OPPORTUNITY TO LEARN:

A LANGUAGE-BASED PERSPECTIVE ON ASSESSMENT

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1. Introduction

Over the last few years, the issue of testing has been central to school reform efforts in the United States and a number of other countries (McNeil 2000). Standardized tests are used for what policy makers call "accountability", that is, they are used to hold schools and teachers accountable for the achievement of all students, rich and poor alike. This testing and accountability agenda has often been tied to calls for a return to "basic skills" and even to scripted forms of instruction in reading, math, and science. The view of learning and assessment on which this whole agenda is based is a profoundly impoverished one. Worse, the agenda implies that if rich and poor children are simply exposed to the same texts and facts in school, they will all "pass the test" and problems of equity will thereby be taken care of.

Current work in a variety of areas—in sociolinguistics, cognitive science, and literacy studies, for example—suggests a more complicated view of learning, assessment, and equity. This view not only challenges the current testing and accountability agenda. It challenges much more broadly how we have heretofore thought about learning, assessment, and equity in schools. I want to develop this view about learning, assessment, and equity around one key notion, namely *opportunity to learn*. If two children are being assessed on something which they have not had equivalent opportunities to learn, the assessment is unjust (unless, of course, the purpose of the assessment is to demonstrate this disparity in opportunity to learn).

In each section below I will discuss some area of current research relevant to learning and assessment. I will then state, in each section, a principle relevant to opportunity to learn. I will center my discussion around assessing reading (in a sense of

"reading" that goes beyond decoding and requires comprehension). However, in the end, I will make clear that the argument I make applies to assessment of all content areas in school (e.g., math and science). There will be six principles in all. In my view, if one cannot demonstrate (or, at least correctly assume) for any evaluative assessment of reading or content learning that those being assessed have had equivalent opportunities to learn in the relevant domain in regard to all six principles, the assessment is invalid and unethical.

2. Literacy is More than Reading and Writing

First and foremost, if one is going to assess students in reading, one must know what reading is and what it means for those students to have had equivalent opportunities to learn to read. Reading is not such general and obvious matter as most people, including test makers, assume (Gee 1996; Street 1995). After all, we never just read "in general", rather, we always read or write *something in some way*. We don't read or write newspapers, legal tracts, essays in literary criticism, poetry, or rap songs, and so on and so forth through a nearly endless list, in the same way. Each of these domains has its own rules and requirements. Each is a culturally and historically separate way of reading and writing, and, in that sense, a different literacy. Furthermore, in each case, if we want to "break the rules" and read against the grain of the text, for the purposes of critique, for instance, we have to do so in different ways, usually with some relatively deep knowledge of how to read such texts "according to the rules".

So there are different ways to read different types of texts. Literacy (reading and writing) is multiple, then, in the sense that the legal literacy needed for reading law books

is not the same as the literacy needed for reading physics texts or Super Hero comic books. Even when we want to think about a child learning to read initially, we want to think about what sorts of texts to want the child eventually to be able to read in what sorts of ways. No learner grows up able to read all sorts of texts in all ways. I will later discuss the fact that, of course, the goal of learning to read in school is eventually to be able to read texts written in "academic language" (the language of the content areas in school). If a child learns to decode print in such a way that later he or she cannot read such "school-based language" in the content areas, obviously the initial reading instruction, from the point of view of schooling, was pointless.

Once we see this multiplicity of literacy (that we read and write different sorts of texts in different ways), we realize that when we think about reading and writing, we have to think beyond print. Reading and writing in any domain, whether it be law, biology, literary criticism, rap songs, academic essays, Super Hero comics, or whatever, are not just ways of decoding print, they are also caught up with and in *social practices*. Literacy in any domain is actually not worth much if one knows nothing about the social practices of which the literacy is but a part. And, of course, these social practices involve much more than just an engagement with print.

Of course, one can know a good deal about a social practice—such as arguing before the Supreme Court, carrying out an experiment in science, or memorializing an event in gang history through graffiti—without actually being able to participate in the social practice. But knowing about a social practice always involves *recognizing* various distinctive ways of acting, interacting, valuing, feeling, knowing, and using various objects and technologies, that constitute the social practice.

Take something so simple as the following sentence about basketball: "The guard dribbled down court, held up two fingers, and passed to the open man". You may very well know what every word in this sentence means in terms of dictionary definitions of the words in it. But you cannot read this sentence with any real worthwhile understanding unless you can recognize, in some sense (perhaps only in simulations in your mind), guards, dribbling, basketballs, open men, and basketball courts. But to be able to recognize these things is already to know a good deal about basketball as a game, that is, as a particular sort of social practice. The same thing is equally true about any sentence or text about the law, comic books, a branch of science, or anything else for that matter.

We can go further. One's understanding of the sentence "The guard dribbled down court, held up two fingers, and passed to the open man" is different, in some sense, deeper and better, the *more* one knows and can recognize about the social practice (game) of basketball. For example, if you know a good bit about basketball, you may see that one possible meaning of this sentence is that the guard signaled a particular play by holding up two fingers and then passed to the player the play left momentarily unguarded.

But then, this, brings us to another important point. While you don't need to be able to enact a particular social practice (e.g., play basketball or argue before a court) to be able to understand texts from or about that social practice, you can *potentially* give deeper meanings to those texts if you can. This claim amounts to arguing that producers (people who can actually engage in a social practice) *potentially* make better consumers (people who can read or understand texts from or about the social practice).

A corollary of this claim is this: writers (in the sense of people who can write texts that are recognizably part of a particular social practice) *potentially* make better readers (people who can understand texts from or about a given social practice). Note that by "writers" here I do not mean people who can just write down words appropriate to a particular practice such as field biology. I mean people who can write a text that field biologists would recognize as an acceptable text within their family of social practices.

Why do I say "potentially" here? Because there is a paradox about producers. On the one hand, producers are deeply enough embedded in their social practices that they can understand the texts associated with those practices quite well. On the other hand, producers are often so deeply embedded in their social practices that they take the meanings and values of the texts associated with those practices for granted in an unquestioning way. One key question for deep learning and good education, then, is how to get producer-like learning and knowledge, but in a reflective and critical way.

All these claims are pretty obvious. It is, thus, fascinating that they are so often ignored in schools. In school, children are often expected to read texts with little or no knowledge about any social practices within which those texts are used. They are rarely allowed to engage in an actual social practice in ways that are recognizable to "insiders" (e.g., field biologists) as meaningful and acceptable, before and as they read texts relevant to the practice [this is, of course, not true of all schools—I have seen second graders engaged in real experiments on fast growing plants and using reading and writing as part and parcel of the social practices involved].

Indeed, children are regularly given reading tests that ask general, factual, and dictionary-like questions about various texts with no regard for the fact that these texts

fall into different genres (that is, they are different kinds of texts) connected to different sorts of social practices. Children can often answer such questions, but they learn and know nothing about the genres and social practices that are, in the end, the heart and soul of literacy.

Schools will continue to operate this way until they (and reading tests) move beyond fixating on reading as silently saying the sounds of letters and words and being able to answer general, factual, and dictionary-like questions about written texts (Coles 1998, 2000). You do, indeed, have to silently say the sounds of letters and words when you read (or, at least, this greatly speeds up reading). You do, indeed, have do be able to answer general, factual, and dictionary-like questions about what you read: this means you know the "literal" meaning of the text. But what so many people—unfortunately so many educators and policy makers—fail to see is that if this is all you can do, then you *can't really read.* You will fail to be able to read well and appropriately in contexts associated with specific types of texts and specific types of social practices.

For example, consider once again our sentence about basketball: "The guard dribbled down court, held up two fingers, and passed to the open man". A typical reading test would ask a question like this: "What did the guard do to the ball?" and give "bounce it" as one of the choices. Unfortunately, you can answer such general, factual, dictionary-like questions and really have no idea what the sentence means in the domain of basketball. When we see that the same thing applies to sentences from science or any other school subject we immediately see why so many children pass early reading tests, but cannot learn later on in the subject areas.

This phenomenon is so pervasive that it has been given a name by researchers: "the fourth-grade slump" (Chall 1967). It is called this, because, in the past, the first three years of school were largely devoted to learning to read (in the sense of being able to decode print and get the literal meanings of texts) and fourth grade was where children began to read to learn (in the subject areas). However, very often today, children are being asked to read to learn things like science and math from first or second grade on, at least in affluent schools.

The view of reading that has been developed in this section gives rise to our first principle in regard to opportunity to learn. The principle says that we have to worry about what texts students have read and how they have read them, not just about how much they have read and how many books they do or do not own (though, of course, these are important matters too):

First Principle

People (children or adults) have not had the same opportunity to learn based solely on much or little they have read "in general", but in terms of how equivalent their experience has been with reading specific types of text in specific sorts of ways. They must also have had equivalent experience with the social practices associated with reading these specific types of text in these specific ways. Finally, they must have had equivalent experiences in being producers and not just consumers of texts of that type read in that way.

Thus, a child who has read a number of texts on animals as classificatory reports and not, say, as stories or mere accumulation of interesting facts, is advantaged over a child who has not if these two children are taking a test on a passage about animals that is intended to be read in that way. The two children have not had the same opportunity to learn.

3. Semiotic Domains

Just as we don't read "in general", but read specific sorts of texts in specific ways, we don't learn "in general", but learn specific "semiotic domains". Indeed, any text is itself associated with one or more specific semiotic domains. By a *semiotic domain* I mean any set of practices that recruit one or more modalities (e.g., oral or written language, images, equations, symbols, sounds, gestures, graphs, artifacts, and so forth) to communicate distinctive types of meanings. Here are some examples of semiotic domains: cellular biology, postmodern literary criticism, first-person-shooter video games, high fashion advertisements, Roman Catholic theology, modernist painting, midwifery, rap music, wine connoisseurship—and so on and so forth, through a nearly endless, motley, and ever changing list.

Our sentence about basketball—"The guard dribbled down court, held up two fingers, and passed to the open man"—is a sentence from the semiotic domain of basketball. It might seen odd to call basketball a semiotic domain. However, in basketball, particular words, actions, objects, and images take on distinctive meanings. In basketball "dribble" does not mean drool, a pick (an action where an offensive player

positions himself so as to block a defensive player guarding one of his or her team mates) means that some defensive player must quickly switch to guard the now unguarded offensive player, and the wide circle on each end of the court means that players who shoot from beyond it get three points instead of two if they score a basket.

If you don't know these meanings—cannot read these signs—then you can't "read" (understand) basketball. The matter seems fairly inconsequential when we are talking about basketball. However, it quickly seems more consequential when we are talking about the semiotic domain of some type of science being studied in school. Equally here, if you don't know how to read the distinctive signs (words, actions, objects, and images), you can't read (understand) that sort of science.

It is often a tricky question as to what semiotic domain is being entered when someone is learning or has learned something, especially in school. For example, consider college freshmen who have taken their first college-level physics class, passed it with good grades, and can write down Newton's Laws of Motion. What domain have they entered? It will not do to say "physics" and leave the matter at that.

Lots of studies have shown that many such students, students who can write down Newton's Laws of Motion, if asked so simple a question as: "How many forces are acting on a coin when it has been thrown up into the air?" (the answer to which one can actually deduce from Newton's Laws), get the answer wrong (Chi, Feltovich, & Glaser 1981). Leaving aside friction, they claim that there are two forces operating on the coin, gravity and "impetus", the force the hand has transferred to the coin. Gravity exists as a force, and, according to Newton's Laws, is the sole force acting on the coin when it is in the air (aside from air friction). Impetus, in the sense above, however, does not exist, though

Aristotle thought it did and people in their everyday lives tend to view force and motion in such terms quite naturally.

So these students have entered the semiotic domain of physics as passive *content*, but not as something in terms of which they can actually see and operate on their world in new ways. There may be nothing essentially wrong with this, since their knowledge of such passive content might help them know, at some level, what physics, an important enterprise in modern life, is "about". I tend myself to doubt this, however. Be that as it may, these students cannot produce meanings in physics or understand them in producer-like ways.

They have not learned to experience the world in a new way. They have not learned to experience the world in a way in which the natural inclination to think in terms of the hand transmitting a force to the coin, a force that the coin stores up and uses up ("impetus"), is not part of one's way of seeing and operating on the world (for a time and place, i.e., when doing modern physics).

When we learn a new semiotic domain in a more active way, not as passive content, three things are at stake: First, we learn to experience (see, feel, and operate on) the world in new ways. Second, since semiotic domains are usually shared by groups of people who carry them on as distinctive social practices, we gain the potential to join this social group, to become affiliated with such kinds of people (even though we may never see all of them, or any of them, face to face). Third, we gain resources that prepare us for future learning and problem solving in the domain, and, perhaps, more importantly, in related domains. Three things, then, are involved in *active* learning: *experiencing* the

world in new ways, forming new *affiliations*, and *preparation* for future learning (Bransford & Schwartz 1999; Gee 2000-2001)

This is "active learning". However, such learning is not yet "critical learning". For learning to be critical, as well as active, one additional feature is needed. For learning to be *critical* in a particular semiotic domain, the learner needs to learn, not only how to understand and produce meanings in that domain that are recognizable to those affiliated with the domain, but, in addition, how to think about the domain at a "meta" level as a complex system of inter-related parts. The learner needs to learn, as well, how to innovate in the domain, that is, how to produce meanings that, while recognizable, are seen as somehow novel or unpredictable (New London Group 1996).

It is clear that many semiotic domains involve meaning resources beyond language, resources such as images, equations, graphs, artifacts, gestures, and actions (e.g., certain characteristic moves in basketball). Very often these are combined in integral and complex ways with each other and with words (Kress & van Leeuwen 1996, 2001). To learn and think in the domain, the student must be able to "read" these signs as well as, and often in tandem with, words. A person who can read texts about basketball, and even knows that "setting a pick" involves an offensive player blocking a defensive one so that the player the defender is guarding can get free, but can't recognize "setting a pick" when he or she sees it, can't read the semiotic domain of basketball. Indeed, he or she can't really read basketball texts in any very deep fashion, either. In fact, seeing picks set, or even setting them oneself, is an excellent way to know what the term means when one reads it. Equivalent remarks can be made about any semiotic domain, including, say, biology in school.

In regard to opportunity to learn we can now formulate a second principle that is, in reality, a supplement to the first principle above.

Second Principle

People have not had the same opportunity to learn unless they have had equivalent experiences within the relevant semiotic domain in terms of active and critical learning (as defined above). Further, they must have had equivalent experiences with the range of non-verbal meaning resources in a domain and how they relate to words (since these other resources are often relevant to what words mean in the domain).

If one student has read texts about biology or basketball and has had the opportunity to "do" biology or basketball (see them, produce them, or simulate them, whatever the case may be) and another student has only read texts about biology, the students have not had equivalent opportunities to learn. If one student has had the opportunity to experience and understand the full range of verbal and non-verbal meaning resources in biology or basketball and another student has experienced only the verbal recourses, then, these students have not had equivalent opportunities to learn.

4. Social Languages

Texts, as well as talk, in specific domains, are not just in English (or some other language) "in general". There really is no such thing as "English in general". Rather, any text or talk is in a specific style of language. For any language, like English or Russian, there are a great many different styles. Let's first, then, distinguish between *vernacular styles* of language and *non-vernacular styles* (Labov 1972a, b). Save in the case of massive social disruption, every human being acquires a native language in his or early years. People use their native language initially and throughout their lives to speak in the vernacular style of language, that is, the style of language they use when they are speaking as "everyday" people and not as specialists of various sorts (e.g., biologists, street-gang members, lawyers, video-game adepts, postmodern feminists, etc.).

Nearly everyone comes to acquire non-vernacular styles of languages later in life, styles used for special purposes, such as religion, work (e.g., a craft), government, or academic specialties. Let us call all these different styles of language "social languages" (Gee 1996, 1999) and say that, while everyone acquires a vernacular social language (a different dialect for different groups of people) connected to his or her native language (e.g., English), people usually go on, as well, to acquire different non-vernacular social languages connected to different social groups, for example, one person may become adept at the language of Christian fundamentalist theology and someone else at the language of modern mathematics.

While the process of acquiring a vernacular form of one's language is, at least in my view (following Chomsky, e.g., see Chomsky 1986), biologically specified and every later social language does, indeed, build on the resources of one's vernacular, acquiring

various non-vernacular social languages is not a process that is itself biologically specified (Gee 2001). Evolution surely aided humans in acquiring the capacity for language in the sense of one's native vernacular (or we humans, like the other primates, would have no language at all), but it did not aid us in acquiring the social language of physics, for instance, since physics and its style of language have been around way too short a time to have been given any evolutionary aid, beyond the basic language resources that the language of physics, like all other later social languages, draws from vernacular forms of language.

Thus, consider the two sentences below:

1. Hornworms sure vary a lot in how well they grow.

2. Hornworm growth displays a significant amount of variation.

The first sentence is a vernacular style of language. Everyone who is a native speaker of English, regardless of their dialect, can utter some equally good variant of this sort of sentence (if they know what hornworms are—green caterpillar-like creatures with yellow horns). The second sentence is in an academic social language. While every native speaker's grammar contains all the grammatical structures that this sentence contains (e.g., nominalizations), not every speaker knows that c*ombining them in just this way* is called for by certain social practices of certain academic (and school-based) domains ("Discourses"). *This has to be learned and this knowledge is not acquired on the basis of any biological capacity for language*. It is manifestly the case that many

children in school struggle to acquire forms of language like that in sentence 2, though none (if they are native speakers) struggle with the forms of language like that in sentence 1.

Again, every native speaker of English has a grammar that contains all of the sorts of grammatical structures that are used in sentence 2. All of them are used at times in vernacular forms of language. However, to produce a sentence like 2 you must know more than this. You must know that, in this style of language, verbs naming dynamic processes (e.g., "grow" and "vary") are turned into nouns naming abstract things (e.g., "growth" and "variation"). You have to know that in this form of language emotive markers like "sure" are not used. You have to know that in this form of language a vague phrase like "a lot" must be replaced by a more explicit one like "significant variation" (where "significant" has a fairly precise definition in areas like biology). You have to know that subjects of sentences in this form of language will very often not be simple nouns (like "hornworms"), but nominalizations (like "hornworm growth") expressing a whole clause worth of information (i.e., hornworms grow) as an abstract concept. *And most importantly you have to know all these things together and that these linguistic features, in fact, tend to go together—to pattern together—in this form of language.*

In regard to opportunity to learn, we can formulate a third principle based on the nature of social languages:

Third Principle

People have not had the same opportunity to learn unless they have had equivalent experiences with the relevant specific social languages, not with just English (or some other language) "in general".

If one student has had experience with, say, the language of controlled experimentation used in a number of sciences (like the second-graders I mentioned above, in fact, did) and another one has not, these students have not had equivalent opportunities to learn not matter whether they are both native speakers of English or not and no matter whether they have spent the same amount of time speaking English. What matters is how much and how long they have spoken (read and written) specific social languages.

5. Situated and Embodied Meanings

One traditional view of language processing and thinking in cognitive psychology is based on the notion of "propositions" (e.g., Dennett 1969; Fodor 1975; Pylyshyn 1984). According to this view, people formulate meaning in their heads in terms of *propositions*. Propositions are logic-like expressions instantiated in a universal "language of thought" (Fodor, 1975) that resembles, in some ways, a human language. For example, we might represent the meaning of an English sentence like "Socrates is wise or he is cunning" in terms of propositions something like this: [(SOCRATES **be** WISE) **or** (SOCRATES **be** CUNNING)] where the capitalized items represent not English words,

but, rather, general concepts in the mind (i.e., WISE and CUNNING) or a name (or index) referring to an individual (SOCRATES). [(SOCRATES **be** WISE) **or** (SOCRATES **be** CUNNING)] is one big proposition composed of two smaller ones, namely (SOCRATES **be** WISE) and (SOCRATES **be** CUNNING).

The bolded items in this proposition are also not English words. Rather, they represent logical terms defined in terms of the grammar of a logical system or logical language. For example, "**or**" is defined as follows: The whole big proposition connected together by "**or**" (i.e., SOCRATES **be** WISE **or** SOCRATES **be** CUNNING) is true if and only if either the first sub-proposition (SOCRATES **be** WISE) is true or the second sub-proposition (i.e., SOCRATES **be** CUNNING) is true, but not both (this is the "exclusive sense" of "**or**"; there is also another sense of "**or**"--the "inclusive sense"--in which the whole big proposition is true if and only either one or both of the sub-propositions is true). The logical word "**be**" is a predicative connector that connects attributes to individuals (e.g., WISE to SOCRATES) and essentially means that the individual (in this case, SOCRATES) is a member of the set of individuals who have that attribute (in this case, WISE).

After formulating the propositions that will express their meanings in this mental logical language, speakers translate (in their heads) these propositions into English. Then they utter the English sentences corresponding to the propositions. The hearer hears and processes the English sentences, translating them back into the mental logical language of general concepts and propositions. Since the mental logical language of propositions is much like a human language, though a universal one translatable into any specific human language, this model is entirely *verbal*. People (are held to) think and communicate in

terms of verbal information, either expressed in a mental logical language or in terms of a human language like English which, at a "deep" level, has a grammar not unlike the grammar of the mental logical language.

In this model, the meaning of a word, say a word like "bachelor" or "light", is some general concept or idea stored in the head, something like a "definition" or set of features that pick out things that are bachelors or illumination (Smith & Medin 1981). The definition or features are represented in the mental language, not in terms of English words. For example, "bachelor" might be represented in the mental language as something like "NOT MARRIED **and** MALE", where "NOT", "MARRIED", and "MALE" are basic, universally available concepts that different languages represent in words in different ways (and "**and**" is a logical word in the mental logical language).

However, today there are accounts of language and thinking that are quite different than this traditional view. Consider, for instance, these two quotes from some recent work in cognitive psychology:

> … 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)

These two quotes are from work that is part of a "family" of related viewpoints. For want of a better name, we might call the family "situated cognition studies" (e.g., Barsalou 1999; Brown, Collins, & Dugid 1989; Clark 1997; Glenberg 1997; Hutchins, 1995; Latour 1999; Lave 1996; Lave & Wenger 1991) While there are differences among the different members of the family (alternative theories about situated cognition), they share the viewpoint that meaning in language is not some abstract propositional representation that resembles a verbal language. Rather, meaning in language is tied to *people's experiences of situated action in the material and social world.* Furthermore, these experiences (perceptions, feelings, actions, and interactions) are stored in the mind/brain not in terms of propositions or language, but in something like dynamic images tied to perception both of the world and of our own bodies, internal states, and feelings:

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

It is almost as if we "videotape" our experiences as we are having them, create a library of such videotapes, edit them to make some "prototypical tapes" or a set of typical instances, but stand ever ready to add new tapes to our library, reedit the tapes based on new experiences, or draw out of the library less typical tapes when the need arises. As we face new situations or new texts we run our tapes, perhaps a prototypical one, or a set

of typical ones, or a set of contrasting ones, or a less typical one, whatever the case may be, in order to apply our old experiences to our new experience and to aid us in making, editing, and storing the videotape that will capture this new experience, integrate it into our library, and allow us to make sense of it (both while we are having it and afterwards).

These videotapes are what we think with and through. They are what we use to give meaning to our experiences in the world. They are what we use to give meaning to words and sentences. But they are not language or "in language" (not even in propositions). Furthermore, since they are representations of experience (including feelings, attitudes, embodied positions, and various sorts of foregroundings and backgroundings of attention), they are not just "information" or "facts". Rather, they are value-laden, perspective-taking "movies in the mind". Of course, talking about videotapes in the mind is a metaphor that, like all metaphors, is incorrect if pushed too far (see Barsalou 1999b for how the metaphor can be cashed out and corrected by a consideration of a more neurally realistic framework for "perception in the mind").

On this account, the meanings of words, phrases, and sentences are always "situated", that is "customized" to the actual contexts we are in (Gee 1999). Here "context" means not just the words, deeds, and things that surround our words or deeds, but also our purposes, values, and intended courses of action and interaction. We bring out of our store of videotapes those that are most relevant to understanding our current context or those that allow us to create and construe that context in a certain way. We can see this in even so trivial example as this: if you hear "The coffee spilled, go get the mop" you run a quite different set of images (that is, assemble a quite different situated meaning) than when you hear "The coffee spilled, go get a broom".

On this account, too, the meaning of word (the way in which we give it meaning in a particular context) is not different than the meaning of an experience, object, or tool in the world (i.e., in terms of the way in which we give the experience, object, or tool meaning):

> The meaning of the glass to you, at that particular moment, is in terms of the actions available. The meaning of the glass changes when different constraints on action are combined. For example, in a noisy room, the glass may become a mechanism for capturing attention (by tapping it with a spoon), rather than a mechanism for quenching thirst (Glenberg 1997, p. 41).

While Glenberg here is talking about the meaning of the glass as an object in one's specific experience of the world at a given time and place, he could just as well be talking about the meaning of the word "glass" in one's specific experience of a piece of talk or written text at a given time and place. The meaning of the word "glass" in a given piece of talk or text would be given by running a simulation (a videotape) of how the glass fits into courses of action being built up in the "theater" of our minds. These courses of action are based on how we are understanding all the other words and other goings on in the world that surrounds the word "glass" as we read it:

> … the embodied models constructed to understand language are the same as those that underlie comprehension of the natural environment (Glenberg 1997, p. 17).

Reading the word and reading the world (Freire 1995) are both embodied processes of situating ourselves, in reality or in simulation, into possible courses of action in the material and social world. And we carry out this work of situating through thinking through and with our concrete experiences in the world, not primarily in terms of words and "facts" in verbal form.

This discussion of situated and embodied meanings leads to yet another principle relevant to opportunity to learn, a principle based on the situated and embodied nature of meaning:

Fourth Principle

> People have not had the same opportunity to learn unless they have had equivalent experiences not just with texts, but with embodied experiences in a given semiotic domain that allow them to situate meanings for words and phrases in that domain.

"Embodied experiences" in the above principle does not just mean actions in the domain. It can mean this, of course, but it also means, as well, experience with talk and

dialogue in the domain (see further below). It can mean, also, simulations one has run in one's mind based on reading and experiences with various visual media. The more the better. If one student has had experiences situating meaning in a domain based on embodied experiences in that domain and another has primarily experienced words from the domain in a purely verbal and rather general way, these students have not had equivalent opportunities to learn.

6. Learning, Language and Literacy as Perspective Taking

Children have obviously not had the same opportunity to learn to read texts in a given social language unless they have equivalent opportunities to learn that social language in the first place. Furthermore, most social languages (like the academic-sort of language about hornworms in sentence 2 above) can be both spoken or written, though there may be somewhat different forms used in speech as opposed to writing. This raises the question as to what learning a social language involves. Let's first consider what learning language in the first place means for young children. Consider, in this regard, the following quote from Michael Tomasello's recent book The Cultural Origins of Human Cognition (1999):

> …the perspectival nature of linguistic symbols, and the use of linguistic symbols in discourse interaction in which different perspectives are explicitly contrasted and shared, provide the raw material out of which the children of all cultures construct the flexible and multi-perspectival--perhaps even dialogical--cognitive

> representations that give human cognition much of its awesome and unique power (p. 163).

Let's briefly unpack what this means. From the point of view of the model Tomasello is developing, the words and grammar of a human language exist to allow people to take and communicate alternative perspectives on experience (see also Hanks 1996). That is, words and grammar exist to give people alternative ways to view one and the same state of affairs. Language is not about conveying neutral or "objective" information; rather, it is about communicating perspectives on experience and action in the world, often in contrast to alternative and competing perspectives: "We may then say that linguistic symbols are social conventions for inducing others to construe, or take a perspective on, some experiential situation" (Tomasello 1999, p. 118).

Let me give some examples of what it means to say that words and grammar are not primarily about giving and getting information, but, rather, about giving and getting different perspectives on experience. I open Microsoft's web site: Is it "selling" its products, "marketing" them, or "under pricing" them against the competition? Are products I can download from the site without paying a price for them "free", or are they being "exchanged" for having bought other Microsoft products (e.g., Windows), or are there "strings attached"--and note how metaphors (like "strings attached") add greatly to, and are a central part of, the perspective taking we can do. If I use the grammatical construction "Microsoft's new operating system is loaded with bugs" I take a perspective

in which Microsoft is less agentive and responsible than if I use the grammatical construction "Microsoft has loaded its new operating system with bugs".

Another example: Do I say that a child who is using multiple cues to give meaning to a written text (i.e., using some decoding along with picture and context cues) is "reading" or (as some of the pro-phonics people do) do I say that she is "not really reading, but engaged in emergent literacy" (for these latter people, the child is only "really reading" when she is decoding all the words in the text and not using non-decoding cues for word recognition). In this case, contending camps actually fight over what perspective on experience the term "reading" or "really reading" ought to name. In the end, the point is that no wording is ever neutral or just "the facts". All wordings--given the very nature of language--are perspectives on experience that comport with competing perspectives in the grammar of the language and in actual social interactions.

How do children learn how words and grammar line up to express particular perspectives on experience? Here, interactive, intersubjective dialogue with more advanced peers and adults appears to be crucial. In such dialogue, children come to see, from time to time, that others have taken a different perspective on what is being talked about than they themselves have. At a certain developmental level, children have the capacity to distance themselves from their own perspectives and (internally) simulate the perspectives the other person is taking, thereby coming to see how words and grammar come to express those perspectives (in contrast to the way in which different words and grammatical constructions express competing perspectives).

Later, in other interactions, or in thinking to oneself, the child can re-run such simulations and imitate the perspective-taking the more advanced peer or adult has done

by using certain sorts of words and grammar. Through such simulations and imitative learning, children learn to use the symbolic means that other persons have used to share attention with them:

> In imitatively learning a linguistic symbol from other persons in this way, I internalize not only their communicative intention (their intention to get me to share their attention) but also the specific perspective they have taken (Tomasello 1999: p. 128).

Tomasello also points out (1999: pp. 129-130) that children come to use objects in the world as symbols at the same time (or with just a bit of a time lag) as they come to use linguistic symbols as perspective taking devices on the world. Furthermore, they learn to use objects as symbols (to assign them different meanings encoding specific perspectives in different contexts) in the same way they learn to use linguistic symbols. In both cases, the child simulates in her head and later imitates in her words and deeds the perspectives her interlocutor must be taking on a given situation by using certain words and certain forms of grammar or by treating certain objects in certain ways. Thus, meaning for words, grammar, and objects comes out of intersubjective dialogue and interaction: "… human symbols [are] inherently social, intersubjective, and perspectival" (Tomasello 1999: p. 131).

This perspective on language acquisition as the learner's simulation of other people's perspectives, garnered from interaction and often compared and contrasted with the alternative perspectives the child initially took in the interaction, applies not only to people's acquisition of their native vernacular early in life, but to the acquisition of all later social languages (which, of course, build on that vernacular). This perspective sees language and interaction as socioculturally, dialogically-situated perspective taking.

Again, our discussion suggests another principle relevant to opportunity to learn:

Fifth Principle

People have not had the same opportunity to learn a given social language unless they have had equivalent experiences dialogically with people who know that language and who have used it in rich enough contexts to allow the learners to "guess" what perspectives the word and forms being used mean.

If one student has interacted with people who know the language of controlled experimentation used in some sciences and who have used in an acquisition-friendly way (that is, in contexts rich enough to allow the learner to match form and function) and another has not, these students have not had equivalent opportunities to learn. We need to worry, as well, how much such experience they have had—that is, how far along they are in their course of social language acquisition.

7. Printed Texts

With all my talk of situated and embodied meanings, social languages and semiotic domains, and dialogue and perspective-taking, some will ask what has happened to good old fashioned printed texts. So, let me exemplify the points I have already made by using a printed text as an example. I will use as my example a small booklet that comes with the computer game *Deus Ex* (Gee, to appear), but I will point out below my discussion is fully relevant to academic texts and school (though it may not seem so at first).

The book contains twenty small-sized pages, printed in double columns on each page. In these twenty pages, 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**, **Nanokey ring**, **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. 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 screen? 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 semiotic domain from which it comes, just as meaningless, however much one could garner literal meanings from it with which to verbally repeat things or pass tests.

Of course, 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.

There is much discussion these days about how many children fail in school—especially children from poor homes—because they have not been taught phonics well or correctly in their early years. But the truth of the matter is that a great many more children fail in school because, while the can decode print, they cannot handle the progressively more complex demands school language makes on them as they move up in the grades and on to high school.

School requires, both in respect to oral and written language, forms or styles of language that are different from, and, in some respects, more complex than, everyday oral language used in informal face-to-face conversations, as we have already discussed above. These forms of language, the sorts of language used in texts and discussions in

science, math, social studies classes, and other content areas, go by the general name of "academic language", though there are different varieties of academic social languages associated with different content areas in school.

Academic language, like the language in the *Deus Ex* booklet, is not really lucid or meaningful if one has no embodied experiences within which to situate its meanings in specific ways. For example, consider the piece of academic language below from a high school science textbook (cited in Martin 1990):

> The destruction of a land surface by the combined effects of abrasion and removal of weathered material by transporting agents is called erosion. ... The production of rock waste by mechanical processes and chemical changes is called weathering.

Again, one can certainly understand this at some literal word by word, sentence by sentence way. However, this is not "everyday" language. No one usually speaks this way at home around the table or at a bar having drinks with friends. But this language is filled with all the same problems the language of the *Deus Ex* booklet was for me when I had not lived through any experiences in terms of which I could situate its meanings. Without embodied experiences with which to cash out its meanings, all the above academic text will do—like the *Deus Ex* booklet did to me initially—is fill one with questions, confusion, and, perhaps, anger.

For example: I have no idea what the difference is between "abrasion" and "removal of weathered material by transporting agents", which I would have thought was one form of abrasion. What's a "transporting agent"? What's a "mechanical process"? I am not really clear on the difference between "mechanical processes", especially in regard to weather, and "chemical changes". And, what chemicals are we talking about here—stuff in rain?

Since the first sentence is about "erosion" and the second about "weathering", I suppose these two things are connected in some important way—but how? They must (?) be two forms of "destruction of a land surface", given that this is the subject of the first sentence. But, then, I would have thought that producing "rock waste" was a way of building, not just destroying, land, since rock waste eventually turns into dirt (doesn't it?) and, thus, I would have supposed, eventually into potentially fertile land. But, then, this is a geology text and they don't care about fertile land (or, do they?). The word "land" here has a different range of possible situated meanings here than I am familiar with.

Of course, I can turn the pages of the book back and forth clarifying all these points. After all, these two sentences are meant to be definitions, though not of the words "erosion" and "weathering" in everyday terms, but in specialist terms in a particular semiotic domain). And, of course, I do need to know that they *are* definitions and I may not even know that if I have had little experience of specialists trying to define terms in explicit and operational ways so as to lessen the sort of ambiguity and vagueness that is more typical of everyday talk. Since they are definitions, they are linked and cross-linked to a myriad of other terms, descriptions, and explanations throughout the book and I can

follow this tangled trail across the pages, back and forth, losing bits of the connections just as I need them and page turning yet again.

However, once I have experienced the sorts of embodied images, actions, and tasks that engage geologists—including their ways of talking and debating, their reasons for doing so, their interests, norms, and values—then the text is lucid and useful. Confusion, frustration, and anger disappear. However, given such understanding, everybody would pass the test and we couldn't fail half the class and reward a small set of "winners", i.e., people who can repeat back verbal details they remember well when they don't fully understand them in any practical way.

This brings us to our last principle in regard to opportunity to learn, a principle which really just sums up all the others:

Sixth Principle

People have not had the same opportunity to learn unless they have equivalent opportunities to "play the game" connected to the texts they are reading. Here "game" applies equally to video games and to different semiotic domains relevant to school.

8. Conclusion

I have focused my discussion here on reading. However, the principles I have developed apply to assessment of all content areas. To learn any area I must learn its "representational resources", that is, the ways in which it uses words and other sorts of

signs to make meaning. In that sense, all learning is learning to "read", read words and other signs within specific semiotic domains. All assessments of such learning are reading assessments in this general sense.

In the end I claim this: an evaluative assessment is invalid and unjust if the people being assessed have not had, in terms of the sorts of principles I have developed here, equivalent opportunities to learn. In our societies divided by race, class, and gender, divisions that apportion embodied experiences of talk, texts, and action in semiotic domains in quite different ways, this is rarely or never the case. The solution is not more tests or "accountability". The solution cannot be accomplished only at and by schools. The solution lies where we always knew it did—social justice.

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