Chapter Eight

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Learning in Semiotic Domains: A Social and Situated Account

I want to talk about one particularly important type of learning: learning to be fluent in what I will call a "semiotic domain". A semiotic domain recruits 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 messages. By the word "fluent" I mean that the learner achieves some degree of mastery, not just rote knowledge. Here are some examples of semiotic domains: cellular biology, postmodern literary criticism, first-person-shooter video games, advertisements, Roman Catholic theology, modernist painting, midwifery, and so on and so forth through a nearly endless and motley list.

It is too bad we don't have a better term than the one I am making up here— "semiotic domains""—but the essential insight I am trying to capture is that domains like Yu-Gu-Oh (a card and video game) for a young fan, Japanese anima manga (comic books) for an otaku (expert), and cellular biology for a cellular biologist are each domains of specialized representations, modalities, knowledge, and practices. In their own ways, each is quite complicated and each is grounded in a group of people who have cognitive and social interests and help uphold a set of standards and norms. Each domain allows people to communicate distinctive sorts of messages (information, values, ideas) to each other.

Any semiotic domain has what I will call a "design grammar" (New London Group, 1996; Gee 2003). By this I mean a set of principles or patterns in terms of which materials in the domain are combined to communicate complex meanings. For example, consider all the elements that must pattern together in a certain way to constitute the meaning "carefully controlled experiment" in some of the sciences. Or all the elements that must pattern together in a certain way in a first-person shooter video game to constitute the meaning "better to sneak here than shoot". Or all the elements that must pattern together in a certain way in an advertisement to constitute the meaning "product will enhance your identity as a successful female in the new global economy".

A "design grammar" involves whatever people in a domain use to communicate appropriate domain-specific messages (information, values, ideas) to each

other. In Yu-Gi-Oh, for instance, this may involve, among many other things, laying down a certain set of cards in a certain order; though it may also mean, in another case, taking about the cards in a certain way. In theoretical linguistics it may mean, among other things, drawing words and symbols on a white board in a certain way. In a fundamentalist pray session it may mean, among other things, citing the Bible while orienting one's body and gaze to another in a certain way.

A person must know—consciously or unconsciously—the design grammar of a semiotic domain in order to understand or produce messages in the domain appropriately. Here the word "message" is meant to cover any act, utterance, element, or combination of elements from the domain that is meaningful. The word "appropriately" means being able to understand or produce messages in the domain in ways that are understandable and acceptable to people who have mastered the domain and are accepted as "insiders" by others who have mastered the domain. Of course, a person can simply learn to repeat details, facts, or messages from a domain without really being able to understand or produce meanings in the domain in a creative way (this often happens in school). But I am concerned here with creative understanding, a form of understanding which is achieved by knowing how meanings in the domain are constructed by the design grammar of the domain.

Semiotic domains are, of course, human creations. As such, each and every one of them is associated with a group of people who have differentially mastered the domain, but who share norms, values, and knowledge about what constitutes degrees of mastery in the domain and what sorts of people are, more or less, "insiders" or "outsiders". Such a group of people share a set of practices, a set of common goals or endeavors, and a set of values and norms, however much each of the individuals in the group may also have their own individual styles and goals, as well as other affiliations. I will call any such group of people associated with a give semiotic domain, an "affinity group", that is, these people have an affinity for the content of the domain and share endeavors in regard to that content (Gee 2004, 2007). Mastering a semiotic domain means joining an affinity group, even if only as a beginner or "apprentice".

Of course, it is not always readily apparent just what semiotic domain someone is attempting to master. For example, in school science, learners are often not mastering any semiotic domain at all. They are just learning details, facts, or messages from a scientific semiotic domain without any real knowledge of this domain's design grammar and, thus, no real capacity to join any real affinity group associated with any such domain. On the other hand, sometimes in

school science learners are, indeed, mastering a semiotic domain that is best called something like "school science" because its design grammar is unlike any design grammar associated with any science outside of school.

Think in this regard of "Freshman Composition" in many colleges and universities, in particular those with an allegiance to "personal voice" and "process writing". There certainly is a design grammar to this sort of writing (acting, speaking) and students often master it, but it exists nowhere else in or out of the university. Students in Freshman Composition of this sort often become members of an affinity group that holds such views as "writing exists to empower my personal voice", a value that is not, in fact, held by most of the other affinity groups that use writing in the university.

Thus, we have three core notions: a semiotic domain, a design grammar associated with the domain, and an affinity group that produces and reproduces the domain and its design grammar. I will define "authentic learning" in a domain as learning that leads to growing mastery of the semiotic domain's design grammar and growing membership in its associated affinity group. Such learning is a trajectory (perhaps, halted short at some point) towards full mastery and insider status in the semiotic domain.

Within a domain, words, symbols, images, and/or artifacts have meanings and combine together (thanks to the design grammar of the domain) to take on complex meanings. But these meanings are situated meanings, not general meanings that can be defined once and for all (Barsalou, 199a, b; Gee, 1996, 1999, 2004; Glenberg, 1997; Glenberg & Robertson, 1999). In order to understand any word, symbol, image, or artifact (or combination thereof) in a domain, a person must be able to situate the meaning of the word, symbol, image, or artifact (or combination thereof) within (actual or mentally simulated) embodied experiences of action, interaction, or dialogue in or about the domain.

Consider, for example, the following sentence from a high school student's paper on "Albinism": "Then to let people know there are different types of Albinism, I will tell and explain all this". This is, of course, "wrong", and we know it, though it is not at all easy to say in words exactly what is wrong. The student appears to be situating a meaning for "tell" within a domain that has to do with telling a story. He appears to be situating a meaning for "explain" that has to do with an account that is meant to clarify a confusing situation. "People" is "wrong", as well. The words in the student's sentence, and the sentence as a whole, have general meanings in English, but not specific and

situated meanings in the domain his teacher intended him to be writing within and about. The domain the student is meant to be in is a type of classificatory science. In this domain, a word like "list" is better than "tell", a word like "describe" is better than "explain", and the audience ("educated readers") does not need to be named, because it is assumed as part and parcel of the practice.

So something like "There are different types of Albinism. Below I list several of these and describe them" would have been better. Of course, this student could not write this if he did not really know what domain he was supposed to be communicating within and about or he had had no meaningful amount of embodied experience of action, interaction, and/or dialogue within this domain. Without such experience (and, thus, too, the ability to simulate in his imagination such experiences as he writes), the student cannot situate the proper meanings for words, phrases, and sentences within the domain's historically specific space of meanings and ways of thinking and doing.

Of course, there is nothing inherently wrong with the words "tell" and "explain" here, only with how they are situated. They could have been used differently and, thus, been better situated within the appropriate classificatory domain, e.g., "In this paper, I will tell the story of how different types of Albinism were discovered and explain how these discoveries changed our understanding of this condition". This is fine, though it represents a different style (more "popular") than the other sentence I suggested ("There are different types of Albinism. Below I list several of these and describe them").

Again, the point is, words mean only as they are situated within a domain and mean differently as they are situated differently within that domain or another domain. Situating meanings requires experience of a domain and the ability to situate meanings in terms of that experience. One of the key types of embodied experience one needs in a domain and needs to be able to simulate—thanks to the fact that domains are owned and operated by affinity groups—is dialogic talk with others within and about the domain (Tomasello, 1999).

Let me turn now to the issue of language (and not images, symbols, and artifacts, all of which also have situated meanings within domains) within semiotic domains. Each different domain—thanks to the workings of situated meaning and the interests and discoveries of different affinity groups through history—recruits a different style of English or whatever other natural language may be at work in the domain. I have elsewhere called such different styles, different "social languages" (Gee, 1990/1996, 1999/2005). They are often called, by others, different "registers". In this sense, learning a new domain is almost always also an instance of acquiring a new language (a new social

language or register). Each social language has its own distinctive vocabulary and its own distinctive syntactic, pragmatic, and discourse resources for situating complex meanings in the domain.

Of course, in learning to situate meanings (simple and complex) in a semiotic domain, one learns the domain's social language, and vice versa, in learning a domain's social language one learns to situate meanings in the domain. But the question arises: How does one learn to situate meanings in a domain, and thereby come to acquire the domain's social language, when initially one does not yet know this social language (and so has not yet got any resources with which to situate meanings)? This is, of course, the traditional "bootstrapping" problem in language acquisition (Gee, 1994), though here phrased in terms of acquiring specific social languages and not "English" (say) in general.
In fact, the question here is more general. Since most semiotic domains are multimodal, we can ask, as well: How does one learn to situate the meanings of symbols, images, and artifacts (and combinations thereof) in multimodal domains when initially one does not yet know how to situate meanings in this domain at all?

The answer to both the language question and the more general question is, I believe, this: We bootstrap into a new domain by simulating the perspective of other more advanced people in the domain as we see them publicly situate meanings within and about the domain in action, interaction, and dialogue (Tomasello, 1999). A newcomer sees a more advanced person use a particular combination of words, symbols, images, and/or artifacts in a particular setting. The newcomer imagines or simulates (at the time or later) the viewpoint or perspective of the more advanced person and concludes that from that perspective that person must (might) mean to situate such and such a meaning. The newcomer eventually tries it out in a similar situation and sees if it works.

Let's meditate a moment on what such perspective taking requires. Of course, first and foremost, it requires the ability and willingness to take another person's perspective. Though this ability appears to be built into all humans (save those with disabilities like autism), the willingness needs to be socially or culturally motivated. Such perspective taking also requires that the learner see more advanced people at practice in settings rich enough to make good guesses as to what they might mean. But, then, this raises an additional problem: settings in practice, especially rich settings, are full of features, only some of which are here and now relevant to the situated meanings being constructed. So, the learner may well need some overt help about what features in the setting to foreground or pay most attention to. This is a type of efficacious overt instruction.

The learner may also need more advanced people to serve as teachers in the sense that, beyond directing the learner's attention, they also model prototypical cases of words, symbols, images, artifacts and combinations thereof being given situated meanings in the domain. Prototypical cases are ones that need to be learned early if more complex cases are to be dealt with fruitfully later on. They can also be simplified cases that do not go beyond the learner's current hypothesizing resources. These, too, are efficacious types of instruction.

Finally, learners need the opportunity to produce combinations of words, symbols, images, and/or artifacts with the hypothesized situated meanings in order to test whether their hypotheses work. Here they need feedback when they are right and protection from punishment when they are wrong. This, too, is a part of efficacious instruction.

Situations in any domain are almost always novel to some (however limited) extent, so no two events can ever be exactly alike. Thus, situating meaning is always a productive (generative) and creative act, matching nuances of meaning to nuances of situations. One is always, in a domain, taking features of possible meanings (a resource from the history of practice in the domain) and combining them in ways that work here and now for this situation (that is what it means to situate meaning). In quite novel situations, situated meanings new to the domain may be created (and, thus, too new words, images, symbols, artifacts, or combinations thereof to carry those meanings).

So far, then, learning in and for a semiotic domain appears a quite productive and creative matter—and it is. As Gunther Kress (1997, 2000a, b) has stressed, learners make up semiotic resources that are apt for their purposes in a domain. Of course, we must admit that these purposes are often not just individual, but socially motivated by growing membership in an affinity group associated with a domain. However, no one can be wildly productive and creative all the time and still go on rapidly and effectively about the business of acting and interacting in a domain. No one can recreate all the semiotic resources that have developed in a domain over a long period of time. Thus, all newcomers need to build up some stored "lore" about practice in a domain—that is, some relatively (not completely) ritualized ways of thinking and acting that help one act and interact rapidly and effectively.

Such stored lore I have elsewhere called "cultural models" (Gee, 1990/1996) and later (not much liking the term "culture") "Discourse models" (Gee, 1999/2005, 2004). I will here just use the term "models" (see also Holland,

Lachicotte, Skinner, & Cain, 1998; Strauss & Quinn, 1997). Models are partial storylines, metaphors, routines, scripts, principles, rules of thumb, or images that help one act and interact in relatively typical situations in a domain (they are much less suited to less typical situations, situations where they may "misfire"). Models are partially stored in people's heads (with different pieces often distributed across different people in an affinity group who can, of course, "share notes" if they need to) and partially stored in the books, materials, images, and artifacts available to members of an affinity group associated with a semiotic domain.

Newcomers sometimes pick up models overtly by being told or having read them. More often they pick them up as "found" items in the midst of practice as they pay attention to (or are directed to pay attention to) prototypical cases which best reflect the models a domain draws on. The models get reinforced and relatively ritualized as they are used in repeated practice. The models and allegiance to the models also become an important bonding cement within the affinity group associated with the domain.

Here is an example of a model and how it might be used in practice. Romance is a semiotic domain (of course, one that differs across cultural, generational, and social groups). So, say a young man wants to "proposition" a young woman. The young man has seen lots of movies and read lots of books with culturally specific stories and images about propositioning women. These stories and images are relatively similar thanks to the fact that they reflect one or a narrow range of cultures' ways of doing such things (there were, for example, no scenes with woman in veils being propositioned in any movie our young man has seen). He applies these to the situation, either picking one wholly or, more likely, combining elements from several. Note, however, he is combining elements from a culturally constrained set of resources.

Such a move is a way for a newcomer to get on in a domain in which he has, so far, had little practice. Thus, cultural models are also part of the bootstrapping story. They are also a way for more advanced people in the domain to operate on "automatic pilot"—a necessity at many times when attention needs to be paid to more novel and important elements in the situation.

This example also shows some of the perils in models. The young woman may share the young man's models, but she may have another set, as well, perhaps a set of storylines wherein the woman mutually performs the proposition or otherwise views it as harassment. Thus, the young man may get a very bad result and both parties may have very different views about what went on. Or, perhaps, the situation is different: our young man has just discovered he is gay

and is trying to proposition a male and he has, as of yet, just no good available models for the job. Perhaps his old heterosexual models work here, too (good luck that), perhaps they don't (in which case, one has to improvise for the while).

Models are the way in which history, institutions, and affinity groups think and act in and through us. We pick them up—often unconsciously—and operate in their terms, thereby reproducing traditional action, interaction, and thinking in the domain (and, of course, the models themselves). Of course, Kress's story wherein actors creatively combine semiotic resources in a way that is apt for their (albeit, usually socialized) purposes is always true, too. There is always agency and creativity of some sort: even prototypical situations in a domain have new elements; even in prototypical situations learners must often combine, on the spot, pieces of different models; less prototypical situations involve even more creative effort (and sometimes lead eventually to transforming old models and the creation of new ones); and, of course, what is prototypical and what isn't changes over time in a domain.

Semiotic domains (and their associated cultural models, social languages, characteristics sorts of situating meanings, and affinity groups) have a very important property that is little commented upon: they are networked. Any semiotic domain is connected to others in a myriad of complex ways. One of these, one that I want to concentrate on here, is this: some domain (or domains) can be a precursor for another domain. This is so because one or more of the elements associated with the precursor domain (ways of situating meaning, pieces of a social language, cultural models) facilitates learning in the other domain. It can also happen because being (or having been) a member of the affinity group associated with the precursor domain facilitates becoming a member of the affinity group associated with the other domain because the values, norms, goals, or practices of the precursor group resemble in some ways the other group's values, norms, goals, and/or practices.

Let me give a concrete example of networks among semiotic domains that affect how mastery of such domains is acquired. In the larger semiotic domain of video games, first and third-person shooter games are a well-defined sub-domain. However, such games often have elements that are similar to features found in arcade games. Thus, someone who has mastered the domain of arcade games has mastered a precursor domain for shooter games (though such games have many other elements as well). On the other hand, fantasy role-playing games are another well-defined semiotic (sub-)domain of the video game domain. In this case, people who have earlier played and mastered the Dungeons and Dragons semiotic domain are advantaged in their acquisition of

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fantasy role-playing games, since such games originated historically, in part, out of Dungeons and Dragons, though they now contain a good many additional elements.

Both the shooter domain and the fantasy role-playing domain have other precursor domains as well, and there are some precursor domains they share (for example, make-believe play wherein one is willing to take on different identities—a domain that some cultures and social groups do not encourage in children or adults). On the other hand, some of these video-game (sub-)domains may well serve as precursor domains for other semiotic domains. For example, it may well be that the popular (sub-)domain of simulation games (so-called "God games" like *Civilization*) could be, for some children, a precursor domain for those sciences that heavily trade in simulations as a method of inquiry (e.g., some types of biology and cognitive science). While I have used video games as my example here, Andy diSessa's (2000) book *Changing Minds* contains an excellent example of the sorts of precursor domains which some young people have experienced at home that facilitate learning school-based physics.

This issue of networking is deeply consequential for schooling. We have tended to ask very general questions about why some groups of people (e.g., certain minorities and lower socioeconomic groups) tend to do less well in school and to seek very general comparisons and contrasts between "home culture" and "school culture". The framework I am developing here would suggest that we need also to ask how specific semiotic domains mastered (or not) locally in homes and communities, as well as in peer groups, relate to (or don't relate to) specific semiotic domains encountered in school (e.g., types of science, art, music, math, etc.) and in society.

I suspect that for children who come to school looking "gifted" at schooling, they have been (and are) immersed in a wide variety of precursor domains, and that they continue to be immersed in ever newer precursor domains, in and out of school, for domains they face later in school and life. I also suspect that for children who come to school looking "behind", they have often been (and are) immersed in semiotic domains that are not fruitfully networked (by teachers) to school-based semiotic domains. Furthermore, they are not introduced in an ongoing fashion to other precursor domains, in and out of school, which will facilitate success in the later or discipline-specific areas of schooling.

At the same time, I suspect these matters are changing and in a variety of ways. Children in some homes are mastering precursor domains that suit them for later semiotic domains the importance of which the school itself is only

beginning to acknowledge. And, too, there are, perhaps, today more and more domains outside of school that are important precursors for the mastery of important semiotic domains later in life, a process that short-circuits the importance of schools, especially public schools and schools that restrict their curriculum to the basics and traditional subjects traditionally taught.

Let me then distinguish between two types of learners coming to any semiotic domain. Some learners are what I will call "well-precursed" and others are "poorly precursed". Of course, this is really a matter of a continuum, with a good many degrees of "medium-precursed" people in between the two poles. For complicated domains, there is a complex network of other linked domains that make up the precursor history of the complicated domain, stretching far back into the life of individuals and the history of societies. Failing to have lived a large part of this historical trajectory, individuals and societies have trouble acquiring the complicated domain, especially when and because other more advantaged individuals and societies often help them—in a myriad of ways—to fail, not least by telling them they are "slow" or "backward".

For almost any domain, then, we can trace out what I will call "a resource precursor trajectory" ("RPT" for short). An RPT for a given semiotic domain is the set of all semiotic domains that contain elements or are associated with affinity groups that facilitate mastering that given domain. We can define "advantaged" and "disadvantaged" learners in terms of this notion of RPT, though I will add something more to these definitions below. We can define an "advantaged learner" (the "well precursed" learner) for any given semiotic domain as a learner whose actual history has seriously and fruitfully engaged with a good deal of the RPT for that domain (of course, not necessarily perfectly). We can, on the other hand, define a "disadvantaged learner" (the "poorly precursed" learner) as one whose actual history has not seriously and fruitfully engaged with a good deal of the RPT for that domain. And, of course, here, too, we have a continuum, rather than a clear binary distinction. Thus, we can talk about degrees of advantage and disadvantage.

A person may very well be able to eventually master a semiotic domain (and join its affinity group) without having mastered any or most of its precursor domains, but acquisition is liable to be slower and more troubled in these cases (sometimes significantly so). In some domains—and within some institutions (e.g., schools)—a learner's being slower can lead to negative judgments about the learner's motivations, efforts, or capacitates, though these are usually underserved. They are simply a matter of the ways in which the learner's history does or does not reflect access to and engagement with the PRT of the new domain.

Just as we can talk about facilitation for the acquisition of certain semiotic domains, so too, we can talk about defacilitation. Let me put this matter in terms of the notion of an "entry price". There is an "entry price" for any new semiotic domain one wants to (attempt to) master. The price is higher for disadvantaged learners than it is for advantaged ones, though there is price for all newcomers. The price exists because mastery, even beginning mastery, of any semiotic domain requires a great deal of extended practice. This is so because, for humans, learning is, by and large, a practice effect. The price exists, as well, because mastery, even beginning mastery, of any domain requires not just practice, but embodied experience in which one commits one's body, mind, and sense of self to the domain. The price exists, as well, because each semiotic domain requires one to take on and grow into (at least partially) the sort of socially-situated identity tied to the affinity group associated with the domain.

The entry price for any domain is this: Learners must be willing and motivated to engage in extended practice in the domain in such a way that they take on and grow into a new socially-situated identity, an identity that they can see as a fruitful extension of their core sense of self.   By "core sense of self" I mean a person's (changing) sense of their own unique individual traits and history (including their unique history of engagement with various semiotic domains and their associated socially-situated identities) as they see these melded with (what they view as) their primary family and community affiliations. In terms of their core sense of self people do not feel to themselves as if they were "kinds of people". Rather they feel to themselves as if they are unique individuals, albeit with complex histories and sociocultural affiliations out of which this sense of uniqueness has been partially formed.

By "socially-situated identity" I mean a way of acting, interacting, believing, valuing, and using signs, symbols, objects, and technologies so as to enact a particular socially recognizable identity as a certain "type of person" doing a "certain type of thing" (e.g., a type of policeman, computer-game player, feminist, doctor, gang member, physicist, African-American, etc.). People have many socially-situated identities and they pick up (and sometimes lose) such identities throughout life. Of course, one's core sense of self and one's myriad socially-situated identities reciprocally influence each other.

By "fruitful" in the above definition I mean to cover anything that makes the learner see making a bridge between his or her core sense of self and the new socially-situated identity as worthwhile. That is, I mean to include anything that makes that person willing to put his or her own unique sense of self

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(socioculturally informed as it is) at the service of playing the "role" of a "certain kind of person". There are a large number of such reasons why someone would or would not be willing to do this. And, obviously, a person usually does not want to do it if they feel that inhabiting a particular kind violates in some serious way either their core sense of self or another of the socially-situated identities to which they are deeply committed. In this sense, we can talk about a learner's core sense of self or other socially-situated identities (mastered as part and parcel of acquiring earlier semiotic domains through an extended commitment of self) as either facilitating or defacilitating the learner's acquisition of a new semiotic domain.

For me, then, one of the key questions in education today, especially in regard to the failure of certain socioeconomic and sociocultural groups of children in school, ought to be this: What makes learners able and willing to pay the entry price for school-based semiotic domains (remembering that I have defined the entry price as: Learners must be willing and motivated to engage in extended practice in the domain in such a way that they take on and grow into a new socially-situated identity, a identity that they can see as a fruitful extension of their core sense of self)?

We can now revise a bit our definitions of "advantaged" and "disadvantaged" learners above: An "advantaged learner" (the "well precursed" learner) for any given semiotic domain is a learner whose actual history has seriously and fruitfully engaged with a good deal of the RPT for that domain (of course, not necessarily perfectly) and who is able and willing to pay the entry price into the domain. A "disadvantaged learner" (the "poorly precursed" learner) is a learner whose actual history has not seriously and fruitfully engaged with a good deal of the RPT for that domain and/or who is unable or unwilling to pay the entry price into the domain. Of course, we need to acknowledge that other people (such as teachers) and institutions can affect, in a myriad of different ways, how and whether a learner is able and willing to pay the entry price into a given semiotic domain.

What I am arguing, put simply, is that success or failure in a domain, and, thus, success or failure in any school domain—and school is made up of a good many different domains—is a matter of three things: (a) a person's historical or life path or trajectory through various related semiotic domains (this is something that can be compensated for, but there must be compensation); (b) whether or not a person can (is taught to) situate meanings in the domain, which is a matter of getting guided experiences in the domain, not just words without experiences and (c) the person is able and willing to pay the entry price.

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