

## What Is Disciplinary Literacy and Why Does it Matter?

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Lately, educators have been turning their attention to reading that is done in the content areas, such as mathematics, history, and science. The idea of focusing on reading within those subjects is not new, but it has gained new life as public attention has shifted from the problems of beginning reading to those of adolescence. Education for young children has long accepted explicit and separate reading instruction as a basic (along with writing and arithmetic). However, with older students, the educational circumstances are different; middle and high schools do not usually assign a reading class to all students (many do not even necessarily have remedial reading classes), and the idea of a core reading program or extensive professional development in literacy for teachers, both common practices in elementary education, are unusual in secondary education.

However, the idea of infusing literacy teaching into content subjects has complex roots, and as a result there is much confusion over what would constitute a sound content area reading or literacy curriculum. A fundamental premise of content area reading has been that, in secondary schools, reading should be “taught mainly in the subject fields with regular content materials and regular daily lessons” (Niles, 1965, p. 36). We have not yet reached this idyllic future, but content area literacy textbooks continue to promote the idea of content literacy as “the

ability to use reading and writing to learn subject matter in a given discipline” (Vacca & Vacca, 2002, p. 15). As such, content area reading tends to emphasize the teaching of a generalizable (across content areas) set of study skills for use in subject matter classes.

More recently, the notion of disciplinary literacy has emerged (Shanahan & Shanahan, 2008). Although, disciplinary literacy is a different construct from content area reading, with many distinguishing characteristics, its meaning has been confused to a great extent by those who erroneously use the terms interchangeably or who think that disciplinary literacy is just a new fad name for content area literacy. This is unfortunate because eliding these differences may lessen the likelihood that disciplinary literacy gains a foothold in secondary education (why bother if we are already teaching content area reading?) and when schools do try to emphasize it, teachers may struggle to support well an ill-understood concept.

Given such confusion, the purpose of this article is to provide a brief introduction to the concept of disciplinary literacy, explaining what it is, how it is different from traditional content area reading, where it comes from, and why it matters.

### **Distinguishing Disciplinary Literacy from Content Area Literacy**

If content area literacy focuses on study skills and learning from subject-matter-specific texts, then disciplinary literacy, by contrast, is an emphasis on the knowledge and abilities possessed by those who create, communicate, and use knowledge within the disciplines. The difference is that content literacy emphasizes techniques that a novice might use to make sense of a disciplinary text (like how to study a history book for an exam), while disciplinary literacy emphasizes the unique tools that the experts in a discipline use to participate in the work of that discipline.

But shouldn't these approaches overlap, at least with regard to what middle school and high school students need to learn? Won't the reading techniques of content area literacy dovetail

nicely with the kinds of resources that disciplinary experts rely upon? Surprising, perhaps, but the answers to these questions are no. Content area reading makes two major presumptions: first, it presumes that what it takes to read and learn any kind of text is pretty much the same no matter what the subject matter (that is, the cognitive requirements of learning and interpretation are the same no matter what the content), and, second, it presumes that the major difference between the subjects is the content itself (that is each discipline focuses on different information about the world). Thus, all that is necessary to solve the content area reading problem would be to figure out the content to be learned and then to make superficial adjustments to some collection of effective study skills to fit the varied materials.

A good example of this approach is that students are expected to learn vocabulary in all the different school subjects. It is easy enough to identify the different sets of words or terms that may be the focus within each content area. Math might focus on terms like *minuend*, *rational*, *quotient*, and *rhombus*; science on *acid*, *adaptation*, *buoyancy*, *nucleus*, and *fermentation*; social studies/history on *affirmative action*, *Middle Ages*, *melting pot*, *Jim Crow*, and *migration*; and literature on terms such as *frugal*, *prosaic*, *wary*, and *mundane*. According to most content area reading books, the study skills one would use to learn such terminology would be the same, no matter which set of words. Content reading books therefore recommend that students make connections among concepts, construct graphic organizers, brainstorm, semantic map, sort words, rate knowledge of words, analyze semantic features of words, categorize or map words, develop synonym webs, and so on and so forth for all subjects.

We will later discuss the idea of whether the cognitive activity needed to learn in one subject is identical (or highly similar) with that which would be beneficial in another subject, but for now the problem is with the second premise. For the past couple of decades, research has

been revealing that disciplines differ a great deal in their fundamental purposes, specialized genres and symbolic artifacts, traditions of communication, evaluation standards of quality and precision, and even in how they wield language (different purposes presuppose differences in how those in the disciplines organize or structure their discourses, as well as in the types of vocabulary that they invent and appropriate, and the grammatical choices that they make).

Now, go back and re-examine those disciplinary vocabulary terms. The science list is rife with words made up of Greek and Latin roots. This is not unique to science words, of course, since the majority of English words have such roots. However, science uses such words for a purpose, so analyzing the Greek and Latin derivatives can provide particularly effective support in understanding concepts within science contexts; the purpose of constructing words in this way is to offer a more complete and precise description of concepts than is likely with vernacular terms, and such words are thought to be more resistant to meaning changes and to the morphological and semantic shifts that occur across time and across languages (Nybakken, 1959). Activities that encourage students to organize words, to use mnemonics, and to rehearse or repeatedly match words with their meanings can be effective study aids with science words, but students may also benefit from knowing how and why scientific terminology is created, how to use tools such as Latin and Greek roots to unpack their often dense, but precise (and recoverable) meanings, and the relations among concepts that are often signaled by the vocabulary of classificatory sciences such as botany (e.g., *annual*, *biennial*, *perennial*). General study techniques (e.g., memorization, mnemonics) are the province of content area literacy, while the consideration of the nature of scientific vocabulary and the focus on specialized tools that are likely to be relatively more effective and efficient within the sciences than in the other subjects is the forte of disciplinary literacy. Both content area reading and disciplinary literacy

may be able to support learning, but they do so in very different ways, and it is essential to understand those differences.

History, in contrast to the sciences, does not focus so heavily on a Greek and Latin based nomenclature, at least not so that it would matter much. History, however, unlike science, is rife with openly metaphorical terms. Attempts at analysis of these words will not usually allow the reader to recover the meaning of the words; so a different approach would be more appropriate for studying history vocabulary. Technical terms in history are meant less to carry precise definitions as much as to unify extensive collections of weakly-interwoven groups and events (the *Gilded Age*) or to express a particular perspective on a particular event or action (*Dark Ages* vs. *Middle Ages*). Again, such insights do not arise within a content area reading approach, but they are essential to a disciplinary approach to a subject matter.

Similarly, functional linguistics has identified subtle, but profound differences, in the language that is used in the various disciplines (Fang & Schleppegrell, 2008; Halliday & Martin, 1993). “Secondary-level science, social studies, language arts, and mathematics use patterns of language that enable these disciplines to develop theories, engage in interpretation, and to create specialized texts” (Fang & Schleppegrell, 2008, p. 4). These patterns of language or grammars include differences in the nature of the technical vocabulary, points of view, attribution of causation and agency, passive and active voice, and other linguistic differences that undergird the nature and purpose of the disciplines.

For example, Fang and Schleppegrell (2008) trace, within science, the use of nominalization; that is the rendering of verbs and adjectives into nouns or things. Water may evaporate (verb), but scientists study and write about the process of evaporation (noun). Fang and Schleppegrell claim that by helping students to unpack this kind of noun, teachers can

provide them with a better understanding of science text, and that such effort makes the text less abstract while giving students valuable insights into the nature of science and scientific communication. One of the major benefits attributed to nominalization (and to certain uses of passive voice) is that it shifts the emphasis from social agents to natural agents in the consideration of causation which is a central premise in most scientific endeavors. In contrast, history texts and literary texts are more likely to use active voice and they are less likely to focus on nominalized subjects. They, too, are interested in the analysis of causation, but understanding human agency is more central to their purpose. Again, by having students examine these disciplinary choices or relatively specialized patterns of language use, they may be better equipped to deal with the learning demands of the particular disciplines. (There are, of course, variations within social and scientific studies: for example, in most sciences human agency is attenuated, while in ecology and environmental sciences human causation is more important.)

And these language differences are only a part of what distinguishes the disciplines. Another example of a disciplinary difference with profound implications for literacy has to do with the role of the author. Research has shown (Shanahan, 1992; Shanahan & Shanahan, under review) clear differences in whether or how those in the various disciplines think about author during reading. For example, it has been shown that in history reading, author is a central construct of interpretation (Wineburg, 1991, 1998). Historians are always asking themselves who this author is and what bias this author brings to the text (somewhat analogous to the lawyer's common probe, "What did he know and when did he know it?"). Consideration of author is deeply implicated in the process of reading history, and disciplinary literacy experts have hypothesized that "sourcing": (thinking about the implications of author during interpretation) is an essential history reading process (Wineburg, 1991, 1998) and studies show that it can, at least

under some circumstances, be taught to students in a way that improves their learning (Hynd-Shanahan, Holschuh, & Hubbard, 2004).

However, while historians (and history students) must consider a text's authorial source, research has revealed a very different pattern of reading for scientists (Shanahan & Shanahan, under review). Interviews with chemists have shown that they do rely on author, but more as a topical or quality screen while determining which texts to read. Chemists admit that they use author when they are deciding what to read; they consider the lab an author may be associated with to determine whether a text would be worth the time. But, once reading begins, unlike the historians, scientists try to focus their attention specifically on the text; considerations of author, according to these chemists, should play no part in interpretation of text meaning, something demonstrated in both their think-alouds during reading and in post-reading interviews. This pattern of intentionally ignoring the author was even more evident in the reading done by mathematicians, who explained, almost stridently, that thinking about author would only be a distraction and that it could help in no way within the process of making sense of the text.

And, to bring things full circle, whether the author should be considered interpretively has been a matter of great controversy within the field of literary criticism (English) for more than 50 years. Literary theorists have worked long and hard to kill off the author, or at least to elbow him/her aside during interpretation (Brooks & Warren, 1938; Fish, 1980; Foucault, 1979; Gadamer, 1975; Rosenblatt, 1978; Wimsatt & Beardsley, 1946). Thus, some literary critics argue for the close reading of "authorless" texts, much in the fashion of the scientific or mathematical readings described above, while other critics allow for some consideration of the author, at least for making sense of the author's ideological stance (à la the historical readings already described).

These differences suggest that students must always read history with an eye to the author, while never reading math in that way. Students should use author sparingly in science reading, though never to make sense of the text. When reading literature, they should sometimes interpret the author along with the text and other times, stay to the words of the literature with no consideration of the author at all.

The aim of disciplinary literacy is to identify all such reading- and writing-relevant distinctions among the disciplines, and to find ways of teaching students to negotiate successfully these literacy aspects of the disciplines. It is an effort, ultimately, to transform students into disciplinary insiders who are able to approach literacy tasks with some sense of agency and with a set of responses and moves that are appropriate to the specialized purposes, demands, and mores of the disciplines.

For our purposes here, however, the important distinctions are not the ones separating the disciplines, but those that distinguish content area reading from disciplinary literacy. We have described the idea of disciplinary literacy in some detail. Content area literacy, on the other hand, has been around longer, and is the focus of dozens of textbooks. We should be able to summarize their agenda more efficiently.

It is evident from examining several decades' worth of content area reading/literacy textbooks that the largely-agreed-upon purpose of this approach is to provide students with a collection of generic study skills that will, more or less, boost learning in all disciplines. These approaches help students to preview books (through examinations of tables of context and indices) and chapters (use of subheadings) and to use various print devices (e.g., italics, bolding, font and point variations) to make sense of text. They promote the use of purpose setting and predicting, along with a rich collection of reading processes or strategies (e.g., visualization,



summarization, clarification, questioning), and the use of particular study or teaching devices (e.g., Cornell note-taking, three-level guides, advance organizers).

The content area reading agenda aims not so much to help students to read history as an historian might, but simply to read history with some grasp of the information, using a set of learning or study tools that may be implemented in any subject. Its focus is less on providing students with an insider's perspective of a discipline (and with ways of coping with the unique properties of the disciplines), but rather emphasizes students as students or studiers and strives to provide them with the tools of the student.

### **The Sources of Disciplinary Literacy**

The roots of the disciplinary literacy concept are three-fold: they can be found in the historical development of content area reading, cognitive analyses of expert readers, and functional linguistics. The history of content area reading has been excellently described (Moore, Readence, & Rickelman, 1983) and we will rely heavily on that treatment. Moore and his colleagues trace its history to the 1920s with the recognition of the importance of reading in content subjects.

From the beginning, the emphasis of content area reading was on instructional applications of the relation of reading to content subjects. For instance, the National Committee on Reading explored this topic in the classic 24<sup>th</sup> Yearbook of the National Society for the Study of Education (Whipple, 1925) which provided guidelines and sample lessons emphasizing how to find answers to questions, follow directions, select major ideas, remember, identify key words, self-question, and make notes.

As a result of the recognition of the importance of reading in school subjects accorded by the National Committee of Reading, researchers began exploring the issue. According to Moore,

et al. (1983), the studies tended to focus on the identification of important vocabulary in the textbooks from the various subjects, studies of the availability and effectiveness of various instructional procedures, and correlations of comprehension measures based on general and subject specific texts. “Although these reports indicated various degrees of similarity between “general” and “specific” comprehension, all concluded that the subjects presented distinct reading demands” (Moore, Readence, & Rickelman, 1983, p. 429). Thus, despite the fact that their methods of research did not permit differences to be discerned, content area reading researchers typically promoted the notion that reading proficiency would be subject-distinct, and this idea of specialized reading has long been rhetorically honored in pedagogical treatments of content area reading, despite the fact that they have mainly endorsed general approaches to reading that were applicable across all subject matters.

Thus, the ironical role that content area reading has played in the development of disciplinary literacy has largely been aspirational. It has pointed towards a theoretical conception of literacy processes specialized to particular disciplines, while fostering a fundamentally different approach: one based upon highly generalizable learning strategies or processes that can be easily adapted and used across different school subjects.

A more substantive source for disciplinary literacy emerges from a series of expert reader studies that have been carried out during the past three decades in various disciplines (Shanahan & Shanahan, under review). Drawing on the expert-novice paradigm from the cognitive sciences, these studies have used observations and think-aloud protocols to identify performance differences. In this paradigm individuals are identified who are particularly proficient in some skill, in this case, in the literacy of a particular discipline. Then these experts are asked to perform their skill (e.g., reading a science text), while thinking aloud. Less skilled individuals,

perhaps students of the discipline, are observed in the same way and differences are noted. A permutation on that approach is to compare the relative performances of experts from different fields of study. Such studies have focused on the reading of science (Bazerman, 1985; Latour & Woolgar, 1979; Shanahan & Shanahan, under review), history (Rouet, et al., 1997; Wineburg, 1991; Shanahan & Shanahan, under review) and poetry (Peskin, 1998) and have gone a long way towards establishing the idea that disciplinary experts read differently than novices in their fields, and, differently than do experts in other fields.

For example, studies of the reading of physicists (Bazerman, 1985) revealed that they tended to pay particular attention to new information (information that they did not already know) and information that violated their expectations. They separated reading to learn from critical reading, reserving the latter for work that was directly applicable to their own work. Or, historians were found to engage in sourcing (paying attention to the author), contextualization (connecting texts to the circumstances of the time), and corroboration (making comparisons across texts); unlike the scientists, historians did not suspend their critical stance when they read information about which they knew little (Wineburg, 1991). As would be expected from studies using such an approach, this research identifies strategies, perspectives, choices, and tendencies that the experts can become aware of or can be observed doing.

Quite another approach, and the third source for disciplinary literacy, comes from functional linguistics (Halliday & Matthiessen, 2004). Functional linguistics is concerned with the choices a grammar makes available to language users. The choices relate speakers' and writers' intentions to the grammar, and, thus, their analyses can reveal important insights about the nature and conduct of the language users, in this case, of the language users of particular disciplines. Although functional linguistics focuses on grammar, it does so by considering

contextualized and practical uses of language, making it useful for considering differences across disciplines.

The tools of functional linguistics have been used to analyze the discourses of science and history (Martin, 1993; Schleppegrell, 1994; Veel, 1997; Wignell, 1994). Earlier, we described how and why science texts employ nominalization, and studies have also considered how such texts classify and describe phenomena (Halliday, 1994). History, by contrast, does not focus heavily on classification, but instead construes actions and events, verbal and mental processes, and descriptions and background information (Schleppegrell, 2004), which means that verbs carry much of the meaning in such texts. Science texts temporize more than history, because in science it is essential to be explicit about the degree or extent to which phenomena occur, and they are more likely to present a *mélange* of mathematical equations, graphics, and prose. Scientific claims are used to predict reactions under similar conditions in the future, and explicitness can even be a life or death matter. Because historians interpret events from documents collected after the fact (and therefore partial), the claims they make are not precise enough to determine the degree or extent to which they are accurate. Their goal is to make a claim that is plausible, given the evidence, and they are not under the same constraints as scientists.

Disciplinary literacy, thus, is drawn from the largely unrealized aspirations of content area reading, and, more substantively, from a growing body of cognitive and linguistic research that examines how disciplinary experts read and the nature of the language evident in disciplinary texts. As such, the empirical roots of disciplinary literacy are not focused specifically on teaching, though many insights drawn from these studies are proving to be useful to literacy and disciplinary teaching. For example, Fang and Schleppegrell (2008) have

developed several strategies, based on functional linguistics analyses, for guiding students to better make sense of their textbooks, and Shanahan and Shanahan (2008) have translated some of the expert reader analyses into practical classroom applications as well.

### **Why It Matters?**

At this stage, there is not yet a sufficient body of scientific research evidence demonstrating the effectiveness of disciplinary literacy instruction. Only a couple of studies testing the efficacy of such methods have been undertaken so far, and with mixed results (Hynd-Shanahan, Holschuh, & Hubbard, 2004; Nokes, Dole, & Hacker, 2007). Nevertheless, the approach is promising – and needed – for several reasons.

First, although content area reading methods have been successful in a plethora of research studies over a long history, they have not made great headway in the schools ( O'Brien, Stewart, and Moje, 1995). There are various reasons for this, none more important than that such approaches have not appealed to most content area teachers. Issues of affiliation and identity are important in the development of young teachers ( ). Someone who aspires to be a science teacher or a math teacher is much more interested in replicating what science and math educators usually do, rather than taking on routines from reading education. Also, even when subject-matter teachers do attempt to use procedures and activities drawn from content area reading, they often find these approaches to be ill-fitting with regard to the purposes of their disciplines or the nature of the texts to be read. In addition, reading strategies are not usually integrating into subject matter curriculum; thus, teachers are left to determine how they can fit them on top of an already full schedule of instruction. Finally, teachers are usually motivated by the success of their students, and the effectiveness of instructional procedures that often foster improvements

only among the lowest performing students ( ) may not be sufficient to be noticed or valued by content teachers.

However, disciplinary reading approaches hold the promise of being more appealing to content area teachers. Because the insights and strategies of disciplinary literacy are drawn from the disciplines themselves, a focus on this information does not pose the same challenges to teachers' efforts at identification and self-actualization as math, science, or history educators. If anything, the insights drawn from disciplinary literacy help these teachers to better understand the practices of their discipline. Instructional practices that have been drawn from examinations of disciplinary texts and studies of successful-reader interactions with such disciplinary texts seem more likely to produce procedures that facilitate the real learning demands of the disciplines, than has been true of traditional content area reading routines. The use of the so-called "generalizable" strategies of content area reading pose fundamental problems to learners, who must not only learn the strategies, but must recognize when they may make sense to use in a particular discipline and then must adjust them to fit to the actual demands of the disciplinary texts. Such generalization can be very difficult in any learning situation, and so if disciplinary reading procedures require less stretching of strategies to texts there is a very real chance that these procedures would be more useful and more effective.

An open question with regard to the value of disciplinary literacy strategies has to do with whom these new approaches will be effective. As has been noted, traditional reading comprehension strategies and content area reading approaches have been most beneficial for the lowest readers, often with no impact on results with average and higher readers. Perhaps disciplinary strategies would have the same pattern of results, although there is some reason to suspect that would not be the case. Many content area reading procedures seem to focus most

heavily on simply getting students to engage with a text and to pay attention to the ideas expressed in the text. Less proficient readers are easily distracted and they often do not think much or well about what they are reading; their focus often seems to be more on getting through the reading rather than trying to gain anything from the reading. Having students summarize what they are reading, asking themselves questions about the information in the text, or setting purposes for their reading all offer the possibility that the students will, through the use of these tools, focus to a greater extent on what a text says and would, consequently, benefit their learning. More proficient readers usually do not have the same problems with concentrating on the text information or trying to make meaning from it. Strategies that guide one to think more effectively in a disciplinary-specific manner could guide these students to go beyond a superficial understanding and to grasp deeper and more sophisticated ideas. Thus, a student who could retell the basic story in a piece of literature might be better able to construct a theme or to interpret multiple perspectives or points-of-view in short stories or novels as a result of applying insights drawn from that discipline. Similarly, a student who can retell many facts from a history book, but who fails to grasp the author's underlying argument may, through disciplinary strategies, be enabled to analyze such reasoning or even to construct their own arguments from the information. If subject matter teachers see their average and better students improving, gaining better purchase on the content of the class, it is possible that they would be more likely to sustain their efforts at using such approaches in instruction.

But what about the lowest-performing students who struggle to gain even the most basic information from their content texts? Will disciplinary strategies benefit the better readers while elbowing aside the basic needs of their less proficient peers? Again, it is impossible to answer such questions without empirical study. But there is a very real possibility that disciplinary

literacy approaches would be successful even with many less-proficient readers. As we have indicated, instructional procedures that have usually been successful with such students have done so by stimulating them to engage with text. There is no reason to believe that encouraging more disciplinary engagements would be any less successful in that regard. Thus, disciplinary strategies might be more attractive to content area teachers since it is possible that such procedures will be facilitative of the learning of a wider distribution of students.

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