

WHAT VIDEO GAMES HAVE TO TEACH US ABOUT LEARNING AND LITERACY

Revised and Updated Edition

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2010年2月

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First published in 2007 by
PALGRAVE MACMILLAN™
175 Fifth Avenue, New York, N.Y. 10010 and
Houndmills, Basingstoke, Hampshire, England RG21 6XS
Companies and representatives throughout the world.

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ISBN-13: 978-1-4039-8453-1
ISBN-10: 1-4039-8453-0

Library of Congress Cataloging-in-Publication Data is available from the Library of Congress.

A catalogue record for this book is available from the British Library.

Design by Newgen Imaging Systems (P) Ltd., Chennai, India.

First edition: December 2007

10 9 8 7 6 5

Printed in the United States of America.

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SEMIOTIC DOMAINS:
IS PLAYING VIDEO GAMES
A “WASTE OF TIME”?

LITERACY AND SEMIOTIC DOMAINS

WHEN PEOPLE LEARN TO PLAY VIDEO GAMES, THEY ARE LEARNING A NEW *literacy*. Of course, this is not how the word “literacy” is normally used. Traditionally, literacy is the ability to read and write. So why should we think of literacy more broadly?

There are two reasons: First, language is not the only important communicational system. Images, symbols, graphs, diagrams, artifacts, and many other visual symbols are significant, more so today than ever. Furthermore, words and images are very often juxtaposed and integrated. In newspaper and magazines, as well as in textbooks, images take up more and more space alongside words. In fact, in many modern textbooks images not only take up more space, they carry meanings that are independent of the words in the text. If you can't read the images, you will not be able to recover their meanings from the words in the text alone—for example, a technical diagram covering cell division in a biology textbook will contain information not fully explicated in the words of the text itself.

In such *multimodal* texts (texts that mix words and images), then, the images often communicate different things from the words. Further, the combination of the two modes communicates things that neither of

the modes does separately. And, indeed, multimodality goes far beyond images and words to include sounds, music, movement, and bodily sensations. Video gaming, as we will see throughout this book, is a multimodal literacy *par excellence*.

Second, even print literacy is multiple. There are many different ways of reading and writing. We don't read or write newspapers, legal tracts, essays, poetry, rap songs, and so on through a nearly endless list, in the same way. Each of these domains has its own rules and requirements. The legal literacy needed for reading law books is not the same as the literacy needed for reading physics texts or superhero comic books. And, indeed, we should not be too quick to dismiss the latter form of literacy. Many a superhero comic is replete with post-Freudian irony of a sort that would make a modern literary critic's heart beat fast and confuse any otherwise normal adult.

Once we see this multiplicity of literacy, we realize that when we think about reading and writing, we must think beyond print. Reading and writing in any domain, whether it is law, rap songs, academic essays, superhero comics, or whatever, are not just ways of decoding print, they are also caught up with ways of doing things, thinking about things, valuing things, and interacting with other people—that is, they are caught up with different sorts of social practices. Literacy in any domain is actually not worth much if one knows nothing about the social practices of which that literacy is but a part. So, for example, legal language and literacy are married to legal practices; gaming language and literacy (words, images, movements, and sounds) are married to gaming practices, to gaming as an activity in the world; and rap as music, language, and literacy are married to hip hop practices and values.

Because literacy requires more than being able to “decode” (words or images for instance) and because it requires people to be able to participate in—or at least understand—certain sorts of social practices, we need to focus on not just “codes” or “representations” (like language, equations, images, and so forth) but the domains in which these codes or representations are used, as well. We need to think in terms of what I will call *semiotic*

domains. “Semiotic” here just means “signs.” It is merely a fancy way of saying that we want to talk about how things take on meaning, things like images, sounds, gestures, movements, graphs, diagrams, equations, objects, and even humans like babies, midwives, and mothers (all of which have had different meanings in different cultures and at different points in history). It is not just words that have meanings. Words and all these other things are all signs (symbols, representations, whatever term you want to use) that “stand for” (take on) different meanings in different situations, contexts, practices, cultures, and historical periods. For example, the image of a cross means Christ (or Christ's death) in the context of Christian social practices and it means the four points of the compass (north, south, west, and east) in the context of other social practices (e.g., in some African religions). Or to take another example, childbirth in the eighteenth century in the United States was seen as a natural event meant to occur at home among friends and family. Later as modern medicine and hospitals arose, it came to be seen as a medical event meant to occur in a hospital among doctors and nurses, though today many people want to view it again as a natural home-based event.

Some readers of the first edition of this book were bothered by the word “semiotic” as a piece of jargon. If it bothers you, just translate “semiotic domain” into something like “an area or set of activities where people think, act, and value in certain ways”—an area like video gaming, bird watching, physics, anime, or many other such “domains,” acknowledging that there are distinctive sub-types of all these bigger domains as well (e.g., real-time strategy gaming).

By a semiotic domain I mean any set of practices that recruits one or more modalities (e.g., oral or written language, images, equations, symbols, sounds, gestures, graphs, artifacts, etc.) to communicate distinctive types of meanings. Here are more examples of semiotic domains: cellular biology, postmodern literary criticism, first-person-shooter video games, high-fashion advertisements, Roman Catholic theology, modernist painting, midwifery, rap music, wine connoisseurship—through a nearly endless, motley, and ever-changing list.

Examples

If we think first in terms of semiotic domains and not in terms of reading and writing as traditionally conceived, we can say that people are (or are not) literate (partially or fully) in a domain if they can recognize (the equivalent of "reading") and/or produce (the equivalent of "writing") meanings in the domain. We can reserve the term "print literate" for talking about people who can read and/or write a language like English or Russian, though here, still, we will want to insist that there are different ways to read and write connected to different social practices. Thus, the rap artist who can understand and compose rap songs but not read print or musical notation is literate (can give and take meanings) in the semiotic domain of rap music, but not print or music notation literate in that domain.

In the modern world, print literacy is not enough. People need to be literate in a great variety of different semiotic domains. If these domains involve print, people often need the print bits, of course. However, the vast majority of domains involve semiotic (symbolic, representational) resources besides print and some don't involve print as a resource at all. Furthermore, and more important, people need to be able to learn to be literate in new semiotic domains throughout their lives. If our modern, global, high-tech, and science-driven world does anything, it certainly gives rise to new semiotic domains and transforms old ones at an ever faster rate.

This book deals with video games as a semiotic domain, actually as a family of related but different domains, since there are different types or genres of video games (e.g., first-person shooter games, fantasy role-playing games, real-time strategy games, simulation games, etc.). People can be literate, or not, in one or more of these video-game semiotic domains. However, in talking about learning and literacy in regard to video games, I hope, as well, to develop a perspective on learning, literacy, and semiotic domains that applies more generally beyond video games.

However, if we want to take video games seriously as a family of semiotic domains in which one can learn to be literate, we face an immediate problem. Many people who don't play video games, especially older

people, are sure to say that playing video games is "a waste of time." In the next section, I sketch out one version of what I think this claim often amounts to, using a specific example involving a six-year-old child.

LEARNING AND THE PROBLEM OF CONTENT

To spell out what I think the claim that playing video games is a waste of time often means, I need first to tell you about a game a six-year-old boy was playing, a game called "*Pikmin*." *Pikmin* is a game for the Nintendo GameCube. It is rated "E," which means that it is a game acceptable for all ages (a sequel, *Pikmin 2*, came out in 2004).

In *Pikmin*, the player takes on the role of Captain Olimar, a small (he's about the size of an American quarter), bald, big-eared, bulbous-nosed spaceman who crashes into an unfamiliar planet when a comet hits his spaceship. Captain Olimar (i.e., the player) must collect the spaceship's lost parts, scattered throughout the planet, while relying on his spacesuit to protect him from the planet's poisonous atmosphere. The player must carefully monitor the damage done to Captain Olimar's suit and repair it when needed. To make matters more complicated, the spacesuit's life support will fail after 30 days, so the captain (the player) must find all the missing parts in 30 days (each day is 15 minutes of game-time play). Thus the game is a race against time and represents the rare case of a game that one can play to the end and still "lose."

However, Captain Olimar gets help. Soon after arriving on the strange planet, he comes upon native life that is willing to aid him. Sprouts dispensed from a large onionlike creature yield tiny (they're even smaller than Captain Olimar) cute creatures that Olimar names "Pikmin" after a carrot from his home planet. These little creatures appear to be quite taken with Olimar and follow his directions without question. Captain Olimar learns to raise Pikmin of three different colors (red, yellow, and blue), each of which has different skills. He learns, as well, to train them so that each Pikmin, regardless of color, can grow through three different ever-stronger forms: Pikmin sprout a leaf, a bud, or a flower from their heads.

Captain Olimar's colorful Pikmin follow him as his army, and he uses them to attack dangerous creatures, tear down stone walls, build bridges, and explore a great many areas of the strange planet in search of the missing parts to his spaceship. While Captain Olimar can replace killed Pikmin from remaining Pikmin, he must, however, ensure that at no point do all his Pikmin perish—an event called, by the game and by the child player, “an extinction event.”

It was quite a sight to watch a six-year-old, as Captain Olimar, lead a multicolored army of little Pikmin to fight, build, grow more Pikmin, and explore a strange landscape, all the while solving multiple problems to discover and get to the locations of the spaceship's missing parts. The child then ordered his Pikmin to carry the heavy parts back to the ship. When this child's grandfather watched him play the game for several hours, the grandfather made the following remark: “While it may be good for his hand-eye coordination, it's a waste of time, because there isn't any content he's learning.” I call this *the problem of content*.

The problem of content is, I believe, based on common attitudes about schooling, learning, and knowledge. The idea is this: Important knowledge (now usually gained in school) is content in the sense of information related to intellectual domains or academic disciplines like physics, history, art, or literature. Activities that are entertaining, but that themselves do not involve such learning, are just “meaningless play.” Of course, video games fall into this category.

The problem with the content view is that an academic discipline (or any other semiotic domain, for that matter) is not primarily content, in the sense of facts and principles. It is primarily a lived and historically changing set of distinctive social practices. It is in these social practices that “content” is generated, debated, and transformed via distinctive ways of thinking, talking, valuing, acting, and, often, writing and reading.

Consider, for a moment, basketball as a domain. No one would want to treat basketball as “content” apart from the game itself. Imagine a textbook that contained all the facts and rules about basketball read by

students who never played or watched the game. How well do you think they would understand this textbook? How motivated to understand it do you think they would be? But we do this sort of thing all the time in school with areas like math and science.

There is, however, an alternative way to think about learning and knowing. I turn to this viewpoint in the following sections. Under this alternative perspective it will become clear that playing video games is not necessarily “a waste of time,” though it will be a while until I can return to that claim and contradict it directly.

AN ALTERNATIVE PERSPECTIVE ON LEARNING AND KNOWING

The alternative perspective starts with the claim that there really is no such thing as learning “in general.” We always learn *something*. And that something is always connected, in some way, to some semiotic domain or other.

Therefore, if we are concerned with whether something is worth learning or not, whether it is a waste of time or not—video games or anything else—we should start with questions like the following: What semiotic domain is being entered through this learning? Is it a valuable domain or not? In what sense? Is the learner learning simply to understand (“read”) parts of the domain or also to participate more fully in the domain by learning to produce (“write”) meanings in the domain? And we need to keep in mind that in the modern world, there are a great many more potentially important semiotic domains than just those that show up in typical schools.

Once we learn to start with such questions, we find that it is often tricky to determine what semiotic domain is being entered when someone is learning something. For example, consider college freshmen who have taken their first college-level physics class, passed it with good grades, and can write down Newton's laws of motion. What domain have they entered? It will not do to say “physics” and leave the matter at that, though the content view would take this position.

Lots of studies have shown that many such students, students who can write down Newton's laws of motion, if asked the simple question "How many forces are acting on a coin that has been thrown up into the air?" get the answer wrong (despite the fact that the answer can actually be deduced from Newton's laws). Leaving aside friction, they claim that two forces are operating on the coin, gravity and "impetus," the force the hand has transferred to the coin. Gravity exists as a force and, according to Newton's laws, is the sole force acting on the coin when it is in the air (aside from air friction). Impetus, in the sense above, does not exist, though Aristotle thought it did and people in their everyday lives tend to view force and motion in such terms.

So these students have entered the semiotic domain of physics as passive *content* but not as something in terms of which they can actually see and operate on their world in new ways. These students cannot produce meanings in physics or understand them in producerlike ways. They have not learned to experience the world in a new way.

When we learn a new semiotic domain in a more active way, not as passive content, three things happen:

1. We learn to experience (see, feel, and operate on) the world in new ways.
2. Since semiotic domains usually are shared by groups of people who carry them on as distinctive social practices, we gain the potential to join this social group, to become affiliated with such kinds of people (even though we may never see all of them, or any of them, face to face).
3. We gain resources that prepare us for future learning and problem solving in the domain and in related domains.

These three things, then, are involved in active learning: *experiencing* the world in new ways, forming new *affiliations*, and *preparation* for future learning.

This is "active learning." However, such learning is not yet what I call "critical learning." For learning to be critical as well as active, one additional feature is needed. The learner needs to learn not only how to understand and produce meanings in a particular semiotic domain but, in addition, needs to learn how to think about the domain at a "meta" level as a complex system of interrelated parts. The learner also needs to learn how to innovate in the domain—how to produce meanings that, while recognizable to experts in the domain, are seen as somehow novel or unpredictable.

To get at what all this really means, though, I need to discuss semiotic domains a bit more. This will allow me to clarify what I mean by critical learning.

MORE ON SEMIOTIC DOMAINS: SITUATED MEANINGS

Words, symbols, images, and artifacts have meanings that are specific to particular semiotic domains and particular situations (contexts). They do not just have general meanings.

I was once a cannery worker; later I became an academic. I used the word "work" in both cases, but the word meant different things in each case. In my cannery life, it meant something like laboring for eight straight hours in order to survive and get home to lead my "real" life. In my academic life, it means something like chosen efforts I put into thinking, reading, writing, and teaching as part and parcel of my vocation, efforts not clocked by an eight-hour workday. In the domain of human romantic relationships, the word "work" means something else altogether; for example, in a sentence like "Relationships take work." A word like "work" can even take on different meanings within a single domain, like the cannery, academics, or romantic relationships, meanings that vary according to different situations or contexts in the domain.

Meaning is both situation (context) and domain specific. Thus, even in a single domain, the meaning of a word varies across different situations. Let me give an example of what I am talking about by taking up again the example of the word "work." In semiotic domains connected to academics, the word "work" takes on a range of possible situated meanings different from the range possible in other semiotic domains (e.g., romance, the cannery, acting, etc.).

In one situation I might say of a fellow academic, "Her work has been very influential" and by "work" mean the ideas developed in her research. In another situation I might say the same thing, but now in regard to a particular committee she has chaired, and by "work" mean her political efforts within her discipline or institution. To understand the word "work" in these cases, you need to ask yourself what you take the situation to be (e.g., talk about contributions to knowledge or about disciplinary or institutional political affairs) and what semiotic domain is at stake (here academics, not the cannery or a movie set).

The same thing is true in all domains. Even in the rigorous semiotic domain of physics, one must give different specific meanings to the word "light," for instance, in different situations (contexts). So even in physics, when someone uses the word "light," we need to know whether they are talking about waves or particles, lasers or colors, or something else (perhaps they are talking about the general theory of electromagnetism). Of course, "light" takes on quite different meanings in other domains, for example in religion (e.g., "bathed in the Lord's light") or theater (e.g., "lighting effects").

Why I am belaboring this point? For two reasons: first, to make clear that understanding meanings is an active affair in which we have to reflect (however unconsciously) on both the situation (context) and the domain we are in. We "situate" the meaning in the given context and domain, I will say. And, second, because I want to argue that learning in any semiotic domain crucially involves learning how to situate (build) meanings for that domain in the sorts of situations the domain involves. That is precisely why real learning is always an active and new way of experiencing the world.

MORE ON SEMIOTIC DOMAINS: INTERNAL AND EXTERNAL VIEWS

There are two different ways to look at semiotic domains: internally and externally. Any domain can be viewed internally as a type of content or externally in terms of people engaged in a set of social practices. For example, first-person shooter games are a semiotic domain, and they contain a particular type of content. For instance, as part of their typical content, such games involve moving through a virtual world in a first-person perspective (you see only what you are holding and move and feel as if you yourself are holding it) and using weapons to battle enemies. Of course, such games involve a good deal more content as well. Thus we can talk about the typical sorts of content we find in first-person shooter games. This is to view the semiotic domain internally.

On the other hand, people actually play first-person shooter games as a practice in the world, sometimes alone and sometimes with other people on the Internet or when they connect several game platforms or computers together. They may also talk to other players about such games and read magazines and Internet sites devoted to them. They are aware that certain people are more adept at playing such games than are others. They are also aware that people who are into such games take on a certain identity, at least when they are involved with those games. For example, it is unlikely that people into first-person shooter games are going to object to violence in video games, though they may have strong views about how that violence ought to function in games.

I will call the group of people associated with a given semiotic domain—in this case, first-person shooter gamers—an *affinity group*. People in an affinity group can recognize others as more or less "insiders" to the group. They may not see many people in the group face to face, but when they interact with someone on the Internet or read something about the domain, they can recognize certain ways of thinking, acting, interacting, valuing, and believing as more or less typical of people who are into the semiotic domain. Thus we can talk about the typical ways of thinking,

acting, interacting, valuing, and believing, as well as the typical sorts of social practices associated with a given semiotic domain. This is to view the domain externally.

What I have said about viewing first-person shooter games internally or externally applies to any semiotic domain. For example, it applies to academic disciplines and sub-disciplines like physics or particle physics. We can take an internal view of a discipline in terms of its content (facts, theories, and principles) or an external view in terms of its social practices and the ways in which people interact within the field.

Do the internal and external aspects of a semiotic domain have anything to do with each other? Of course, if we are talking about academic disciplines as semiotic domains, most academics would like to think that the answer to this question is no. But the answer is, in fact, yes. Content, the internal part of a semiotic domain, gets made in history by real people and their social interactions. They build that content in certain ways because of the people they are (socially, historically, culturally), the beliefs and values they share, and their shared ways of talking, interacting, and viewing the world. That content comes to define one of their important identities in the world. As these identities develop through further social interactions, they come to affect the ongoing development and transformation of the content of the semiotic domain in yet new ways. In turn, that new content helps further develop and transform those identities. The relationship between the internal and external is reciprocal.

MORE ON SEMIOTIC DOMAINS: DESIGN GRAMMARS

Semiotic domains have what I call *design grammars*. Each domain has an internal and an external design grammar. By an internal design grammar, I mean the principles and patterns in terms of which one can recognize what is and what is not acceptable or typical content in a semiotic domain. By an external design grammar, I mean the principles and patterns in

terms of which one can recognize what is and what is not an acceptable or typical social practice and identity in regard to the affinity group associated with a semiotic domain.

Do you know what counts as a modernist piece of architecture? If you do, then you know, consciously or unconsciously, the internal design grammar of the semiotic domain of modernist architecture (as a field of interest).

If all you know is a list of all the modernist buildings ever built, then you don't know the internal design grammar of the domain. Why? Because if you know the design grammar—that is, the underlying principles and patterns that determine what counts and what doesn't count as a piece of modernist architecture—you can make judgments about buildings you have never seen before or even ones never actually built, but only modeled in cardboard. If all you have is a list, you can't make any judgments about anything that isn't on your list.

Do you know what counts as thinking, acting, interacting, and valuing like someone who is into modernist architecture? Can you recognize the sorts of identities such people take on when they are in their domain? Can you recognize what counts as valued social practices to the members of the affinity group associated with modernist architecture and what counts as behaving appropriately in these social practices? If the answer to these questions is “yes,” then you know, consciously or unconsciously, the external design grammar of the semiotic domain.

Of course, the internal and external grammars of a domain change through time. For example, it was once common for linguists to study issues germane to the translation of the Bible, for example, into Native American languages, as a core part of their academic work and identity as linguists. They hoped to facilitate the work of Christian missionaries, and they saw no conflict between doing linguistics and serving their religious purposes at the same time. Other linguists, not involved in Bible translation, did not necessarily dispute this at the time and often did not withhold professional respect from such religious linguists. The external grammar of the domain (and this was certainly influenced by the wider

culture at the time) allowed a connection between linguistic work as science and religious commitments as an overt part of that work. The internal grammar of the domain—its content—involved lots of direct research on issues germane to translation and the “modernization” of “non-modern” people.

Today most linguists would be skeptical of any connection between linguistic work and religion. They would not see translating the Bible into languages connected to cultures without the Bible, to facilitate the work of missionaries, as a central part of any branch of linguistics. Today the external design grammar of the field does not as readily allow for a connection between work as a linguist and religion, for identities as a linguist that are formed around this connection or for social practices germane to it. At the same time, the sorts of linguistic content that was most relevant to translation and conversion is no longer prominent in linguistics (the internal grammar).

So why I am being so perverse as to use the term “design grammar” for these matters? Because I want us to think about the fact that for any semiotic domain, whether it is first-person shooter games, architecture, or linguistics, that domain, internally and externally, was and is designed by someone. But who, for example, was/is this someone who designed the semiotic domains of first-person shooter games?

Obviously real game designers and producers determine what counts as recognizable content (in terms of story, images, and game play) for first-person shooter games by actually making such games. Over time, as they apply certain principles, patterns, and procedures to the construction of such games, the content of first-person shooter games comes to have a recognizable shape such that people not only say things like “Oh, yeah, that’s a first-person shooter game” or “No, that’s not a first-person shooter” but also “Oh, yeah, that’s a typical first-person shooter game” or “Oh, no, that’s a groundbreaking first-person shooter game.” Fans, through activities like modding (modifying the game design using software that comes with the game) also help determine aspects of the internal grammar (content) of first-person shooters.

Yet these designers and producers are only a few of the people who produce the external grammar of first-person shooter games. People who play, review, and discuss such games, as well as those who design and produce them, shape the external design grammar of the semiotic domain of first-person shooter games through their ongoing social interactions. It is their ongoing social interactions that determine the principles and patterns through which people in the domain can recognize and judge the thinking, talking, reading, writing, acting, interacting, valuing, and believing characteristic of people who are in the affinity group associated with first-person shooter games.

And, of course, the acts of people helping to design the domain externally as a set of social practices and identities rebound on the acts of those helping to design the domain internally as content, since that content must “please” the members of the affinity group associated with the domain as well as recruit newcomers to the domain. At the same time, the acts of those helping to design the domain internally in terms of content rebound on the acts of those helping to design the domain externally as a set of social practices and identities, since that content shapes and transforms those practices and identities. It is crucial, then, to see that the internal and external grammars of semiotic domains interrelate with each other, mutually supporting and transforming each other.

BACK TO PIKMIN: CRITICAL LEARNING

If learning is to be active, it must involve experiencing the world in new ways. Active learning in a domain also involves not just learning here and now but preparation for future learning within the domain and within related domains, as well.

However, as I said earlier, critical learning involves yet another step. For active learning, the learner must, at least unconsciously, understand and operate within the internal and external design grammars of the semiotic domain he or she is learning. But for critical learning, the learner must be able consciously to attend to, reflect on, critique, and manipulate

those design grammars at a metalevel. That is, the learner must see and appreciate the semiotic domain as a *design space*, internally as a system of interrelated elements making up the possible content of the domain and externally as ways of thinking, acting, interacting, and valuing that constitute the identities of those people who are members of the affinity group associated with the domain.

Let me return to the child playing *Pikmin* for a specific example of what I mean. What does it take just to play a game as an active learner? To do this the player must understand and produce situated meanings in the semiotic domain that this game, and games like it, constitutes. Elements in the content of *Pikmin*—for example, a yellow Pikmin—do not have just one general meaning or a single significance in the game world. Learners must learn to situate different meanings for such elements within different specific situations within the domain.

For example, when a player is faced with a rock wall, his yellow Pikmin (who can throw bomb rocks) take on the situated meaning *the type of Pikmin who can use bombs* (unlike red and blue Pikmin), since a good strategy for destroying walls in the game is to have yellow Pikmin throw bombs at them. However, when attacking a fat, sleeping, dangerous spotted creature (a Spotty Bulborb) found throughout the first levels of the game, the yellow Pikmin take on the situated meaning *the sorts of Pikmin who can be thrown farther than other sorts of Pikmin*, since a good strategy when fighting big creatures like these is to have Captain Olimar tell the red Pikmin to run up and attack from the rear, while he throws the yellow Pikmin onto their backs to attack from up top.

Additionally, players need to know what patterns or combinations of elements the game's internal design grammar allows. They need to know, given the situated meanings they have given to each element in the pattern or combination, what the whole pattern or combination means in a situated way useful for action.

For example, the internal design grammar of *Pikmin* allows the player to bring together (by moving Captain Olimar and his Pikmin) the combination of Pikmin, a rock wall, and a small tin can containing little

rock bombs. Of course, the game did not need to allow this pattern or combination to be able to occur; its design grammar could have been built differently. Even given that the design grammar does allow this combination, players still have to build a situated meaning for this combination out of the situated meanings they have given to each element in the combination.

If this is a point in the game where the player needs to get past a wall, and given the fact that he or she can build a situated meaning for yellow Pikmin like *the type of Pikmin that can throw bombs*, the player can build a situated meaning for this combination, something like: *Equip the yellow Pikmin with the rock bombs and have them use the bombs to blow up the wall.*

Here is another example from *Pikmin* of a combination of elements allowable by the internal design grammar of the game. The player often finds a Spotty Bulborb—a creature with big teeth and jaws suitable for swallowing Pikmin whole—sleeping peacefully in a fairly exposed space. So the design grammar of the domain allows the combination: Spotty Bulborb, sleeping, in exposed area. Depending on what situation the player takes him- or herself to be in, this combination can be assigned several different situated meanings. For instance, it could be taken to mean: *Attack the Spotty Bulborb carefully from the rear before it wakes up*; or it could be taken to mean: *Sneak quietly by the Spotty Bulborb to get where you want to go without trouble*. Nothing stops the player from assigning the combination a more unexpected situated meaning, perhaps something like: *Wake the Spotty Bulborb up so you can get a more exciting (and fair?) fight.*

Since the child can successfully break down rock walls and attack Spotty Bulborbs, he can understand (“read”) and produce (“write”) appropriate situated meanings for elements and combinations of elements in the domain (game). But all of this is “just” playing the game in a proactive way—that is, using situated meanings and the design grammar of the game to understand and produce appropriate meanings and actions. Of course, one could just ritualize one's response to the game and try pretty much the same strategy in every situation, but this would not be a proactive way to play and learn.

All these meanings and actions are a product of what I have called active learning, but they are not yet critical learning that leverages the design grammar at a metalevel in a reflective way that can lead to critique, novel meanings, or transformation of the domain. However, the child is learning to do this as well—that is, his process of learning the game is not only active, it is increasingly critical.

When the child had recovered 5 of the spaceship's 30 missing parts, he was able to search in a new area called the Forest's Navel. This area had a much harsher and more dangerous-looking landscape than the previous areas the child had been in. It had different dangerous creatures, including a number of closely grouped creatures that breathed fire. And the background music had changed considerably. Since the player has already found five parts, the game assumes that he is now more adept than when he began the game; thus, the landscape and creatures get harder to deal with, offering a bigger challenge. At the same time, these changes in features communicate a new mood, changing the tone of the game from a cute fairy tale to a somewhat darker struggle for survival.

The child was able to think about and comment on these changes. He said that the music was now "scary" and the landscape much harsher-looking than the ones he had previously been in. He knew that this signaled that things were going to get harder. Furthermore, he was aware that the changes signaled that he needed to rethink some of his strategies as well his relationship to the game. He was even able to comment on the fact that the earlier parts of the game made it appear more appropriate for a child his age than did the Forest Navel area and considered whether the game was now "too scary" or not. He decided on a strategy of exploring the new area only a little bit at a time, avoiding the fire-breathing creatures, and returning to old areas with the new resources (e.g., blue Pikmin) he got in the Forest Navel area to find more parts in these old areas more quickly and easily (remember, the player has only 30 game days to get all the parts and so wants to get some of them quickly and easily).

What we are dealing with here is talking and thinking about the (internal) design of the game, about the game as a complex system of

interrelated parts meant to engage and even manipulate the player in certain ways. This is metalevel thinking, thinking about the game as a system and a designed space. Such thinking can open up critique of the game. It can also lead to novel moves and strategies, sometimes ones that the game makers never anticipated. This is what I mean by critical learning and thinking. Of course, the six-year-old is only beginning the process of critical learning in regard to *Pikmin* and other video games, but he is well begun.

The child is learning to think reflectively about the internal design grammar (the grammar of content) of *Pikmin* and games like it. As he interacts with others, he will have opportunities to reflect on the external design grammar (the grammar of social practices and identities) too. For example, he has already learned that he can search the Internet for helpful tips about playing the game, including what are called Easter Eggs (little surprises players can find in a game if they know where and how to look for them). He considers these tips part of playing the game. On the other hand, he characterizes advice from adults about how to play the game as "bossing him around" and claims he can "do his own thinking."

These are early moments in the child's induction into the affinity groups associated with video-game playing, their characteristic social practices, and the sorts of identities people take on within these groups and practices. If he is to engage with these external aspects of game playing critically, he will need to reflect in an overt way on the patterns and possibilities he does and does not find in these social practices and identities. Doing this is to reflect on the external design grammar of the domain. Today this child is 11 and actively keeps a website up devoted to a favorite game (*Naruto*), creating faqs and contests for fellow fans who visit the site. He visits and actively interacts on boards devoted to *Naruto*. He is very much part of the affinity group associated with *Naruto* and, more generally, anime games, films, and books. He now has many more opportunities to think critically about the external design grammar—the social and interactional organization—associated with *Naruto* and games (and anime) like it.

Critical learning, as I am defining it here, involves learning to think of semiotic domains as design spaces that manipulate (if I can use this term without necessary negative connotations) us in certain ways and that we can manipulate in certain ways. Then there is the crucial matter of learning how these design spaces relate to each other and to other sorts of semiotic domains, some more closely related to video games as semiotic domains, some less closely related. That is, the child can learn how to think about, and act on, semiotic domains as a larger design space composed of clusters (families) of more or less closely related semiotic domains.

So, then, why do I call learning and thinking at a metalevel about semiotic domains (alone and in relation to each other) as design spaces *critical* learning and thinking? For this reason: Semiotic domains are human cultural and historical creations that are designed to engage and manipulate people in certain ways. They attempt through their content and social practices to recruit people to think, act, interact, value, and feel in certain specific ways.

Let me make this discussion more concrete. A game like *Pikmin* recruits from our six-year-old a complex identity composed of various related traits. The game encourages him to think of himself as an active problem solver, one who persists in trying to solve problems even after making mistakes, one who, in fact, does not see mistakes as errors but as opportunities for reflection and learning. It encourages him to be the sort of problem solver who, rather than ritualizing the solutions to problems, leaves himself open to undoing former mastery and finding new ways to solve new problems in new situations.

At the same time, the boy is encouraged to see himself as solving problems from the perspective of a particular fantasy creature (Captain Olimar) and his faithful helpers (the Pikmin) and, thus, to get outside his “real” identity and play with the notions of perspectives and identities themselves. He is also encouraged to focus on the problem-solving and fantasy aspects of his new identity and not, say, his worries about killing (virtual) “living” creatures, however odd they may be, though he can choose to avoid killing some of the creatures by running from them or

sneaking around them. The learner, in this case, gets to customize the identity the game offers him to a certain extent—this, in fact, is an important feature of good video games.

The identity that *Pikmin* invites the player to take on relates in a variety of ways to other identities he takes on in other domains. I believe, for example, that the identity *Pikmin* recruits relates rather well to the sort of identity a learner is called on to assume in the best active science learning in schools and other sites. Such learning—just like *Pikmin*—encourages exploration, hypothesis testing, risk taking, persistence past failure, and seeing “mistakes” as new opportunities for progress and learning.

If this is true, then our six-year-old is privileged in this respect over children who do not have the opportunity to play such games (in an active and critical way). An issue of social justice is at stake here in regard to the distribution of, and access to, this identity, whether through video games or science. We can note, as well, that the boy is using the video game to practice this identity, for many hours, at an early age, outside of science instruction in school, which may take up very little of the school day. Other children may get to practice this identity only during the limited amount of time their school devotes to active and critical learning in science—the sort that lets children do science rather than memorize lists of facts—which often is no time at all.

VIDEO GAMES: A WASTE OF TIME?

I have now discussed a perspective on learning that stresses active and critical learning within specific semiotic domains. So, let me now return to the grandfather’s remark that playing video games is a waste of time because the child is learning no “content.”

If children (and adults) are playing video games in such a way as to learn actively and critically, then they are:

1. Learning to experience (see and act on) the world in a new way.
2. Gaining the potential to join and collaborate with a new affinity group.

3. Developing resources for future learning and problem solving in the semiotic domains to which the game is related.
4. Learning how to think about semiotic domains as design spaces that engage and manipulate people in certain ways and, in turn, help create certain relationships in society among people and groups of people, some of which have important implications for social justice.

These, of course, are just the four things one learns when engaging actively and critically with any new semiotic domain. So the questions in regard to any specific semiotic domain become: Are these good or valuable ways to experience the world? Is this a good or valuable affinity group to join? Are these resources for future learning applicable to other good and valued semiotic domains? Is this domain leading the learner to reflect on design spaces (and the concomitant identities they help create), and their intricate relationships to each other, in ways that potentially can lead to critique, innovation, and good or valued thinking and acting in society?

The answers to these questions will vary along a variety of parameters. But they show that a great deal more is at stake than “content” in the grandfather’s sense. This book offers a positive answer to these questions in regard to a good many (certainly not all) video games, as long as people are playing them in ways that involve active and critical learning.

What ensures that a person plays video games in a way that involves active and critical learning and thinking? Nothing, of course, can ensure such a thing. Obviously, people differ in a variety of ways, including how much they are willing to challenge themselves, and they play video games for a great variety of different purposes. But two things help to lead to active and critical learning in playing video games.

One is the internal design of the game itself. Good games—and the games get better in this respect all the time—are crafted in ways that encourage and facilitate active and critical learning and thinking (which is not to say that every player will take up this offer). The other is the people around the learner, other players and nonplayers. If these people

encourage reflective metatalk, thinking, and actions in regard to the design of the game, of video games more generally, and of other semiotic domains and their complex interrelationships, then this, too, can encourage and facilitate active and critical learning and thinking (though, again, the offer may not be taken up). And, indeed, the affinity groups connected to video games do often encourage metareflective thinking about design, as a look at Internet game sites will readily attest.

There is another important issue here that bears on deciding whether a given semiotic domain—like video games—is valuable or not: Semiotic domains in society are connected to other semiotic domains in a myriad of complex ways. One of these is that knowledge of a given domain can be a good precursor for learning another one, because mastering the meaning-making skills in, and taking on the identity associated with, the precursor domain facilitates learning in the other domain. Facilitation can also happen because being (or having been) a member of the affinity group associated with the precursor domain facilitates becoming a member of the affinity group associated with the other domain, because the values, norms, goals, or practices of the precursor group resemble in some ways the other group’s values, norms, goals, or practices.

Let me give a concrete example of such connections. In the larger semiotic domain of video games, first- and third-person shooter games are a well-defined subdomain. However, such games often have elements that are similar to features found in arcade games, games (like *Space Invaders*, *Pacman*, and *Frogger*) that involve a good deal of fast hand-eye coordination. (In fact, one of the original first-person shooter games, a game that helped start the genre—*Wolfenstein 3D*—operates very much like an arcade game.) Thus, someone who has mastered the domain of arcade games has mastered a precursor domain for shooter games, though such games now contain many other elements, as well.

On the other hand, fantasy role-playing games are another well-defined subdomain. People who have earlier played and mastered the *Dungeons and Dragons* semiotic domain (as make-believe play or with books and cards) are advantaged when they play fantasy role-playing

games, since such games developed out of *Dungeons and Dragons*, though they now contain a good many additional elements.

Both the shooter domain and the fantasy role-playing domain have other precursor domains, and they share some precursor domains (e.g., make-believe play wherein one is willing to take on different identities). Some of these video-game (sub)domains may well serve as precursor domains for other semiotic domains. For example, it may well be that the popular (sub)domain of simulation games (so-called god games, like *SimCity*, *The Sims*, *Railroad Tycoon*, and *Civilization*) could be, for some children, a precursor domain for those sciences that heavily trade in computer-based simulations as a method of inquiry (e.g., some types of biology and cognitive science).

In interviews my research team and I have conducted with video-game players, we have found a number of young people who have used the domain of video games as a fruitful precursor domain for mastering other semiotic domains tied to computers and related technologies. Indeed, several of these young people have subsequently gone on to college and majored in computer science or related areas.

So we can ask: Can various subdomains in the larger domain of video-game playing serve as precursor domains facilitating later learning in and out of school? I believe that the sorts of active and critical learning about design—and the type of problem-solving identities—that a game like *Pikmin* can involve may well relate to later learning in domains like science, at least when we are talking about teaching and learning science as an active process of inquiry and not the memorization of passive facts.

I am convinced that playing video games actively and critically is not “a waste of time.” And people playing video games are indeed (*pace* the six-year-old’s grandfather) learning “content,” albeit usually not the passive content of school-based facts. (Though many games, such as *Civilization*, do contain a good number of facts.) The content of video games, when they are played actively and critically, is something like this: *They situate meaning in a multimodal space through embodied experiences to solve problems*

and reflect on the intricacies of the design of imagined worlds and the design of both real and imagined social relationships and identities in the modern world. That’s not at all that bad—and people get wildly entertained to boot. No wonder it is hard for today’s schools to compete.

LEARNING PRINCIPLES

The discussion in this chapter suggests a variety of learning principles that are built into good video games, like *Pikmin*, as will the discussion in each of the following chapters. Some of the learning principles suggested in this chapter are a bit more general than are those in later chapters. Here I bring together these principles to start a list that will continue in subsequent chapters.

I state only five very basic principles, since quite a number of other principles that are implicated in the earlier discussion will be discussed in greater detail later. The order of the principles is not important. Some of the principles overlap and, in actuality, reflect different aspects of much the same general theme. Furthermore, these principles are not claims about all and any video games played in any old fashion. Rather, they are claims about the potential of good video games played in environments that encourage overt reflection. (While good video games do indeed encourage overt reflection, this feature can be greatly enhanced by the presence of others, both players and viewers.)

I state each principle in a way that is intended to be equally relevant to learning in video games and learning in content areas in classrooms.

1. Active, Critical Learning Principle

All aspects of the learning environment (including the ways in which the semiotic domain is designed and presented) are set up to encourage active and critical, not passive, learning.

2. Design Principle

Learning about and coming to appreciate design and design principles is core to the learning experience.

3. Semiotic Principle

Learning about and coming to appreciate interrelations within and across multiple sign systems (images, words, actions, symbols, artifacts, etc.) as a complex system is core to the learning experience.

4. Semiotic Domains Principle

Learning involves mastering, at some level, semiotic domains, and being able to participate, at some level, in the affinity group or groups connected to them.

5. Metalevel Thinking About Semiotic Domains Principle

Learning involves active and critical thinking about the relationships of the semiotic domain being learned to other semiotic domains.

BIBLIOGRAPHICAL NOTE

See Kress 1985, 1996, and Kress and van Leeuwen 1996, 2001 for insightful discussions on reading images and multimodal texts, that is, texts that mix words and images. For work on literacy as multiple—that is, multiple literacies—see the citations to the New Literacy Studies at the end of chapter 1 as well as Cope and Kalantzis 2000, Gee 2007a, Heath 1983, Scollon and Scollon 1981, and Street 1984. On the complexity of the language and meanings in comic books, see the sidebars on comics in Jenkins (2006).

The discussion of physics students who know Newton's laws of motion but cannot apply them to a specific situation is taken from Chi, Feltovich, and Glaser 1981. For further discussion, see Gardner 1991 and Mayer 1992.

On semiotics and content learning, see Kress 2003; Kress, Jewitt, Ogborn, and Tsatsarelis 2001; Kress and van Leeuwen 2001; Lemke 1990; and Ogborn, Kress, Martins, and McGillicuddy 1996. On the notion of affiliation and affinity groups, see Beck 1992, 1994; Gee 2004; Rifkin 2000; and Taylor 1994. For the idea of preparation for future learning, see Bransford and Schwartz 1999, a very important and illuminating paper for anyone interested in learning. On the notion of design and design grammars, see New London Group 1996, a "manifesto" written by an international group of scholars (a group of which I was a member) working in the area of language and literacy studies.

My notion of critical learning combines work on situated cognition (see bibliographic note for chapter 4), especially work on metacognition—see, for example Bereiter and Scardamalia 1989; Bruer 1993 (pp. 67–99); Pellegrino, Chudowsky, and Glaser 2001; Schon 1987; with Paulo Freire's 1995 work on critical thinking and literacy as "reading the world" and not just "reading the word."