

A Situated Sociocultural Approach to Literacy and Technology

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Introduction

In this paper I will first sketch out the background to the approach I take to literacy and technology—an approach I would call “situated-sociocultural”. By this term I mean a blend of themes from work on situated cognition dealing with mind and learning and work on sociocultural approaches to language, literacy, and technology. I will sketch out this background by over viewing several interdisciplinary intellectual movements that have arisen over the last few decades. I start with the New Literacy Studies and move on to Situated Cognition Studies, The New Literacies Studies, and the New Media Literacy Studies.

After my background sketch, I will turn to one specific application of the ideas in this sketch to the interactions between literacy and technology in and out of schools. This application starts with reading and ends with a discussion of video games.

The New Literacy Studies (NLS)

In my book *Sociolinguistics and Literacies* (1990/1996/2007) I attempted to name what I saw as an emerging new field of study. I called this field “The New Literacy Studies”. Today it is sometimes just referred to as the “NLS” (Brandt & Clinton, 2002; Gee, 2000; Hull & Schultz, 2001; Pahl & Rowsel, 2005, 2006; Prinsloo & Mignonne, 1996; Street, 1993, 1995, 1997, 2005). And, of course, it is no longer new.

The scholars I saw as composing the emerging field of the New Literacy Studies were people from linguistics, history, anthropology, rhetoric and composition studies, cultural psychology, education, and other areas (e.g., Bazerman, 1989; Cazden, 1988; Cook-Gumperz, 1986; Gee, 1987; Graff, 1979; Heath, 1983; Scribner & Cole, 1981; Scollon & Scollon, 1981; Street, 1984; Wertsch, 1985). These scholars all came from different disciplines and wrote in different theoretical languages. Nonetheless, it seemed to me that they were converging on a

coherent and shared view about literacy, though they never did come to share a common language out of which they wrote.

The NLS opposed a traditional psychological approach to literacy. Such an approach viewed literacy as a “cognitive phenomenon” and defined it in terms of mental states and mental processing. The “ability to read” and “the ability to write” were treated as things people did inside their heads.

The NLS saw literacy as something people did not just do inside their heads but inside society. It argued that literacy was not primarily a mental phenomenon, but, rather, a sociocultural one. Literacy was a social and cultural achievement—it was about ways of participating in social and cultural groups—not just a mental achievement. Thus, literacy needed to be understood and studied in its full range of contexts—not just cognitive—but social, cultural, historical, and institutional, as well.

Traditional psychology saw readers and writers as engaged in mental processes like decoding, retrieving information, comprehension, inferencing, and so forth. The NLS saw readers and writers as engaged in social or cultural *practices*. Written language is used differently in different practices by different social and cultural groups. And, in these practices, written language never sits all by itself, cut off from oral language and action. Rather, within different practices, it is integrated with different ways of using oral language; different ways of acting and interacting; different ways of knowing, valuing, and believing; and, too, often different ways of using various sorts of tools and technologies.

For example, people read and write religious texts differently than legal ones and differently again than biology texts or texts in popular culture like video game strategy guides or fan fiction. And, too, people can read the same text in different ways for different purposes, for

example, they can read the Bible as theology, literature, history, or as a self-help guide. They can read a comic book as entertainment, as insider details for expert fans, as cultural critique, or as heroic mythology.

And people don't just read and write these texts. They do things with these texts, things that often involve more than just reading and writing. They do them with other people—people like fundamentalists, lawyers, biologists, manga otaku, gamers, or whatever—people who sometimes (often) make judgments about who are “insiders” and who are not. So what determines how one reads or writes in a given case? Not just what is in one's head, but, rather, the conventions, norms, values, and practices of different social and cultural groups: lawyers, gamers, historians, religious groups, and schools, for instance, or larger cultural groups like (certain types of) Native Americans, African-Americans, or “middle class” people.

For example, Ron and Suzanne Scollon (1981) argued that some Native American and Canadian groups viewed essays (a prototypical literacy form in school) quite differently than do many Anglo-Americans and Canadians. Athabaskians—the group the Scollons studied in the U.S. and Canada—have a cultural norm in which they prefer to communicate only in known circumstances with people who are already known.

Essays require the writer to communicate to a “fictional” audience—the assumed general “rational reader”, not someone already known—and, thus, violate a cultural communicational norm for Athabaskians. To write an essay, for Athabaskians, is to engage in a form of cross-cultural conflict. Essays are not “neutral”, they are socially, historically, and culturally value-laden; indeed, how, when, and why they arose in history is a well studied phenomenon.

People learn a given way of reading or writing by participating in (or, at least, coming to understand) the distinctive social and cultural practices of different social and cultural groups.

When these groups teach or “apprentice” people to read and write in certain ways, they never stop there. They teach them to act, interact, talk, know, believe, and value in certain ways as well, ways that “go with” how they write and read (Gee, 1990/1996/2003).

So, for example, knowing how to write a “game faq” (a strategy guide for a video game)—or how to read one—requires that you know how game faqs are used in the social practices of gamers, practices that involve a lot more than just reading and writing. You need to know how gamers talk about, debate over, and act in regard to such things as “spoilers” and “cheats” and “cheating”, all defined as gamers define them, not just in general terms (Consalvo, 2007).

The same thing is true of knowing how to write or read a legal document, a piece of literary criticism, a religious tract, or a memo from the boss. You can come to an appreciation for some texts without actually participating in the practices of the group whose texts they are, but you still have to know how the “texts” fit into those practices. And you can only be a “central participant” if you have actually participated and undergone an “apprenticeship” with the group (Lave, 1996; Lave & Wenger, 1991).

So “literacy” becomes plural: “literacies”. There are many different social and cultural practices which incorporate literacy, so, too, many different “literacies” (legal literacy, gamer literacy, country music literacy, academic literacy of many different types). People don’t just read and write in general, they read and write specific sorts of “texts” in specific ways and these ways are determined by the values and practices of different social and cultural groups.

That is why the NLS often tended to study not literacy itself directly, but such things as “activity systems” (Engeström 1987); “Discourses” (Gee, 1990/1996/2007); “discourse communities” (Bizzell, 1992); “cultures” (Street, 1995); “communities of practices (Lave &

Wenger, 1991; Wenger, 1998); “actor-actant networks” (Latour, 2005); “collectives” (Latour, 2004); “affinity groups” or “affinity spaces” (Gee, 2004)—the names differed and there are others—but they are all names for ways in which people socioculturally organize themselves to engage in activities. The moral was: follow the social, cultural, institutional, and historical organizations of people (whatever you call them) first and then see how literacy is taken up and used in these organizations, along with action, interaction, values, and tools and technologies.

The NLS—thanks to its opposition to traditional cognitive psychology (not to mention its hostility to earlier forms of psychology like behaviorism) tended to have little or nothing to say about the mind or cognition. It paid attention only to the social, cultural, historical, and institutional contexts of literacy. It had little to say about the individual apart from the individual’s “membership” in various social and cultural groups. It, thus, too, had little to say about learning as an individual phenomenon. Learning was largely treated—if it was treated at all—as changing patterns of participation in “communities of practice” (Lave & Wenger, 1991).

Situated Cognition Studies

The NLS talked little about learning at the level of the individual, largely due to its hostility to psychology. However, in the 1980s psychology itself changed. New movements in “cognitive science” and “the learning sciences” began to argue that the mind is furnished not primarily by abstract concepts, but by records of actual experience (e.g., Barsalou, 1999a, b; Churchland, P. S. & Sejnowski, 1992; Clark, 1989, 1993, 1997; Damasio, 1994; Gee, 1992; Glenberg, 1997; Kolodner, 1993, 2006)

Earlier work in cognitive psychology—often based on a metaphor that saw the human mind as like a digital computer—argued that memory was severely limited, as it is in a digital computer (Newell & Simon 1972). This newer work argued that human memory is nearly

limitless and that we can and do store almost all our actual experiences in our heads and use these experiences to reason about similar experiences or new ones in the future (Gee, 2004; Churchland, P. S., 1986; Churchland, P. M., 1989; Churchland & Sejnowski, 1992).

This newer work comes in many different varieties and constitutes a “family” of related but not identical viewpoints. For want of a better name, we might call the family “Situated Cognition Studies” (see also: Brown, Collins, & Dugid, 1989; Hutchins, 1995; Hawkins, 2005; Lave & Wenger, 1991). These viewpoints all believe that thinking is connected to, and changes across, actual situations and is not usually a process of applying abstract generalizations, definitions, or rules.

Situated Cognition Studies argues that thinking is tied to *people's experiences of goal-oriented action in the material and social world*. Furthermore, these experiences are stored in the mind/brain not in terms abstract concepts, but in something like dynamic images tied to perception both of the world and of our own bodies, internal states, and feelings (Churchland, P. S., 1986; Gee, 1992; Damasio, 1994). Thus, consider the following quotes, which give the flavor of what it means to say that cognition is situated in embodied experience:

... comprehension is grounded in perceptual simulations that prepare agents for situated action (Barsalou, 1999a: p. 77)

... to a particular person, the meaning of an object, event, or sentence is what that person can do with the object, event, or sentence (Glenberg, 1997: p. 3)

... Increasing evidence suggests that perceptual simulation is indeed central to comprehension (Barsalou, 1999a, p. 74).

... higher intelligence is not a different kind of process from perceptual intelligence (Hawkins, 2005, p. 96).

Human understanding, then, is not primarily a matter of storing general concepts in the head or applying abstract rules to experience. Rather, humans think, understand, and learn best when they use their prior experiences (so they must have had some) as a guide to prepare themselves for action. I will talk below about how they do this.

Work on situated cognition does not take a digital computer as a model of the human mind. Rather, it often uses as a model so-called connectionist or parallel distributed computers (Churchland, P. S., 1986; Churchland, P. M., 1989; Churchland & Sejnowski, 1992; Gee, 1992; Rumelhart, McClelland, & the PDP Research Group, 1986). Such computers look for and store patterns (networks of associations) among elements of input from the world. The argument is that humans—like connectionist computers—look for patterns in the elements of their experiences in the world and, as they have more and more experiences, find deeper and more subtle patterns, patterns that help predict what might happen in the future when they act to accomplish goals (this is, of course, a dynamic version of schema theory, see Gee 1992).

For example, say I ask you to think of a typical bedroom (Gee, 1992; Rumelhart, McClelland, & the PDP Research Group, 1986). Thanks to your experiences in the world, what you think of may be a room of moderate size with things like a bed, side tables, a dresser, drapes, lamps, pictures, a clock, a carpet, and other things. These have all been elements in your experiences, elements that you have come to see as a pattern (or network of elements). But, say, I tell you there is a small refrigerator in the bedroom. Now you may envision something like a student's bedroom in a dorm (e.g., a smaller room, a bed, a desk, a lamp on the desk, and maybe a mess on the floor). You have formed a different pattern out of the elements of your experience. Such associations and how you use them change as you gain more experiences.

You can see the same thing happening if I say “The coffee spilled, go get a mop” (where you bring in an association with coffee as a liquid) versus “The coffee spilled, go get a broom” (where you bring in an association with coffee as grains). Compare also: “The coffee spilled, stack it again” (Clark, 1993).

Despite the fact that the NLS had little interest in the mind, there is a natural affinity between Situated Cognition Studies and the NLS. This affinity has, for the most part, not been much built on from either side. Situated Cognition Studies argues that we think through paying attention to elements of our experiences. While this is a claim about the mind, we can ask “What determines what experiences a person has and how they pay attention to those experiences (i.e., how they find patterns in their experiences or what patterns they pay attention to)?”

The answer to this question is this: what determines what experiences a person has and how they pay attention to the elements of these experiences is their participation in the practices of various social and cultural groups. And these practices are mediated by various tools and technologies whether these be print or digital media or other tools.

And, of course, this was just what the NLS wanted to study. For example, bird watching clubs and expert bird watchers shape how new bird watchers pay attention to their experience of birds and environments in the field (Gee, 1992). And these experiences are mediated in important ways by various tools and technologies such as bird books, scopes, and binoculars. Obviously one experiences a wood duck in a vastly different way when looking at it through a powerful scope than through unaided vision. Furthermore, such technologies allow distinctive social practices to arise that could not otherwise exist (e.g., debating the details of tiny aspects of feathers on hard to tell apart gulls).

Thus, a situated view of the mind leads us to social and cultural groups and their tools and technologies. Both Situated Cognition Studies and the NLS point not to the “private mind” but to the world of experience—and that experience is almost always shared in social and cultural groups—as the core of human learning, thinking, problem solving, and literacy (where literacy is defined as getting and giving meanings using written language). This was the argument I made in my book, *The Social Mind* (1992) at a time when I was trying to integrate learning into the NLS and to link Situated Cognition Studies and the NLS.

The New Literacies Studies

The NLS argued that written language was a technology for giving and getting meaning. In turn, what written language meant was a matter determined by the social, cultural, historical, and institutional practices of different groups of people.

The New Literacies Studies simply carries over the NLS argument about written language to new digital technologies. By the way, “The New Literacies Studies” is parsed grammatically differently than “the New Literacy Studies”. The NLS was about studying literacy in a new way. “The New Literacies Studies” is about studying new types of literacy beyond print literacy, especially “digital literacies” and literacy practices embedded in popular culture.

The New Literacies Studies views different digital tools as technologies for giving and getting meaning, just like language (Coiro, Knobel, Lankshear, & Leu, 2008; Gee 2004, 2007; Kist, 2004; Kress, 2003; Lankshear, 1997; Lankshear and Knobel, 2006, 2007). Like the NLS, the New Literacies Studies also argues that the meanings to which these technologies give rise are determined by the social, cultural, historical, and institutional practices of different groups of people. And, as with the NLS, these practices almost always involve more than just using a

digital tool—they involve, as well, ways of acting, interacting, valuing, believing, and knowing, as well as often using other sorts of tools and technologies, including very often oral and written language.

Just as the NLS wanted to talk about different literacies in the plural—that is, different ways of using written language within different sorts of sociocultural practices—so, too, the New Literacies Studies wants to talk about different “digital literacies”—that is, different ways of using digital tools within different sorts of sociocultural practices. In this sense, the New Literacies Studies is a natural off-shoot of the NLS, though the two fields do not contain just the same people by any means.

The New Literacies Studies has had an important historical relationship with the NLS, from which it partly stems. At the same time as the New Literacies Studies has been emerging as a field, there has emerged, as well, another area, what we can call the New Media Literacy Studies, for short, the “NMLS”. The NMLS has not had a significant historical relationship with the NLS, at least until recently.

New Media Literacy Studies

The NMLS is an off shoot of a movement that has been around for some time, namely “media literacy” (on NMLS and its relation to traditional media literacy, see e.g., Beach, 2006; Brunner & Tally, 1999; Buckingham, 2003, 2007; Hobbs, 1997, 2007; Jenkins, 2006; Warschauer, 1998). Both the NMLS and the earlier media literacy are connected in large part to people in the field of communications or related fields, though interest in both has spread well beyond communications.

Media literacy as a field was concerned with how people give meaning to and get meaning from media, that is, things like advertisements, newspapers, television, and film. Of

course, giving and getting meaning from media sometimes involves giving and getting meaning from oral and written language, but in case where this language is used in media contexts. And giving and getting meaning from media can, of course, involve giving and getting meaning from images, sounds, and “multimodal texts” (texts that mix images and/or sounds with words) as well.

Media literacy did not want to study just how people give meaning to and get meaning from media, but also to intervene in such matters by studying how people can be made more “critical” or “reflective” about the sorts of meanings they give and get from media (see Vasquez, Harste, & Albers, Chapter xx, this volume). People can be “manipulated” by media and can “manipulate” others with media. It is often relevant to ask whose (vested) interest is served by a given media message and to wonder whether people mistake whose interest such messages really serve, for example, an ad whose message really serves the profit motives of a company but which a consumer can mistakenly take to be in his or her best interest.

Such an approach also raised issues about the extent to which consumers of media are “dupes” or “savvy”. Some approaches to media literacy tended to stress the ways in which consumers can and sometimes do use media and media messages for their own interests and desires, even in ways that the producers of those messages did not intend (Alvermann, Moon, & Hagood, 1999; Fiske, 1989; Lankshear & Knobel, 2006). The extent to which such proactive use of media is or is not a politically effective counter to consumerism and the power of profit-seeking businesses is a matter of debate.

The NMLS inherited a good deal of the concerns and issues of media literacy. However, today it is not just media professionals and corporations that can produce and manipulate people with media. Everyday people—former “consumers”—can now produce their own media and

compete with professionals and corporations. Thus, the NMLS stresses the ways in which digital tools and media built from them are transforming society and, in particular, popular culture.

Digital tools are giving rise to major transformations in society. These transformations are crucial to the NMLS. First, digital tools are changing the balance of production and consumption in media. It is easier today for everyday people not just to consume media but to produce it themselves. Everyday peoples—not just experts and elites—can produce professional looking movies, newscasts, and video games (thanks to “modding”) and many other such products.

Second, digital tools are changing the balance of participation and spectatorship. More and more today, people do not have to play just the role of the spectator. Since they can now produce their own music, news, games, and films, for example, they can participate in what used to be practices reserved for professional or elite musicians, film makers, game designers, and news people (Shirky, 2008).

Third, digital tools are changing the nature of groups, social formations, and power. Prior to our current digital tools, it was hard to start and sustain a group. It usually required an institution, with all its attendant bureaucracy and top-down power. Today, with things like Flickr, My Space, Facebook, and digital devices like mobile phones, it is easier than ever to form and join groups, even for quite short-term purposes. Often no formal institution is required and groups can organize themselves bottom up through constant communication and feedback. These quickly formed groups can engage in social, cultural, and political action in a fast, pervasive, and efficient manner. Such groups can readily form and re-form, transforming themselves as circumstances change. In fact, it can sometimes be hard for more traditional groups and institutions to keep up with such flexible group formation.

Fourth, all the above trends are leading to the phenomenon known as “Pro-Ams”. Today young people are using the Internet and other digital tools outside of school to learn and even become experts in a variety of domains. We live in the age of “Pro-Ams”: amateurs who have become experts at whatever they have developed a passion for (Anderson, 2006; Gee, 2008; Leadbeater & Miller, 2004).

Many of these are young people who use the Internet, communication media, digital tools, and membership in often virtual, sometimes real, communities of practice to develop technical expertise in a plethora of different areas. Some of these areas are digital video, video games, digital storytelling, machinima, fan fiction, history and civilization simulations, music, graphic art, political commentary, robotics, anime, fashion design (e.g., for Sims in *The Sims*). In fact, there are now Pro-Ams in nearly every endeavor the human mind can think of.

These Pro-Ams have passion and go deep rather than wide. At the same time, Pro-Ams are often adept at pooling their skills and knowledge with other Pro-Ams to bring off bigger tasks or to solve larger problems. These are people who don’t necessarily know what everyone else knows, but do know how to collaborate with other Pro-Ams to put knowledge to work to fulfill their intellectual and social passions.

The NMLS, thus, engages with a new sense of “media literacy”. The emphasis is not just on how people respond to media messages, but also on how they engage proactively in a media world where production, participation, social group formation, and high levels of non-professional expertise are prevalent. Issues of being critical and reflective are still paramount, of course, but so are issues of how digital media are and are not changing the balance of power and status in society.

Popular Culture, Video Games, and Learning

Now I want to turn to a specific application of the ideas I have just sketched out. Through this discussion, I will show one way—but only one among many—to relate in an integrated way the New Literacy Studies, Situated Cognition Studies, the New Literacies Studies, and the New Media Literacy Studies to education.

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 learn to decode print and assign basic or literal meanings to that print. But the situation is not that simple. We know from the now well-studied phenomenon of the “fourth-grade slump” (the phenomenon whereby many children, especially poorer children, pass early reading tests, but cannot read well 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; Gee, 2008; Snow, Burns, & Griffin, 1998).

The goal has to be that children learn to read early on in such a way that this learning creates 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. Children need to get ready for these increasing language demands as early as possible. It is as if school were more and more conducted in Greek as the grades increased: surely it would be better to be exposed to Greek as early as possible and not wait until school becomes the equivalent of advanced Greek.

Let’s call this a “trajectory approach” to early reading. Such an approach has to look not only forwards, but backwards, as well. 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 and 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 in the content areas—past the first grade, essentially for the rest of schooling (Dickinson and Neuman, 2006; Gee, 2004; Senechal, Ouellette, and Rodney, 2006). Thus, a child’s oral language development is key to a successful trajectory approach to reading, that is, an approach that seeks to make a long-term school-based reader of academic content (and that’s what’s in the high school biology textbook, for example). It is the key to avoiding, even eradicating, the fourth-grade slump.

I must pause because we are on the brink of what could be a major misunderstanding. Decades of research in linguistics has 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 very wide array of variation—that, in acquiring English, say, little Janie develops relative clauses, but little Johnnie just can’t master them. That, is, of course, in a way, a surprising fact, showing that the acquisition of one’s native language is not particularly a matter of ability or skill.

But, 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. I am talking about their early

preparation for language that is not “everyday”, for language that is “technical” or “specialist” or “academic” (Gee, 2004; Schleppegrell, 2004). I will 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 will 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, both in terms of specialist language and in terms of getting ready for later complex specialist language demands early on in life. Kevin Crowley has talked insightfully about quite young children developing what he calls “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 transcript below is adapted from Crowley and Jacobs 2002, pp. 343-344). The mother and child are looking at replica fossil dinosaur and a replica fossil dinosaur egg. The mother has a little card in front of 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 transcript below, “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 . . .
- B: 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 . . .
- B No, I know, they, they...
- M: Your dinosaur book, what they use them...
- B: Have so great claws so they can eat and kill...
- M: They use their claws to cut open their prey, right.
- B: Yeah.

This is a language lesson, but not primarily a lesson on vernacular language, though, 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, though the mother is no expert on language development.

Let’s look at some of the features 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, though 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 (2007) 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 this type of print (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 the child is familiar with: “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 (books, games, and computers), situating the child’s new knowledge not just in a known background, but 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 hard 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).

Informal Specialist-Language Lessons

So, let’s be clear about two things. This is an informal language lesson. And such lessons involve more than language and language learning. They involve teaching and learning cognitive (knowledge) and interactional moves in specialist domains. Finally, they involve teaching and learning identities, the identity of being the sort of person who is comfortable with specialist, technical knowing, learning, and language. Of course, even formal language lessons—in learning a second language, for instance, in school—should involve language, knowledge, interaction, and identity. But this is not formal teaching, it is informal teaching, the teaching equivalent of informal learning. Let’s call such informal language lessons, with the

sorts of features I have just discussed, “informal specialist-language lessons” (ironically, they are informal formal-language lessons!).

Along with all we know about “emergent literacy” at home (Dickinson and Neuman, 2006; Gee, 2004), informal specialist language lessons are crucial if one wants to take a trajectory view of reading development. They are pre-school pre-reading activities that lead to early reading instruction that avoids the fourth-grade slump. Of course, the reading instruction the child receives at school must continue these language lessons, informally and formally. It must place reading from the get go in the context of learning specialist styles of language, just as this mother has done. This, however, raises the issue of what happens for children who come to school without such informal specialist language teaching, and, often, too, without other important aspects of emergent literacy. My view is that this cannot be ignored. We cannot just move on to reading instruction of the “decode and literally comprehend” sort as if it just doesn’t matter that these children have missed out on early specialist language learning. For these children language teaching needs to start, start with a vengeance, and sustain itself throughout the course of reading instruction. And, again, remember, this claim has nothing to do with teaching “standard” English or ESL, *per se*: it is a claim that even native speakers of vernacular standard English need language learning to prepare for specialist varieties of language.

Specialist Language in Popular Culture

There are other things, beyond such informal specialist-language lessons that can prepare children for the increasing language demands of school in the content areas. And we can see one of these if we look, oddly enough, at young people’s popular culture today. 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, 2007).

Young children often engage with these practices socially with each other in informal peer learning groups. And, some parents recruit these practices to accelerate their children's specialist language skills (with their concomitant thinking and interactional skills).

For example, consider the text below, which appears on a *Yu-Gi-Oh* card. *Yu-Gi-Oh* is a card game involving quite complex rules. It is often played face-to-face with one or more other players, sometimes in formal competitions, more often informally, though it can be played as a video game, as well.

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 what moves in the game the card allows. This text has little specialist vocabulary (though it has some, e.g., “activated”), unlike the interaction we saw between mother and child above, but it contains complex specialist syntax. It contains, for instance, three straight conditional clauses (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, really, of multiple related "either-or", "if-then" propositions.

Note, too, that the card contains a bunch of 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 over 10,000 of them—and the rule system of the game itself. This is complex system thinking with a vengeance.

Consider, also, the *Yu-Gi-Oh* card below:

Cyber Raider

Card-Type: Effect Monster

Attribute: Dark | **Level:** 4

Type: Machine

ATK: 1400 | **DEF:** 1000

Description: "When this card is Normal Summoned, Flip Summoned, or Special Summoned successfully, select and activate 1 of the following effects: Select 1 equipped Equip Spell Card and destroy it. Select 1 equipped Equip Spell Card and equip it to this card."

Rarity: Common

This card—and remember it is one of 10,000—contains nearly nothing but words and phrases that are technical, specialist terms in *Yu-Gi-Oh*. Few texts children see in school will be this saturated with such technical language.

I have watched seven-year-old children play *Yu-Gi-Oh* with great expertise. They must read each of the cards. 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 over 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, here is the sort of thing 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

I don't really think I have 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 will see in their school books, until they get to middle school at best and, perhaps, even high school. But, seven-year-old children deal and deal well with this language (though *Yu-Gi-Oh* cards—and, thus, their language—are often banned at school).

Let's consider a moment what *Yu-Gi-Oh* involves. First and foremost it involves what I will call "lucidly functional language". What do I mean by this? The language on *Yu-Gi-Oh* cards, 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 (where meaning here is the rules and the actions connected to them) is clear and lucid. The *Yu-Gi-Oh* company has designed such lucid functionality because it allows them to sell 10,000 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 was taught in this lucidly functional way. It rarely is.

So we can add "lucidly functional language" to our informal specialist-language lessons as another foundation for specialist language learning, one currently better represented in popular culture than in school. And, note here, too, that such lucidly functional language is practiced socially in groups of kids as they discuss, debated, and trade cards with each other, including more advanced peers. They learn to relate oral and written language of a specialist sort, a key skill for specialist domains, including academic ones 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 well as we will see below, digital technologies like video games—to engage their children in informal specialist-language lessons.

My thirteen-year-old son Sam recently told me recently that he felt he had learned to read by playing *Pokemon*, another card and video game. He was referring to the games on the

Nintendo Game Boy, games he played before he could read, when he was five. His mother or I sat with him and read for him—the game requires much reading. In a real sense, Sam did learn to read by playing *Pokemon*. But he learned to read, then, in a context that was also early preparation for dealing with complex specialist language, a type of language he would see later in school, though, for the most part, only after the first couple of grades. Of course, he learned other sorts of reading in other activities, as well. I am not arguing for early literacy that is focused on only specialist languages.

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 first grade—to teach school valued content. But they don't. Here the creativity of capitalists has far out run that of educators.

Situated Meaning and Video Games

So far we have talked about two underpinnings of a trajectory view of reading: informal (and later formal) specialized-language lessons and practices built around lucidly functional language. Why are these underpinnings for reading, in a trajectory sense? Because they place reading development in the context of specialized language development, which is the basis for being able to keep up with the ever increasing demands for learning content in school via complex technical and academic varieties of language (and, indeed, other sorts of technical representations used in areas like science and math).

Now we move to a third underpinning of a trajectory view of reading development. Lots of research has shown, for years now, that in areas like science, a good 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 write down for a test Newton's Laws of Motion

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—and, ironically, this is something that can be deduced from Newton’s Laws (Chi, Feltovich, & Glaser, 1981). They cannot apply their knowledge, because they don’t see how it applies—they don’t see the physical world and the language of physics (which includes mathematics) in such a way that it is clear to them how that language applies to that world.

There are two ways to understand words. I will call one way “verbal” and the other way “situated” (Gee, 2004, 2007). 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, 2007). 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, while verbal or general understandings may facilitate passing certain sorts of information-focused tests, they do not necessarily facilitate actual problem solving.

Let me quickly point out that, in fact, all human understandings are, in reality, situated. What I am calling verbal understandings are, of course, situated in terms of other words and, in a larger sense, the total linguistic, cultural, and domain knowledge a person has. But they are not necessarily situated in terms of ways of applying these words to actual situations of use and varying their applications across different contexts of use. Thus, I will continue to contrast verbal understandings to situated ones, where the later implies the ability to do and not just say.

Situated understandings are, of course, 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, and 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, 2003). 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, 2003/2007, 2005; McFarlane, Sparrowhawk & Heald, 2002; Squire, 2006).

Consider a phenomenon that all gamers are well aware of. This phenomenon gets to the heart and soul of what situated meaning 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.

Let me take the small booklet that comes with the innovative shooter game *Deus Ex* to use as an example of what I mean by saying this. In the twenty pages of this booklet, there are

199 bolded references that represent headings and sub-headings (to take one small randomly chosen stretch of headings and subheadings that appears at the end of page 5 and the beginning of page 6: **Passive Readouts, Damage Monitor, Active Augmentation & Device Icons, Items-at-Hand, Information Screens, Note, Inventory, Inventory Management, Stacks, Nanokeyring, Ammunition**). Each of these 199 headings and subheadings is followed by text that gives information relevant to the topic and relates it to other information throughout the booklet. In addition, the booklet gives 53 keys on the computer keyboard an assignment to some function in the game, and these 53 keys are mentioned 82 times in the booklet in relation to the information contained in the 199 headings and subheadings. So, though the booklet is small, it is just packed with concise and relatively technical information.

Here is a typical piece of language from this 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 (p. 5).

This makes perfect sense at a literal level, but that just goes to show how worthless the literal level is. When you understand this sort of passage at only a literal level, you have only an illusion of understanding, one that quickly disappears as you try to relate the information in this passage to the hundreds of other important details in the booklet. Such literal understandings are precisely what children who feel 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, though 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 (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—doesn't 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 screens by pressing on “tabs”? And so on and so forth—20 pages is beginning to seem like a lot—remember there are 199 different headings under which information like this is given a brisk pace through the booklet.

Of course, all these terms and questions can be defined and answered if you closely check and cross-check information over and over again 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're back to turning pages. Is the booklet poorly written? Not at all. It is written just as well or poorly, just like, in fact, any of a myriad of school-based texts in the content areas. It is, outside the practices in the domain

from which it comes, just as meaningless, though one could, of course, garner literal meanings from it with which to verbally repeat things or pass tests, as one often does with texts in school.

And, of course, too, you can utter something like “Oh, yea, you click on F1 (function key 1) to get to the Inventory screen and F2 to get to the Goals/Notes screen” and sound like you know something. The trouble is this: in the actual game, you can click on F2 and meditate on the screen you see at your leisure. Nothing bad will happen to you. However, you very often have to click on F1 and do something quickly in the midst of a heated battle. There's no “at your leisure” here. The two commands really don't function the same way in the game—they actually mean different things in terms of embodied and situated action—and they never really *just* mean “click F1, get screen”. That's their general meaning, the one with which you can't really do anything useful until you know how to spell it out further in situation-specific terms in the game.

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

When I first read this booklet before playing *Deus Ex* (and at that time I had played only one other shooter game before, 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 stuff in the booklet. But none of it was well-enough understood to be found easily without continually re-

searching for the same information. In the end, you have to just actively play the game and explore and try everything. Then, at last, the booklet makes good sense, but, then too, you don't need it all that much any more.

So now I would make just the same claim about any school content domain as I have just said about the video game *Deus Ex*: specialist language in any domain—games or science—has no situated meaning—thus no lucid or applicable meaning—unless and until one has “played the game”, in this case the game of science, or, better put, a specific game connected to a specific science. Such “games”(“science games”) involve seeing the language and representations associated with some part of science in terms of activities I have done, experiences I have had, images I have formed from these, and interactional dialogue I have 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 kids who have already played the game at home, but is disastrous for those who have not.

Good video games don't just support situated meanings for the written materials associated with them in manuals and on fan web sites—and these 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 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: “game-like learning” can lead to situated and not just verbal meanings. In turn, situated meanings make specialist language lucid, easy, and useful. Of course, video games are only one digital medium among many that can be used to support learning and literacy. The

key to all of them, though, is that they situate meaning in worlds of experience—the stuff out of which the human mind is made—experience that is ultimately shared, collaborative, social, and cultural.

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