made by a head-to-head conflict between two movies in 2001: *Final Fantasy* and *Shrek*. The first of these was a computer-graphics film boasting state-of-the-art graphics. The producers boasted that the software modeled 30,000 individual hairs on the heroine's head. The imagery truly was spectacular. By contrast, *Shrek*

used simple computer graphics, much inferior to those of *Final Fantasy*. However, *Shrek's* story completely outclassed *Final Fantasy*'s. The result was predictable: *Shrek* outsold *Final Fantasy* by ten to one.

The exaltation of spectacle is a recent and temporary infatuation. Consider that literature has never relied on spectacle, theater relies on a limited form of spectacle, and cinema underwent short bursts of spectacle arising from technological advances (initial invention in the 1890s, sound in 1930, color in 1940, and special effects starting in the 1970s and continuing through today). Each of these technological advances was initially the source of much infatuation, with movies overusing the technology. After a few years, the technology reverted to its normal position as a supporting element of the story rather than the central attraction.

Lesson 5

Spectacle does not make stories.

The Tyranny of the Visual

Many observers have noted that our culture is increasingly dominated by image. Indeed, a recent book was titled *The Rise of the Image, the Fall of the Word*. No doubt, image plays a larger role in our culture now than at any time in the past. In many ways, this is good. Glorifying war, for example, is much harder when the news gushes with images of the horrible reality of war. This applies in fictional representations as well. Old war movies showed victims clutching their chests and sanitarily falling face down. Today, a movie such as *Saving Private Ryan* shows heads being blown off bodies and people being ripped apart with such graphic realism that, after watching the movie, a friend of mine declared he could not see how anybody could ever again support a war.

Tremendous effort has gone into improving the quality of images. Computer graphics has absorbed billions in research and development money and consumed the energies of thousands of our brightest minds. Hundreds of people labor over the computer graphics in a major movie, and their efforts are usually rewarded with bounteous ticket sales. Television in 2012 is looking forward to the imminent dominance of HDTV and the accompanying huge improvement in image quality. Electronic networks are dramatically increasing their capacity, primarily to permit the transmission of larger and more detailed images. The text you type amounts to a few kilobytes, while images gobble up megabytes.

I won't condemn the rise of the image in our culture, and I will not bemoan the decline of the word. Instead, let's consider the ways visual thinking has come to dominate our thinking to the exclusion of subtler cognition.

When I gaze upon a scene, I realize that I'm perceiving but a tiny fragment of reality—I am perceiving reality through the narrow window of the visual. When I look at a tree, I perceive so much more than the visual image. I imagine the fluids slowly creeping through its cambium, the photosynthesis taking place in its leaves, the absorption of nutrients from the soil—all these invisible processes that are central to the life of a tree. My eyes tell me only so much about the tree; there's much more going on outside my view.

Note that my perception of the tree is informed, indeed driven, by my education. Because I have read about biology, trees, and physics, I bring an understanding that allows me to see deeper inside the tree. My

perception of the universe is an integration of my knowledge and my senses.

Consider this analogy: Suppose that you are watching a black-and-white movie. You see an apple presented in shades of gray, but you know that the apple must be red. Your real eyes see a gray apple, but your mind's eye fills in the color. Now extend that analogy. What if you also perceive the smooth texture of the apple's skin, the slow oxidation of the apple's flesh—everything going on in that apple. By living only in the world of the visual, are you "seeing" less of the world than you could?

The Wachowski brothers created a stunning visual analogy to this process in the first *Matrix* movie. At the climax, Neo has revived from death and can now see the matrix for what it truly is. He looks down the corridor at the three agents and sees not the corridor, but the code behind it. The image communicates the idea of seeing the processes behind reality rather than just the visual skin of reality. Ironic, isn't it: a visual representation of an idea that attempts to get around visual thinking?

Lesson 6

Visual thinking should not dominate storytelling.

Spatial Thinking

Closely related to visual thinking is spatial thinking. Spatial reasoning is one of the brain's greatest achievements. When you reach around behind the refrigerator to retrieve the fallen spoon, you're using spatial reasoning. People often metaphorically apply spatial reasoning to nonspatial problems, as evidenced by such statements as "Joe and I aren't very close friends" or "Your statement is wide of the mark." Spatial reasoning used metaphorically, as in these examples, works well. The problem comes when people apply it too literally to storytelling. Spatial reasoning is out of place in the universe of drama because drama is about people, not things.

In my designs for interactive storytelling, I have always used a simple arrangement: Space is composed of individual stages with no spatial relationships whatever between stages. In my definition, a stage is simply a location containing characters and props. Characters simply disappear from one stage and reappear on another. Inside a stage, all characters are able to interact with each other without any spatial considerations. It's a simple, robust model, and it closely approximates the way space operates in most stories. This broader definition of "stage" can be applied in any storytelling medium: theater, cinema, literature, or interactive storytelling.

You can't ignore spatial considerations in stories! Luke Skywalker and Darth Vader can't fight with their light sabers unless they're close together. Han Solo can't kiss Princess Leia unless they're face to face. They couldn't have rescued the princess unless they got on board the Death Star.

How many times do the spatial relationships of actors play a crucial role in those interactions? The important factor in the fight between Luke Skywalker and Darth Vader was not the separation between them; it was a dramatically insignificant act to close the gap between them. The crucial factor was the decision on Luke Skywalker's part to take on Darth Vader.

Han Solo didn't kiss Princess Leia because they just happened to be close together; the feelings they had for each other drove that interaction. Rescuing the princess was primarily a dramatic decision on Luke's part.

Don't let your familiarity with movies dominate your thinking about stories. Consider a medium in which spatial factors are not automatically included: literature.

For example, *The Odyssey* is at heart a story of a journey around the Mediterranean. Isn't that fundamentally spatial? Indeed, the journey motif shows up repeatedly in literature, from *The Odyssey* to *Huckleberry Finn* to *Star Wars*. But are the spatial motions central to the story? Are they not merely transitions from one stage to another, without any genuine spatial content? The best evidence for the chimerical nature of spatial factors in stories is that the actual spatial relationships are never specified. Odysseus traveled for many days and came to the Land of the Lotus Eaters—where is that? How far away is it from Scylla and Charybdis? Is it closer to Troy or to Ithaca? These relationships aren't specified in *The Odyssey*—because they're not important.

The same theory applies to other journey stories. *Huckleberry Finn* takes place on a specified river with specified places that could be found on a map. Yet many of the details just aren't there. Where was it that Huck saw the body of his father? And how far away was that from the town where they tarred and feathered Huck's shyster buddies? Or the place where the feud led to the murders of his hosts? The reader doesn't know because those spatial relationships are irrelevant to the dramatic matters addressed in the story.

Consider this standard sentence from a romantic novel: "Overpowered with passion, he seized her in his arms and kissed her frantically." Now consider the sentence modified to include spatial factors: "Overpowered with passion, he walked over to her, seized her in his arms, moved his head directly in front of hers, rotated his head slightly to avoid a collision of noses, then closed the gap between their lips and kissed her frantically." Pretty silly, eh? Spatial factors just aren't that important in drama. If an actor needs to alter a spatial relationship to get something done, he simply does it, and you don't need to worry about the mechanical details of how that's carried out. Stories are about the exercise of emotion, not musculature.

Consider the *Star Trek* universe, developed over the course of more than three decades by hundreds of people. Fat encyclopedias define and list all manner of details of the *Star Trek* universe. You can read technical specifications for all kinds of starships and wondrous devices, plus detailed histories of dozens of different species and their home worlds. Yet this stupefying mountain of data lacks one of the simplest of all documents: a map. Nobody can tell you whether the planet Vulcan is closer to the Klingon home world or to Earth. Where is the planet Andoria? How do you get to Raisa or Cardassia? There are literally hundreds of stories from the *Star Trek* universe, but there's never been a map.

Lesson 7

Stories take place on stages, not maps.

Temporal Discontinuity

Just as stories break up space into discrete chunks called stages, they play havoc with time—breaking it up, jumping backward and forward, and

skipping it altogether. Actors are shown embarking on a journey and arriving at their destination; the time the journey itself consumes is skipped over. Years are disposed of with the note, "Many years later...." Simultaneity is presented with the simple phrase, "Meanwhile, back at the ranch...." Flashbacks jerk you backward in time and then return you to the present. Dramatic time just doesn't behave like physical time; it follows whatever course the story requires.

Fortunately, temporal reasoning facilities aren't as unconsciously pervasive as spatial reasoning facilities, so people seldom have difficulty appreciating the liberties storytellers take with time. Nevertheless, computer game designers contemplating the problems of interactive storytelling should disencumber themselves of the old notions of physical time that dominate games.

Conclusions

This chapter offers no grand theory of storytelling. Instead, it offers a number of separate points about story that are important considerations of interactive storytelling. Storytelling is so deeply entwined in human nature and cultures that I doubt whether the true essence of stories can ever be nailed down. If you mean to build interactive storytelling systems, however, the points in this chapter should be clear in your mind before you turn to interactivity.