



## CHAPTER 17

# Literacy, Video Games, and Popular Culture

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### School Success

In this chapter, I place the role of popular culture – and video games as one characteristic popular cultural media – squarely in the framework of literacy traditionally conceived. So, let's start with reading. Consider the situation of a child learning to read. What should our goal for this child be? On the face of it, the goal would seem to be that the child should learn to decode print and assign basic or literal meanings to that print. However, the situation is not that simple. We know from the now well-studied phenomenon of the “fourth-grade slump” (i.e., the phenomenon whereby many children, especially poorer children, pass early reading tests but cannot read well enough to learn academic content later on in school) that the goal of early reading instruction has to be more forward-looking than simple decoding and literal comprehension (American Educator, 2003; Chall, Jacobs, & Baldwin, 1990; Snow, Burns, & Griffin, 1998). The goal has to be that children learn to read early on in such a way that this learning cre-

ates a successful trajectory throughout the school years and beyond. Such a trajectory is based more than anything else on the child's being able to handle ever increasingly complex language, especially in the content areas (e.g., science and math), as school progresses (Gee, 2004). Children need to get ready for these increasing language demands as early as possible.

Early phonemic awareness and early home-based practice with literacy are the most important correlates with success in first grade, especially success in learning to read in the “decode and literally comprehend” sense (Dickinson & Neuman, 2006). However, the child's early home-based oral vocabulary and early skills with complex oral language are the most important correlates for school success – not just in reading but also in the content areas – past the first grade, essentially for the rest of schooling (Dickinson & Neuman, 2006; Senechal, Ouellette, & Rodney, 2006). This latter claim needs to be taken in a certain way: as discussed herein, we are not talking primarily about children's “everyday” vernacular

oral language but rather their early exposure to what might be called “school-based” language and practices. Testing a child’s oral vocabulary, for instance, is a practice that is not typical of face-to-face, everyday conversational practices.

However, here I must pause, because we are on the brink of what could be a major misunderstanding. Decades of research in linguistics have shown that every normal child’s early language and language development are just fine (Chomsky, 1986; Labov, 1979; Pinker, 1994). Every child, under normal conditions, develops a perfectly complex and adequate oral language, the child’s “native language” (and, of course, sometimes children develop more than one native language). It never happens, under normal conditions – and “normal” here covers a wide array of variation – that in acquiring English, say, little Janie develops relative clauses but little Johnnie just can’t master them.

However, when I say that children’s early oral language – vocabulary and skills with complex language – are crucial correlates of success in school, correlates that show up especially after the child has learned to decode in first grade (one hopes) – I am not talking about children’s everyday language, the sort of language that is equal for everyone. Rather, I am talking about their early preparation for language that is not “everyday,” for language that is “technical” or “specialist” or “academic,” language that is used in a range of practices that are not typical of face-to-face, everyday conversational practices (Gee, 2004; Schleppegrell, 2004) and the sorts of thinking and knowledge work that goes with such language (Olson, 1994). I refer to people’s “everyday” language – the way they speak when they are not speaking technically or as specialists of some sort – as their “vernacular style.” I refer to their language when they are speaking technically or as a specialist as a “specialist style” (people eventually can have a number of different specialist styles, connected to different technical, specialist, or academic concerns).

## An Example

Let me give an example of what I am talking about, in terms of both specialist language and of getting ready for later complex specialist language demands early on in life. Crowley talked insightfully about quite young children developing what he called “islands of expertise.” Crowley and Jacobs (2002, p. 333) define an *island of expertise* as “any topic in which children happen to become interested and in which they develop relatively deep and rich knowledge.” They provide several examples of such islands, including a boy who develops relatively deep content knowledge and a “sophisticated conversational space” (p. 335) about trains and related topics after he is given a *Thomas the Tank Engine* book.

Now consider a mother talking to her four-year-old son, who has an island of expertise around dinosaurs (the following transcript is adapted from Crowley & Jacobs, 2002, pp. 343–344). The mother and child are looking at replica fossil dinosaurs and a replica fossil dinosaur egg. The mother has a little card in front of her that says:

- Replica of a Dinosaur **Egg**
- From the Oviraptor
- Cretaceous Period
- Approximately 65 to 135 million years ago
- The actual fossil, of which this is a replica, was found in the Gobi Desert of Mongolia

In the following transcript, “M” stands for the mother’s turns and “C” for the child’s:

- C: This looks like this is a **egg**.  
 M: Ok well this . . . That’s exactly what it is! How did you know?  
 C: Because it looks like it.  
 M: That’s what it says, see look **egg**, **egg** . . . . Replica of a dinosaur **egg**. From the oviraptor.  
 M: Do you have a . . . You have an oviraptor on your game! You know the **egg** game on your computer? That’s what it is, an oviraptor.

- M: And that's from the Cretaceous Period. And that was a really, really long time ago.  
...  
M: And this is... the hind claw. What's a hind claw? (pause) A claw from the back leg from a velociraptor. And you know what...  
C: Hey! Hey! A velociraptor!! I had that one my [inaudible] dinosaur.  
M: I know, I know and that was the little one. And remember they have those, remember in your book, it said something about the claws...  
C: No, I know, they, they...  
M: Your dinosaur book, what they use them...  
C: Have so great claws so they can eat and kill...  
M: They use their claws to cut open their prey, right.  
C: Yeah.

This is a language lesson but not primarily a lesson on vernacular language – although, of course, it thoroughly mixes vernacular and specialist language. It is a lesson on specialist language. It is early preparation for the sorts of academic (school-based) language children see ever more increasingly, in talk and in texts, as they move on in school. It is also replete with “moves” that are successful language-teaching strategies, although the mother is no expert on language development.

Let's look at some of the features that this interaction has as an informal language lesson. First, it contains elements of non-vernacular, specialist language – for example: “**replica** of a dinosaur egg”; “from the **oviraptor**”; “from the **Cretaceous Period**”; “the **hind claw**”; “their **prey**.” The specialist elements here are largely vocabulary, although such interactions soon come to involve elements of syntax and discourse associated with specialist ways with words as well.

Second, the mother asks the child the basis of his knowledge: Mother: “How did you know?” Child: “Because it looks like

it.” Specialist domains are almost always “expert” domains that involve claims to know and evidence for such claims. They are, in Shaffer's (2005) sense, “epistemic games.”

Third, the mother publicly displays reading of the technical text, even though the child cannot yet read: “That's what it says, see look **egg, egg**... . Replica of a dinosaur **egg**. From the oviraptor.” This reading also uses print to confirm the child's claim to know, showing one way that this type of print (i.e., descriptive information on the card) can be used in an epistemic game of confirmation.

Fourth, the mother relates the current talk and text to other texts with which the child is familiar: “You have an oviraptor on your game! You know the **egg** game on your computer? That's what it is, an oviraptor”; “And remember they have those, remember in your book, it said something about the claws.” This sort of intertextuality creates a network of texts and modalities (e.g., books, games, and computers), situating the child's new knowledge not just in a known background but also in a system the child is building in his head.

Fifth, the mother offers a technical-like definition: “And this is... the hind claw. What's a hind claw? (pause) A claw from the back leg from a velociraptor.” This demonstrates a common language move in specialist domains – that is, giving relatively formal and explicit definitions (not just examples of use).

Sixth, the mother points to and explicates difficult concepts: “And that's from the Cretaceous Period. And that was a really, really long time ago.” This signals to the child that “Cretaceous Period” is a technical term and displays how to explicate such terms in the vernacular (this is a different move than offering a more formal definition).

Seventh, she offers technical vocabulary for a slot the child has left open: Child: “Have so great claws so they can eat and kill...” Mother: “They use their claws to cut open their **prey**, right.” This slot-and-filler move co-constructs language with the

child, allowing the child to use language “above his head” in ways in line with Vygotsky’s concept of a “zone of proximal development” (Vygotsky, 1978).

New digital media – for example, video games; the Internet; DVDs; and software that facilitates production in areas like video, animation, and fan fiction – essentially create the opportunity for more and more young people to form areas of expertise early in life and throughout the school years and beyond. Ironically, as discussed herein, modern businesses are selling our children such centers of expertise built around highly specialized languages and the concomitant knowledge structures.

### Specialist Language in Popular Culture

Something very interesting has happened in children’s popular culture. It has gotten very complex and it contains a great many practices that involve highly specialist styles of language (Gee, 2004; Johnson, 2005). Young children often engage with these practices socially with each other in informal peer learning groups. Some parents recruit these practices to accelerate their children’s specialist language skills (with their concomitant thinking and interactional skills).

To take one example from the many possible, consider the following text, which appears on a *Yu-Gi-Oh* card. *Yu-Gi-Oh* is a card game (with thousands of cards) involving quite complex rules. It is often played face to face with one or more other players – sometimes in formal competitions, more often informally – although it also can be played as a video game.

**Armed Ninja**

**Card-Type:** Effect Monster

**Attribute:** Earth | **Level:** 1

**Type:** Warrior

**ATK:** 300 | **DEF:** 300

**Description:** FLIP: Destroys 1 Magic Card on the field. If this card’s target is face-down, flip it face-up. If the card is a Magic Card, it is destroyed. If not, it

is returned to its face-down position.

The flipped card is not activated.

**Rarity:** Rare

The “description” is really a rule. It states which moves in the game the card allows. This text has little specialist vocabulary (although it has some; e.g., “activated”) unlike the interaction we saw between mother and child, but it contains complex specialist syntax. It contains, for instance, three straight conditional clauses (i.e., the “if” clauses). Note how complex this meaning is: first, if the target is face down, flip it over. Now check to see if it is a magic card. If it is, destroy it. If it isn’t, return it to its face-down position. Finally, you are told that even though you flipped over your opponent’s card, which in some circumstances would activate its powers, in this case, the card’s powers are not activated. This is “logic talk,” a matter of multiple, related “either-or,” “if-then” propositions.

Note, too, that the card contains classificatory information (e.g., type, attack power, defense power, rarity). All of these linguistic indicators lead the child to place the card in the whole network or system of *Yu-Gi-Oh* cards – and there are more than ten thousand of them – and the rule system of the game itself. This is complex system thinking with a vengeance.

I have watched seven-year-old children play *Yu-Gi-Oh* with great expertise. They must read each card. They endlessly debate the powers of each card by constant contrast and comparison with other cards when they are trading them. They discuss and argue about the rules and, in doing so, use lots of specialist vocabulary, syntactic structures, and discourse features. They can go to Web sites to learn more or to settle their disputes. If and when they do so, following is the sort of information they will see:

**8-CLAWS SCORPION** *Even if “8-Claws Scorpion” is equipped with an Equip Spell Card, its ATK is 2400 when it attacks a face-down Defense Position monster.*

*The effect of “8-Claws Scorpion” is a Trigger Effect that is applied if the condition*

is correct on activation (“8-Claws Scorpion” declared an attack against a face-down Defense Position monster.) The target monster does not have to be in face-down Defense Position when the effect of “8-Claws Scorpion” is resolved. So if “Final Attack Orders” is active, or “Ceasefire” flips the monster face-up, “8-Claws Scorpion” still gets its 2400 ATK.

The ATK of “8-Claws Scorpion” becomes 2400 during damage calculation. You cannot chain “Rush Recklessly” or “Blast with Chain” to this effect. If these cards were activated before damage calculation, then the ATK of “8-Claws Scorpion” becomes 2400 during damage calculation so those cards have no effect on its ATK. [http://www.upperdeckentertainment.com/yugioh/en/faq\\_card\\_rulings.aspx?first=A&last=C](http://www.upperdeckentertainment.com/yugioh/en/faq_card_rulings.aspx?first=A&last=C)

It is not necessary to say much about this text. It is, in every way, a specialist text. In fact, in complexity, it is far above the language many young children see in their schoolbooks until they get to middle school at best and, perhaps, even high school. However, seven-year-old children deal and deal well with this language (although *Yu-Gi-Oh* cards – and, thus, their language – are often banned at school).

Let’s consider for a moment what *Yu-Gi-Oh* involves. First and foremost, it involves what I call “lucidly functional language.” What do I mean by this? The language on *Yu-Gi-Oh* cards, on Web sites, and in children’s discussions and debates is quite complex, as we have seen, but it relates piece by piece to the rules of the game, to the specific moves or actions one takes in the domain. Here, language – complex specialist language – is married closely to specific and connected actions. The relationship between language and meaning (in which meaning here is the rules and the actions connected to them) is clear and lucid. The *Yu-Gi-Oh* company designed such lucid functionality because it allows it to sell ten thousand cards connected to a fully esoteric language and practice. It directly banks on children’s love of mastery and expertise. Would that schools did the same. Would

that the language of science in the early years of school were taught in this lucidly functional way. It rarely is.

So, we can add “lucidly functional language” to the sorts of informal specialist-language lessons discussed previously as another foundation for specialist-language learning, one currently better represented in popular culture than in school. Note, too, that such lucidly functional language is practiced socially in groups of children as they discuss, debate, and trade with more advanced peers. They learn to relate oral and written language of a specialist sort, a key skill for specialist domains, including academic domains at school. At the same time, many parents (usually, but not always, more privileged parents) have come to know how to use such lucidly functional language practices – like *Yu-Gi-Oh* or *Pokemon* and, as discussed herein, digital technologies like video games – to engage their children in informal specialist-language lessons.

Of course, the sorts of lucidly functional language practices and informal specialist-language lessons that exist around *Yu-Gi-Oh* or *Pokemon* could exist in school – even as early as the first grade – to teach school-valued content. However, it doesn’t; the creativity of the capitalist has far outdistanced that of the educators.

## Video Games and Learning

Following the examples such as *Yu-Gi-Oh*, several people have begun to argue that today’s popular culture often organizes learning for problem solving, and for language and literacy, in deep and effective ways (Gee, 2003a, 2005; Johnson, 2005; Shaffer, 2007). To see the case more generally, let’s take good video games as an example, games like *Rise of Nations*, *Age of Mythology*, *Deus Ex*, *The Elder Scrolls III: Morrowind*, and *Tony Hawk’s Underground*. We discuss just a few of the ways in which good video games recruit good learning.

Such games, first of all, offer players strong identities. Learning a new domain, whether biology or urban planning, requires

learning to see and value work and the world in new ways – in the ways that biologists or urban planners do (Collins, 2006; Gee, 1990/1996; Shaffer, 2007). In video games, players learn to view the virtual world through the eyes and values of a distinctive identity (e.g., Solid Snake in *Metal Gear Solid*) or one that they themselves have built from the ground up (e.g., in *The Elder Scrolls III: Morrowind*). It is unfortunate that we have built so few games centered on identities relevant to school and the world of work (however, see Gee, 2005; Shaffer, 2004, 2005, 2007).

Good games are built on a cycle of “hypothesize, probe the world, get a reaction, reflect on the results, re-probe to get better results,” a cycle typical of experimental science and of reflective practice (Schön, 1991).

Good games let players be producers, not just consumers. An open-ended game like *The Elder Scrolls III: Morrowind* is a different game for each player. Players co-design the game through their unique actions and decisions. At another level, many games come with software through which players can modify (“mod”) them, producing new scenarios or whole new games (e.g., new skate parks in the *Tony Hawk* games).

Good games lower the consequences of failure. When players fail, they can start from their last saved game. Players are encouraged to take risks, explore, and try new things. Good games allow players to customize the game to fit their learning and playing styles. Games often have different difficulty levels, and good games allow problems to be solved in multiple ways. Thanks to all these features, players feel a real sense of agency, ownership, and control. It’s *their* game.

However, learning goes yet deeper in good games. In good video games, problems are well ordered so that earlier ones lead to hypotheses that work well for later, more difficult problems.

Good games offer players a set of challenging problems and then let them practice them until they have routinized their mastery. Then, the game throws a new class of problem at the player (this is sometimes

called a “boss”), requiring them to rethink their taken-for-granted mastery. In turn, this new mastery is consolidated through repetition (with variation), only to be challenged again. This cycle of consolidation and challenge is the basis of the development of expertise in any domain (Bereiter & Scardamalia, 1993).

Good games stay within – but at the outer edge – of the player’s “regime of competence” (diSessa, 2000). That is, they feel “doable” but challenging. This makes them pleasantly frustrating – a flow state for human beings (Csikszentmihalyi, 1990).

Good games encourage players to think about relationships, not isolated events, facts, and skills. In a game like *Rise of Nations*, players need to think how each action they take might impact their future actions and the actions of the other players playing against them as they each move their civilizations through the ages.

Good games recruit smart tools, distributed knowledge, and cross-functional collaborative teams just like modern high-tech workplaces (Scardamalia & Bereiter, 2006). The virtual characters one manipulates in a game are “smart tools.” They have skills and knowledge of their own that they lend to the player. For example, the citizens in *Rise of Nations* know how to build cities, but the player needs to know where to build them. In a multiplayer game like *World of Warcraft*, players play on teams in which each player has a different set of skills. Each player must master a specialty – because a Mage plays differently than a Warrior – but also understand enough of each other’s specializations to coordinate with them. Thus, the core knowledge needed to play video games is distributed among a set of real people and their smart tools, much as in a modern science laboratory or high-tech workplace.

Good video games operate by a principle of performance before competence. Players can perform before they are competent, supported by the design of the game, the “smart tools” the game offers, and often other, more advanced players (i.e., in the game or in chat rooms).

In my view, the learning features players see in good video games are all well supported by research in the Learning Sciences (Gee, 2003a, 2004; see also Bransford, Brown, & Cocking, 2000; Sawyer, 2006). All of them could and should be present in school or adult learning – for example, in learning science (diSessa, 2000) – whether or not a game is present.

### Situated Meaning and Video Games

Let's turn now not to how learning in general works in games but rather how literacy and language work. Abundant research has shown for years now that in areas like science, many students with good grades and passing test scores cannot actually use their knowledge to solve problems (Gardner, 1991). For example, many students who can list Newton's Laws of Motion for a test cannot correctly say how many forces are acting on a coin when it is tossed into the air and at the top of its trajectory – ironically, this is something that can be deduced from Newton's Laws (Chi, Feltovich, & Glaser, 1981). They cannot apply their knowledge because they do not see how it applies – that is, they do not see the physical world and the language of physics (which includes mathematics) in such a way that it is clear how that language applies to that world.

There are two ways to understand words: I call one way “verbal” and the other way “situated” (Gee, 2004). A situated understanding of a concept or word implies the ability to use the word or understand the concept in ways that are customizable to different specific situations of use (Brown, Collins, & Dugid, 1989; Clark, 1997; Gee, 2004). A general or verbal understanding implies an ability to explicate one's understanding in terms of other words or general principles but not necessarily an ability to apply this knowledge to actual situations. Thus, although verbal or general understandings may facilitate passing certain types of information-focused tests, they do not necessarily facilitate actual problem solving.

Let me quickly acknowledge that, in fact, all human understandings, in reality, are situated. What I am calling verbal understandings are situated, of course, in terms of other words and, in a larger sense, the total linguistic, cultural, and domain knowledge that a person has. However, they are not necessarily situated in terms of how to apply these words to actual situations of use and vary their applications across different contexts of use. Thus, I continue to contrast verbal understandings to situated understanding, in which the latter implies the ability to do and not just say.

Situated understandings, of course, are the norm in everyday life and in vernacular language. Even the most mundane words take on different meanings in different contexts of use. Indeed, people must be able to build these meanings on the spot in real time as they construe the contexts around them. For instance, people construct different meanings for a word like *coffee* when they hear something like “The coffee spilled, get the mop” versus “The coffee spilled, get a broom” versus “The coffee spilled, stack it again.” Indeed, such examples have been a staple of connectionist work on human understanding (Clark, 1993).

Verbal and general understandings are top-down. They start with the general – that is, with a definition-like understanding of a word or a general principle associated with a concept. Less abstract meanings follow as special cases of the definition or principle. Situated understandings generally work in the other direction: understanding starts with a relatively concrete case and gradually rises to higher levels of abstraction through the consideration of additional cases.

The perspective I am developing here, one that stresses knowledge as tied to activity and experiences in the world before knowledge as facts and information – that is, knowledge as situated as opposed to verbal understandings – has many implications for the nature of learning and teaching, as well as for the assessment of learning and teaching (Gee, 2003b). Recently, researchers in several different areas have raised the possibility that what we might call

“game-like” learning through digital technologies can facilitate situated understandings in the context of activity and experience grounded in perception (Games-to-Teach, 2003; Gee, 2003a, 2004, 2005; McFarlane, Sparrowhawk, & Heald, 2002; Squire, 2003).

Before I discuss game-like learning in some depth, let me point out a phenomenon of which all gamers are well aware. This phenomenon gets to the heart and soul of what situated meanings are and why they are important: Written texts associated with video games are not very meaningful – certainly not very lucid – unless and until one has played the game. I use the small booklet accompanying the innovative shooter game *Deus Ex* to use as an example of my meaning. Following is a typical piece of language from the booklet:

*Your internal nano-processors keep a very detailed record of your condition, equipment and recent history. You can access this data at any time during play by hitting F1 to get to the Inventory screen or F2 to get to the Goals/Notes screen. Once you have accessed your information screens, you can move between the screens by clicking on the tabs at the top of the screen. You can map other information screens to hotkeys using Settings, Keyboard/Mouse (<http://services.yummy.net/docs/Deusexmanual.pdf>, p. 5).*

This makes perfect sense at a literal level, which just goes to show how worthless the literal level is. When you understand this sort of passage only at a literal level, you have only an illusion of understanding, one that quickly disappears as you try to relate the information to the hundreds of other important details in the booklet. Such literal understandings are precisely what children who fuel the fourth-grade slump have. First of all, this passage means nothing real to you if you have no situated idea about what “nano-processors,” “condition,” “equipment,” “history,” “F1,” “Inventory screen,” “F2,” “Goals/Notes screen” (and, of course, “Goals” and “Notes”), “information screens,” “clicking,” “tabs,” “map,”

“hotkeys,” and “Settings, Keyboard/Mouse” mean in and for playing games like *Deus Ex*.

Second, although you know literally what each sentence means, they raise a plethora of questions if you have no situated understandings of this game or games like it. For instance: Is the same data (i.e., condition, equipment, and history) on both the Inventory screen and the Goals/Notes screen? If so, why is it on two different screens? If not, which type of information is on which screen and why? The fact that I can move between the screens by clicking on the tabs – but what do these tabs look like; will I recognize them – suggests that some of this information is on one screen and some on the other. But, then, is my “condition” part of my Inventory or my Goals/Notes? It does not seem to be either, but, then, what is my “condition” anyway? If I can map other information screens (and what are these?) to hotkeys using “Setting, Keyboard/Mouse,” does this mean there is no other way to access them? How will I access them in the first place to assign them to my own chosen hotkeys? Can I click between them and the Inventory screen and the Goals/Notes screen by pressing on “tabs”? And so on and so forth: 20 pages is beginning to seem like a lot, but remember that there are 199 different headings under which information like this is given at a brisk pace throughout the booklet.

Of course, all these terms and questions can be defined and answered if you closely check and repeatedly cross-check information through the little booklet. You can constantly turn the pages backwards and forwards, but once you have one set of links relating various items and actions in mind, another drops out just as you need it, and you are back to turning pages. Is the booklet poorly written? Not at all. It is written just as well or poorly as, in fact, any of myriad school-based texts in the content areas. Outside the practices in the domain from which it comes, it is just as meaningless, no matter how much one could garner literal meanings from it with which to verbally repeat facts or pass tests.



When you can spell out such information in situation-specific terms in the game by actually playing the game, then its relationships to the other hundreds of pieces of information in the booklet become clear and meaningful. Of course, it is these relationships that really count if you are to understand the game as a system and therefore play it at all well. *Now* you can read the book if you need to in order to fill in missing bits of information, check on your understandings, or solve a particular problem or answer a particular question.

When I first read this booklet before playing *Deus Ex* (at that time, I had played only one other shooter game, a very different one) – yes, I, an overly academic baby-boomer, made the mistake of trying to read the book first, despite my own theories about reading – I was sorely tempted to put the game on a shelf and forget about it. I was simply overwhelmed with details, questions, and confusions. When I started the game, I kept trying to look up information in the booklet, but none of it was understood well enough to be found easily without continually re-searching for the same information. In the end, I had to simply play the game and explore and try everything. Then, at last, the booklet made good sense and it could be used for one’s own supplemental and research purposes and goals, not just as preparation for activity long delayed.

I would now make the same claim about any school content domain as I have just made about the video game *Deus Ex*: specialist language in any domain – games or science – has no situated meaning and, thus, no lucid or applicable meaning, unless and until one has “played the game”; in this case, the game of science or, better stated, a specific game connected to a specific science. Such “games” (i.e., “science games”) involve seeing the language and representations associated with some part of science in terms of activities one has done, experiences one has had, images one has formed from these, and interactional dialogue one has heard from and had with peers and mentors outside and inside the science activities. School is too often about reading the manual before you

get to play the game, if you ever do. This is not harmful for students who have already played the game at home, but it is disastrous for those who have not.

Good video games do not just support situated meanings for the written materials associated with them in manuals and on fan Web sites – which are copious – but also for all language within the game. The meaning of such language is always associated with actions, experiences, images, and dialogue. Furthermore, players get verbal information “just in time,” when they can apply it or see it be applied, or “on demand,” when they feel the need for it and are ready for it – and, then, in some cases, games will give the player walls of print (e.g., in *Civilization IV*).

So my claim – what I call “game-like learning” – leads to situated and not just verbal meanings. In turn, situated meanings make specialist language lucid, easy, and useful. We saw much the same thing with *Yu-Gi-Oh*. To demonstrate what I mean by “game-like learning,” I turn to an example: a situation in which a game-like simulation is built into an overall learning system.

### Augmented by Reality: Madison 2020

In their Madison 2020 project, Shaffer and Beckett at the University of Wisconsin developed, implemented, and assessed a game-like simulation of the activities of professional urban planners (Beckett & Shaffer, 2004; Shaffer, 2007; see also Shaffer, Squire, Halverson, & Gee, 2005). I call this a “game” because learners are using a simulation and role-playing new identities; of course, it is not a “game” in a traditional sense.

Shaffer and Beckett’s game is not a stand-alone entity but rather is used as part of a larger learning system. Shaffer and Beckett call their approach to game-like learning “augmented by reality” because a virtual reality – that is, the game simulation – is augmented or supplemented by real-world activities – in this case, further activities of the type in which urban planners engage. Minority high school students in a summer enrichment program engaged with

Shaffer and Beckett's urban-planning simulation game. As they did so, their problem-solving work in the game was guided by real-world tools and practices taken from the domain of professional urban planners.

As in the game *SimCity*, in Shaffer and Beckett's game, students make land-use decisions and consider the complex results of those decisions. However, unlike in *SimCity*, they use real-world data and authentic planning practices to inform those decisions. The game and the learning environment in which it is embedded is based on Shaffer's theory of *pedagogical praxis*, a theory that argues that modeling learning environments on authentic professional practices – in this case, the practices of urban planners – enables young people to develop deeper understandings of important domains of inquiry (Shaffer, 2004, 2007).

Shaffer and Beckett argue that the environmental dependencies in urban areas have the potential to become a fruitful context for innovative learning in ecological education. Whereas ecology is, of course, a broader domain than the study of interdependent urban relationships, cities are examples of complex systems that students can view and with which they are familiar. Thus, concepts in ecology can be made tangible and relevant.

Cities consist of simple components but the interactions among those components are complex. Altering one variable affects all the others, reflecting the interdependent, ecological relationships present in any modern city. For example, consider the relationships among industrial sites, air pollution, and land property values: increasing industrial sites can lead to pollution that, in turn, lowers property values, changing the dynamics of the city's neighborhoods in the process.

Shaffer and Beckett's Madison 2020 project situated student experience at a micro-level by focussing on a single street in their own city (i.e., Madison, Wisconsin):

*Instead of the fast-paced action required to plan and maintain virtual urban environments such as SimCity, this project focused*

*only on an initial planning stage, which involved the development of a land use plan for this one street. And instead of using only a technological simulation [i.e., the game, JPG], the learning environment here was orchestrated by authentic urban planning practices. These professional practices situated the planning tool in a realistic context and provided a framework within which students constructed solutions to the problem. (Beckett & Shaffer, 2004, pp. 11–12).*

The high school students Shaffer and Beckett worked with had volunteered for a ten-hour workshop (conducted over two weekend days) that focussed on city planning and community service. At the beginning of the workshop, the students were given an urban-planning challenge: they were asked to create a detailed redesign plan for State Street, a major pedestrian thoroughfare in Madison that was quite familiar to all the students in the workshop. Professional urban planners must formulate plans that meet the social, economic, and physical needs of their communities. To align with this practice, students received an informational packet addressed to them as city planners. The packet contained a project directive from the mayor, a city budget plan, and letters from concerned citizens providing input about how they wished to see the city redesigned. The directive asked the student city planners to develop a plan that, at the end of the workshop, would be presented to a representative from the planning department.

Students then watched a video about State Street, featuring interviews with people who expressed concerns about the street's redevelopment aligned with the issues in the informational packet (e.g., affordable housing). During the planning phase, students walked to State Street and conducted a site assessment. Following the walk, they worked in teams to develop a land-use plan using a custom-designed interactive geographic information system (GIS) called MadMod. MadMod is a model built using Excel and ArcMap (ESRI 2003) that enables students to assess the ramification of proposed land-use changes.

MadMod allowed students to see a virtual representation of State Street. It has two components: a decision space and a constraint table. The decision space displays address and zoning information about State Street using official two- or three-letter zoning codes to designate changes in land use for property parcels on the street. As students made decisions about changes they wished to make, they received immediate feedback in the constraint table about the consequences of those changes. The constraint table showed the effects of changes on six planning issues raised in the original information packet and the video: crime, revenue, jobs, waste, car trips, and housing. Following the professional practices of urban planners, students presented their plans to a representative from the city planning office in the final phase of the workshop.

MadMod functions in Shaffer and Beckett's curriculum like a game in much the same way *SimCity* does. In my view, video games are simulations that have "win states" in terms of the goals that players have set for themselves. In this case, the students had certain goals and the game let them see how close or far they were from attaining those goals. At the same time, the game is embedded in a learning system that ensured that those goals and the procedures used to reach them were instantiations of the professional practices and ways of knowing of urban planners.

Through a pre-interview/post-interview design, Shaffer and Beckett showed that students in the workshop were able to provide more extensive and explicit definitions of the term *ecology* after the workshop than before it. The students' explanations of ecological issues in the post-interview were more specific about how ecological issues are interdependent or interconnected than in the pre-interview. Concept maps that the students drew showed an increased awareness of the complexities present in an urban ecosystem. Thus, students apparently developed a richer understanding of urban ecology through their work in the project.

All of the students stated that the workshop changed the way they thought about

cities and most said the experience changed the things they paid attention to when walking down a city street in their neighborhood. Shaffer and Beckett were also able to show transfer: students' responses to novel, hypothetical urban-planning problems showed increased awareness of the interconnections among urban ecological issues. All of these effects suggest, as Shaffer and Beckett argued, "that students were able to mobilize understanding developed in the context of the redesign of one local street to think more deeply about novel urban ecological issues" (Beckett & Shaffer, 2004, p. 21).

## Conclusions

I have argued that if a child is not to be a victim of the fourth-grade slump, learning to read must involve early preparation for specialist, technical, and academic forms of language – forms that will be seen more and more in speech and, most characteristically, in writing as school progresses. I discussed some of the underpinnings of effective early preparation for such styles of language, including "informal specialist-language lessons," "lucidly functional language" practices, and practices that facilitate "situated meanings." These practices are common in certain homes and in some of the popular cultural practices of children. They are, perhaps, less common in the early years of schooling. More generally, I have argued that a game-like approach to learning – by which I mean not "having fun" but rather thinking inside of and with simulations in a situated and embodied way, an approach well represented even in commercial video games – holds out significant potential as a foundation for learning that leads to problem solving and not just paper and pencil test-passing.

In an important recent paper, Neuman and Celano (2006) show that introducing digital media – for example, science games on computers – into libraries actually widens the literacy and knowledge gaps between rich and poor. Middle-class parents engage in the types of interactional scaffolding that

we saw previously with the mother and her three-year-old son talking about dinosaurs; poorer parents do not. The middle-class parents push their children to more complex language, orally and in writing, and to the concomitant knowledge structures that such language supports. Neuman and Celano (2006) argued that modern librarians will have to play just such a role for poorer children. In the end, then, the issue is not about who has access to what in popular culture but rather who has access to powerful popular-culture practices placed in rich scaffolding and mentoring learning systems.

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