Descriptive Analysis of Texts and Tasks in Secondary English Language Arts, History, and Science
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Project READI Technical Report # 2

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Background for the Study

The study draws on observations of middle and high school English language arts, history, and science classrooms observed during Year 1 of Project READI. The primary goal of the Year 1 observations was to facilitate rapid prototyping of Evidence-Based Argument Instruction Models (E-B AIMs) based on the kinds of texts, tasks, participation structures, and tools that appear to be engaging and challenging for students and that are associated with evidence of substantial engagement on the part of students with disciplinary literacies and reasoning with multiple sources.

Specific questions guiding classroom observation data collection and analyses for rapid prototyping were:
- *What features of disciplinary and literacy texts and tasks are associated with high student engagement and effort?*
- *What instructional tools and routines do students and teachers find useful in supporting evidence-based argumentation (E-BA)?*
- *What features of participation structures and discourse routines maximize student talk and engagement with texts and higher-level literacy tasks?*
- *What routines foster a classroom climate supportive of risk-taking and effort?*

To meet the goal of these observations, we collected evidence of the kinds of texts, activities, and classroom culture that are associated with disciplinary literacies and reasoning with multiple sources in literature, history, and science classrooms. Because we were interested in how texts, activities, and culture of the classroom manifest and reflect the content, tools, and practices specific to a particular discipline, a conscious decision was made to integrate the disciplinary focus into the definitions of these three elements:

1. *Texts* refer to the types of disciplinary texts used in the lesson, their instructional function in the lesson and the discipline, and the supports provided by the teacher. The term "text" is used broadly and refers to both traditional, as well as electronic texts, visual or verbal modes, oral or printed. Texts include cartoons, scripts, videos, and orally presented material.

2. *Classroom Activities* refers to the nature, quality, and purpose of the activities within the lesson and discipline, along with the types and degree of supports provided by the teacher for student completion of these activities.

3. *Classroom Culture* refers to the nature and purpose of the participation structures and routines within the discipline as well as the general classroom climate and norms.

In order to standardize the observed lessons and to ensure that we witnessed literacy practices, we asked to observe typical lessons "in which reading plays a central role."

We approached the observations with the understanding that many of the classrooms we would observe did not necessarily have established argumentation routines, or may only have emergent ones. However, we also reasoned that the observed lessons may have other disciplinary literacy

practices that could potentially be building blocks for the rapid-prototyping work.

In the sections to follow, we describe this strand of Project READI's work, including instrumentation, observer training, data collection, and analysis. We then present findings that emerged from the initial constant comparison analysis of these data.

Methods

Instrumentation for Observations

Observation and analytic protocol. The observation and analytic protocol drew on a number of existing observation instruments and went through multiple iterations from July to November 2010. The modifications focused on clarifying the goals of the study with an emphasis on describing texts, classroom activities and classroom culture. Within each of the three components, guiding questions focused observer attention on features of the teaching and learning situation that we posited would be central to evidence-based argumentation, to guide researchers' observations, thinking, and initial interpretation of the lesson. Observed lessons were audio- and videotaped to capture classroom discourse (both whole class and small group). Whenever possible, researchers also gathered lesson artifacts, including copies of texts, handouts, and student work for subsequent analysis. (See READI Tech Report #1 for Observation and Analytic Protocol.)

The majority of observer effort during observations was devoted to writing detailed field notes. Time codes were inserted about every two minutes or more often if there was something occurring of note. The goal of the field notes was to come as close as possible to a verbatim record of the lesson and classroom interactions.

Field notes focused on both teacher instruction and student participation and engagement during the observed lessons. Of particular interest were characteristics of classroom discourse. Specifically, the observation protocol was designed to capture:
- classroom discussion for evidence of student engagement in processes we hypothesized based on extant literature to be central to content learning and argumentation discourse;
- whole-class and small-group situations for a) teacher initiations (how teachers initiated an instructional conversation on discipline-based argumentation and provided information about argumentation), b) student uptake of teacher initiations (how students used and appropriated the information, models, and strategies the teachers provided and in what situations and how they integrated the teacher provided information, models, and strategies with previous learning, knowledge, and their own academic and social goals), and c) teacher and peer scaffolding, repairs, and revoicings of students' contributions and learning.

Following the observation, the majority of observer effort was devoted to writing an initial interpretation of each of the three lesson components (texts, classroom activities, and classroom culture) which drew primarily on field notes for supporting evidence, but also on teacher interviews and classroom materials.

Pre- and post-observation questionnaires. In addition to collecting observation data, information was also collected through pre- and post-observation questionnaires. The pre-observation questionnaire focused on the lesson goals and information about the lesson to be observed. Whenever possible the texts and other materials that were used during the lesson to be observed were secured in advance and reviewed by the observer prior to the classroom observation. The post-observation questionnaire helped to further understand the lesson observed in relation to the three key aspects of teaching/learning situations of interest to the project: the texts, the classroom activities, and the classroom culture. These questionnaires were enacted as conversations (face to face or telephone) or via email. Throughout the process of data collection, observers made every effort to take a non-evaluative stance and assure teachers that we were there to learn from what they were doing.

Observer Training

There were several challenges to both the development of the observation protocol and to achieving a shared understanding across sites and observers regarding the observation purposes, procedures and protocol. One challenge was associated with the distributed nature of Project READI in the Midwest and on the West Coast. The second stemmed from the breadth of expertise and background experiences of the observers. The observation staff included former teachers of the three disciplines, graduate students with expertise in teaching and learning processes in the three disciplines, university-based faculty and research staff and WestEd research and professional development staff. We addressed the first challenge through a series of video-conference based meetings and phone conferences. The initial video-conference training session was key to establishing shared understanding and a common basis for proceeding with the observations. During this training session, the goals of the observations were clarified and then observers reviewed the draft observation and analytic protocol. Observers then watched videotapes of lessons and attempted to map what they saw onto the observation protocol. Sharing and discussion of the field notes resulted in both a deeper understanding of the protocol and in fine-tuning the protocol itself. Related to the second challenge, it was also clear that literacy and disciplinary expertise influenced which facets of the observed lesson were most salient. Recognizing the value of these multiple perspectives, each observation was conducted by two people—an observer with disciplinary expertise and an observer with expertise in literacy teaching and learning.

Throughout the data collection phase, observers continued to meet in order to ensure that questions and issues that came up regarding the protocol and observation procedures were addressed. These ongoing observer meetings—both cross-site (California and Chicago) and at each site — were important venues both for honing observation and analytic abilities and for collaborative meaning making around what we were learning from these classroom observations. They helped ensure that observed lessons were described in sufficient detail and that initial interpretations were supported with appropriate evidence. In addition to discussing observations and initial interpretations of individual lessons, we used these meetings to discuss questions, themes, and concepts that were emerging across observations.

Despite these efforts, initial interpretations of the lessons reflected the different orientations of researchers at each site. Interpretations by California researchers were grounded in extensive

knowledge and experience of the Reading Apprenticeship framework and reflected greater emphasis on building blocks of evidence-based argumentation such as opportunities for students to do the intellectual work of comprehending and engage in nascent argumentation in the service of negotiating meaning with individual texts and cross textually as the foundation for disciplinary E-BA with multiple sources. In contrast, Chicago researchers generally focused on discipline-specific reading and thinking, and on a more formal definition of argumentation. While cross-site meetings helped researchers at both sites to broaden the lens through which they observed and analyzed lessons, these tensions remained to some extent. Conversations across sites and researchers were both rich and, occasionally, contentious. However, both the development and evaluation of Evidence-Based Argument Instruction Models (E-B AIMs) benefited from argumentation around these dual perspectives.

Observation Sites and Teachers

Observations were conducted in classrooms located in the San Francisco Bay Area and the greater Chicago area. Identification of teachers/classrooms for observations followed somewhat different procedures and timelines in the two locations, so we describe them separately here.

San Francisco Bay Area Sites: From the WestEd network of teachers who had participated in WestEd's Strategic Literacy Initiative professional development, we identified experienced Reading Apprenticeship teachers in middle and high school whose literacy implementation in subject areas was believed to hold some promise to inform the development of new interventions (E-B AIMS). These teachers were invited to participate in classroom-based research with the aim of identifying features of instruction that were marked by high engagement and appeared to develop advanced comprehension skills. Because this sample included few science teachers, we identified additional science teachers, particularly at the middle school level, who had not participated in Reading Apprenticeship professional development but were known to be strong teachers of science.

We observed 18 teachers and 20 classes in 12 middle and high schools in the San Francisco Bay Area and California's Central Valley. The sample includes suburban and urban schools. Table 1 shows observations by month, subject area, and grade level. Because some classes were observed on more than one occasion, we observed a total of 42 lessons.

Table 1. San Francisco Bay Area Classroom Observations

Class (grade)	2010				2011					
	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June
English Language Arts (8)							X			
English Language Arts (7)							X			
Integrated ELA/Social Studies (8)	X	X	X							
Integrated ELA/Social Studies, 8	X	X	X							
English Language Arts (7)								X		
English Language Arts (7)								X		
English (9)						X		X		
English (9)	X	X	X			X		X		
English (9-10)						X	X			
English (11-12)					X	X		X		
English (12)	X	X	X			X				
English (12)							XX			
Government (12)					X			X		
History (9)						X		XX		
History (11)	X	XXX		XX						
RA Academic Literacy (9)				X						
Science (10)						XX				
Science (9-10)						X				
Social Studies (7)								X		
Social Studies (7)								X		

Chicago Area Sites: Teachers and schools for observations in the Chicago Area were nominated by Project READI team members who had worked with area schools and teachers. Team members nominated those (1) they knew to be engaging in instruction designed to foster disciplinary literacies in history, science, and /or literature; (2) who were participating in implementing Cultural Modeling practices; and/or (3) who were reported to have established classroom participation structures that supported high student engagement. We also solicited teacher nominations from the Chicago Public Schools district leadership in literacy, social sciences, and sciences. Our sample included urban and suburban schools. We observed a total of 16 teachers and 24 classes in 6 middle and high schools in Chicago and an outlying area. Table 2 shows observations by month, subject area, and grade level. Because some classes were observed on more than one occasion, we observed a total of 37 lessons.

Table 2. UIC READI Classroom Observations

Class (grade)	2010 Dec	2011 Jan	Feb	March	April	May	June
Academy English (9)	XX						
Academy English (9)						XX	
Anatomy & Physiology (11-12)	X						
Chemistry (10)						XX	
Chemistry (10)						X	
English III (11)							
English II (10)						XX	
English II (10)		XX					
English III (11)						XX	
Global Studies Honors (9)		XX					
Global Studies I (9)	XX						
Honors Biology (9-10)	X						
Language Arts (7)						X	
Language Arts (8)						X	
Literature (8)			XX				
Literature (8)						XX	
Physical Science (9)				XX			
RA Academic Literacy, History (9)				XX			
Science (6)						X	
Science (7)						X	
Social Studies (6)						X	
Social Studies (7)						X	
Social Studies (8)		XX					
US History (11)			XX				

Data Collection

The IRB protocol for Project READI required that we send consent letters to principals at urban and suburban schools of interest. Within those schools from which we received signed principal letters, we then contacted teachers to ask them to participate. Once teachers consented to join Project READI, they were paired with observers in their discipline to schedule a visit. During this visit, observers explained the project to students, and disseminated student assent and parent consent forms. Once the consent and assent forms were returned, classroom observations were scheduled.

Approximately one week before the observation, teachers were emailed the pre-observation questionnaire. Teachers were asked about the learning goals of the lesson, including literacy goals; characteristics of the students in the class; and about any previous work students had done to prepare them for the content of the lesson. In addition, we requested permission to make copies of any materials used in the lesson for later analysis.

Following each observation, observers engaged the teacher in the post-observation conversation (using the post-observation questionnaire) to help them understand what they observed in relation to the three key aspects of a teaching/learning situation: the texts, the classroom activities, and the classroom culture. The interviews were conducted in person, by email, or by telephone, depending on teacher preference and availability.

Ideally, initial interpretations were written up as soon as possible after the observation and before the next observation. The initial interpretation analysis was time consuming and in order to take advantage of observation opportunities, observers did not always have a chance to complete the initial interpretation section of the observation and analytic protocol before the next observation. In that case, the detailed field notes allowed observers to revisit lessons in sufficient detail to capture and interpret what they saw.

Emergent Findings

Analytical Approach

As mentioned previously, initial interpretations of the lessons reflected the different orientations of researchers at each site. These different orientations also resulted in different approaches to the initial analysis of observation data at the two sites. Chicago researchers approached the analysis with a focus on discipline-specific reading and thinking from multiple text sources, and on a more formal definition of argumentation. Consequently, their approached to data analysis focused on "identifying segments that will be useful for E-B AIMs intervention development…where we see teachers and students engaged in some aspect of evidence-based argumentation with multiple texts in history, science, or literature in ways that we think will support students' disciplinary reasoning and interpretive reading" (S. Goldman, personal communication, June 9, 2011).

In contrast, the greater emphasis among California researchers on opportunities for students to do the intellectual work of comprehending and to engage in negotiating meaning as the foundation

for disciplinary E-BA resulted in greater attention to nascent elements of argumentation from multiple text sources: "In general, we don't see multiple texts in use in very many classrooms. Nevertheless, some of the promising practices are taking place with single texts, with argumentation practices around them, or building blocks for argumentation present and practiced" (C. Greenleaf, personal communication, June 9, 2011). In an ongoing conversation with Chicago researchers, Co-Principal Investigator Cynthia Greenleaf of WestEd's Strategic Literacy Initiative argued "to look broadly rather than only at something we define, a priori, as EBA, so that we can capture developmental practices" (C. Greenleaf, personal communication, July 12, 2011). Analysis of California observations thus cast a broad net.

Consistent with this stance and with qualitative analysis methods, California researchers interwove data collection and analysis from the start to begin "to notice, and look for, patterns of meaning and issues of potential interest in the data" (Braun & Clarke, 2006, p. 15) related to evidence-based argumentation from multiple text sources.

In order to explain how features of instruction and classroom life mediate student engagement and learning from higher level disciplinary literacy tasks, in a preliminary analysis overlapping data collection, observations were scrutinized for dimensions of text use, classroom activities and classroom culture.

Below we present emergent findings from the subset of California observations, based on observer write-ups, memos, and analysis meetings in which observers shared what they were seeing and discussed emerging themes, puzzling or unexpected phenomena, research questions, etc.

Results

Promising Practices

In these classrooms taught by experience Reading Apprenticeship teachers we found many instances that could inform the design of E-B Aims, including tasks that engaged students in disciplinary thinking processes, routines that supported sustained intellectual engagement, collaborative structures that made available multiple perspectives and fostered interactive negotiation of meaning, and use of texts and tasks that provided rich affordances for argumentation.

Text use. Use of text for core subject area learning was prevalent, in contrast to lecture or other activities that side-step text, across all subject areas.

Discipline-specific uses of text were often the focus of classroom lessons.

> Framing questions, tasks, notetakers, and classroom discussion (in various participation structures) supported students to engage in discipline-specific reading practices such as investigating primary sources to make an evidence-based decision/judgment, developing an interpretive stance toward a literary work and accumulating evidence to support this interpretation, determining the taxonomic category for types of volcanoes based on

descriptive features, etc. Framing questions – why might writers choose to use poetic forms to communicate their ideas? How did governments convince young men to fight a war? – were key to orienting students to disciplinary inquiry practices and epistemologies.

Sets of multiple documents were frequently in use in or across lessons.

Texts were sometimes used simultaneously but more often sequentially. The use of multiple texts is a promising practice, and we observed different disciplinary goals for using multiple texts – all of which seemed promising. These included the following: reading multiple texts representing multiple genres to inform a single topic; reading multiple texts from the same genre with a common archetypal theme yet different historical contexts, structures, language, etc.; reading the same text in multiple modalities (listening, silent reading); reading and making intertextual connections between two unrelated texts.

Texts often went beyond textbook selections to primary sources, literature, visual texts, and authentic informational sources (newspapers, published articles), embodying complexity from which multiple perspectives could be identified and about which multiple perspectives could arise – a necessary condition for argumentation.

Close analysis of texts used revealed that each text presented its own challenges and affordances, but whether students engaged and learned or floundered depended in our observations on the nature of the task and support offered rather than task difficulty, per se.

Classroom Reading Practices. Close reading routines that involved in-class reading/rereading; strategies and tools for making thinking visible; collaborative discourse routines for articulating, documenting, and solving problems of comprehension; and text-based discussion were well established in many observed lessons.

While reading was often assigned for homework and merely referenced during in-class tasks, we saw regular in-class reading and work on comprehending in many classrooms. In most promising lessons, routines and space for making thinking visible were habitual and ongoing. In successful lessons, the first cycle of individual, group and whole class work frequently involved close reading of the text focused on making meaning and resolving comprehension difficulties, including odd phraseology, word meanings, references and connections within and beyond the text, and the like. In addition, these close reading routines were frequently a venue for generating bridging inferences and making connections to prior knowledge that moved students from a text-based to a situational model, and thus a deeper understanding of text.

Initiating metacognitive conversation by inviting students to share their confusions encouraged all students to participate (since all had valued resources in the form of complexities and confusions to share), and provided a venue for students to share and practice problem-solving strategies. Inviting confusions increased participation/equity by insuring that everyone had something worthwhile to contribute—whether a confusion or clarification. We saw that opportunities to share confusions increased student engagement even in an otherwise unengaging and lackluster lesson.

Close reading routines supported perseverance and engagement with complex texts.

> Working collaboratively to understand complex text was not something students seemed to dread. On the contrary, we saw extended engagement and participation in this intellectually hard work when texts and tasks were aligned and when there were multiple opportunities for teacher and peer support. Engagement and learning were supported by multiple opportunities to read/comprehend challenging texts in different social and/or task contexts. Recursive cycles of individual, group and teacher-facilitated reading and thinking seemed to be especially effective for increasing engagement and learning, particularly in classrooms where collaborative meaning-making was supported by well-established protocols for group work, and teacher mentoring in disciplinary discourse.

Close reading routines supported interactive argumentation about meaning, given that texts were rich with possibilities and complex/challenging for students. We came to view interactive argumentation/inquiry into and negotiation of meaning as a key building block for discipline-based argumentation.

> In our observations, close reading provided significant opportunities for E-BA in the form of interactive argumentation. Much of the rich argumentation we saw in these classroom—students generating claims, providing evidence, evaluating evidence, challenging claims, reconciling conflicting evidence, etc.—occurred in the context of close reading and work to comprehend text meaning. Close reading invited interactive argumentation as students proposed alternative understandings and interpretations and defended their readings and interpretations with evidence from the text. A significant amount of E-BA we observed took the form of interactive argumentation, rather than formal disciplinary argumentation.

> We came to see close reading and this collaborative, interactive argumentation as an important building block for discipline-specific reading and argumentation tasks. When reading multiple texts, students needed time and support to make sense of individual texts before tackling cross-textual analysis, which places its own demands. Similarly, students needed an opportunity to read for meaning/content before they could focus on rhetorical/disciplinary features of texts, especially in the case of an unfamiliar genre or otherwise challenging text. We saw instances in which students halted their work in synthesis to clarify text meaning, going back to the text to work through various possibilities in order to make or refine a claim.

Close reading frequently but not always involved features of discipline-specific literacy such as particular reasoning processes and interpretive practices valued in literature and history.

> The goal of engaging in discipline-specific literacy practices and argumentation was served by close reading routines that engaged students habitually in (socialized them to) making meaning with texts and solving text-based problems in collaborative groupings and discussions of various kinds. Overall, open-ended tasks supported student grappling, inquiry, agency and learning – these often but not always included students using note takers and material support to compare, contrast and synthesize across texts.

Close reading routines established a culture of inquiry into meaning where sense-making was the dominant way of working with text.

In our observations, we saw teachers cultivate what we might call inquiry orientations to text and learning. In these classrooms teachers supported active student agency in learning by facilitating open ended discussion that explicitly invited students to think, work, talk, and question. These discussion moves included re-voicing student ideas, turning questions back to students, probing for how students know, non-evaluative responses that acknowledge student contributions and effort, rather than helping or hinting so students get the "right" answer. In the inquiry culture fostered by these "rules for talk", students showed high levels of engagement and perseverance in intellectual work and demonstrated pride in their ability to solve problems and make sense of challenging text.

Multiple readings of texts occurred in many lessons as students engaged in close reading and tasks involving synthesis or analysis, which drove them back to the text.

Note-takers/material supports played a key role in supporting students to compare, contrast, synthesize across texts. These tools were necessary but not sufficient; absent routines for close reading and established classroom culture around collaborative sense-making, students were ill prepared to use these tools to deepen their comprehension of texts.

In classes where close reading/collaborative sense-making routines were well established, students moved flexibly from synthesis or analysis tasks to clarifying text meaning as needed to carry out these tasks.

Students were often asked to identify and share their confusions, connections, and questions during first encounters with texts. Such open ended invitations gave all students something to contribute to a conversation, centered student attention on text-based problem solving, and built a classroom culture in which students expected to work to make sense of texts and that their collaborative efforts would pay off in greater comprehension.

For example, collaborative meaning-making structured around open-ended tasks accommodated the needs of diverse students (i.e., differentiated instruction) because they were able to solve their own, sometimes idiosyncratic problems of comprehension with the support of others in the class as a foundation for further work with text. These tasks also permitted group members to move between the roles of asker and answerer, seeker and giver of help, challenger and defender, as students practiced disciplinary reading and tackled new concepts, vocabulary, discourses, and thinking.

Lessons where students demonstrated high levels of engagement and learning were characterized by high challenge and high support, which could take many forms.

Classrooms with high engagement and learning had well-establish routines for reading, discourse and task organization. In these classrooms, instructional support provided by well-established reading and discourse routines played as great of a role as direct instruction.

Some of the routines included ongoing and habitual space for making thinking visible; ongoing development of students' repertoire of shared comprehension strategies that they could use flexibly in the service of making meaning (both independently or with teacher support); collaborative meaning making as a primary mode of working with texts; and significant opportunities for student talk in pairs or small groups to learn and practice disciplinary reasoning, concepts and vocabulary.

Missed Opportunities

Within our observations we also noted missed opportunities that were instructive for our design work.

Close reading of texts did not always lead to or support discipline-specific reasoning or literacy practices, even if it supported content learning goals.

We saw instances in which students were asked to do cross-textual reading tasks, but not instructed in *how* to do it.

> Teachers often did not recognize the challenges of synthesizing across texts, and even teachers who provided thoughtful support for reading single texts may have assumed that close reading/comprehending of individual texts is sufficient preparation for intertextual analysis. Teachers frequently delegated multi-textual analysis to a common note taker without modeling or explicitly guiding the reasoning processes needed to do the work. We concluded that while material support provides some assistance in intertextual analysis, it generally is not sufficient.

We saw some cases of mis-alignment of tasks with particular texts that did not seem productive.

> In some lessons, students were assigned specific reading comprehension strategies or tasks (e.g., to fill in a worksheet or notetaker) that failed to support deeper comprehension or disciplinary reasoning because: they were not aligned with text affordances or challenges; there was a mismatch between the task and the affordances of the text. We also saw instances in which tasks or teacher directions narrowed possible solutions. In these comparatively closed tasks we saw reduced student engagement and participation and reliance on teacher "help" to complete tasks. Teacher-generated reading and comprehension strategies resulted in pro forma approach and low engagement. When this was the case, students did not realize the benefits of comprehension-supporting strategies and we think are unlikely to appropriate or use strategies spontaneously or in other contexts, independent of classroom assignment.

When close reading routines were not in place, students floundered with texts and tasks.

> Without metacognitive and collaborative sense-making routines, students relied on teacher interpretation and authority, showing little agency in the face of challenge**.** We saw instances in which reliance on teacher authority undermined student agency as well as learning. We saw other instances in which teachers curtailed student sense-making too soon due to time pressures or undermined student sense-making by providing "the answer" after students had

invested considerable effort. This would likely deter students from marshaling such effort in the future, knowing they could rely on the teacher to provide answers.

Other missed opportunities sometimes occurred in classroom talk in the form of routines that foregrounded individual thinking rather than interactive negotiation of meaning.

> At times "discussion" of text assumed the form of sharing out what individuals or groups did or thought, rather than collaborative meaning-making and interactive negotiation due to lack of time and/or lack of protocol, routines, or support for collaborative meaning making and instructionally focused conversation.

Teachers sometimes believed themselves to be engaged in evidence-based reasoning with text when in fact they were simply testing students' comprehension of a text.

> There were instances where teachers used the language of argumentation in observation interviews and with students in classroom lesson, but "claims" were actually teacher generated factual questions, and "evidence" was information from the textbook students used to answer these questions.

Implications for Design of Interventions

The classroom observations have many implications for the design on the interventions.

Teachers need helpful tools and instructional approaches for supporting student reasoning across texts.

Close reading is integral to evidence-based argumentation.

> Much rich argumentation takes place in the context of negotiating meaning with texts as interactive argumentation. It is clear that classroom reading routines play a key role in supporting text-based discussion, thinking, and argumentation. Students need an opportunity to read for meaning/content in order to reason about the rhetorical/disciplinary features of texts, disciplinary language, and concepts or to work with texts to conduct discipline-shaped inquiries (such as sourcing and corroboration in history).

The intervention design can also benefit from practices and routines for building student engagement and investment in the rigorous work of making sense of complex texts and of disciplinary reasoning tasks.

> In particular, a disciplinary stance that privileged open ended inquiry (and provided tools and support for this inquiry) over information/facts increased student engagement, learning, and effort. We observed that teacher uptake (revoicings), and use of student contributions to shape class discussion encouraged students to ask questions above and beyond instruction. Likewise, facilitation and tasks that leveraged student connections increased engagement and understanding. In contrast, when students' prior knowledge, experience, literacies and interests were excluded from work with text or text discussions—for example, by limiting

opportunities for asking questions or making observations or dismissing student prior knowledge, experience or thinking—students disengaged/disinvested and their participation took on a pro forma (doing school) quality.

Significant opportunities for student talk in pairs and/or small groups should be built into the intervention as a means of support for students to learn and practice collaborative meaning making, disciplinary practices and concepts, and academic language/discourse.

Designers should build in opportunities for students to pursue their own questions about texts, considering the benefits of open ended inquiry tasks in comparison with predetermined, thus closed, inquiries.

The observations raised questions about the implications of having students generate a claim (e.g. based on prior knowledge), followed by reading to inform the claim, versus generating a claim based on their close reading of text(s) with a more open ended inquiry frame. Might finding evidence to support a pre-existing claim act similarly to a misconception and interfere with the development of accurate mental models from text, as per the role of misconceptions in science learning? Likewise, what is the impact on disciplinary reading, learning and E-BA of having students build a case around a teacher-generated argument or claim, rather then generating their own—and under what circumstances would each option best support student learning?

Students' authentic questions that arise from engagement with texts and ideas very often dovetail with important disciplinary learning at the secondary level. Designs should capitalize on this resource explicitly to drive engagement and deepen interactions and learning rather than curtail opportunities for students to raise the curiosities, conundrums, and confusions they experience with learning materials by directing student work prematurely toward specific questions/tasks/procedures.

Thematic Analysis

Analytical Approach

We subsequently engaged in a more systematic constant comparison analysis of the California lessons. The analysis was based on field notes, lesson artifacts and teacher interviews, and did not include audio- or videotapes of observed lessons.

We used an iterative approach to analyzing these data. Using a combination of inductive and theoretically-driven analysis, moving back and forth between the entire data set of field notes and lesson artifacts, coded extracts of data, and emergent analyses, we iteratively identified a set of categories and codes related to the teaching and learning of argumentation.

Initial coding and analysis utilized a "start list" of broad descriptive codes reflecting the conceptual framework and research questions articulated in the Project READI proposal (Miles & Huberman, 1994): lesson architecture, texts and text characteristics, tasks and task support,

classroom culture, and student behavior. Within these broad categories, we approached the analysis using open and axial coding from grounded theory research.

Through repeated readings of field notes and other lesson artifacts and teacher interviews, researchers acquired a deep understanding of the instructional moves and interactions related to texts, tasks and classroom culture in each of the 42 observed lessons. The analysis did not include coding of audio- or videotapes of observed lessons. Using a combination of inductive and theoretically-driven analysis, observations were coded for dimensions of text use, tasks and classroom culture, including quality of inquiry tasks, participation structures, types and patterns of discourse and indicators of student knowledge, processing skills, and dispositions. We also identified segments of lessons involving instruction and engagement in promising texts, tasks and literacies for future in-depth analysis. Extracts of data were transferred to a coding notetaker. (For coding manual and coding notetaker, see READI Technical Report #1).

This analysis yielded 8 themes mediating student engagement and learning from text-based argumentation from multiple text sources, presented below.

Results

Themes

Through this process, we identified 8 broad themes that represent malleable factors mediating student engagement and learning from higher level literacy tasks: (1) texts; (2) close reading; (3) argumentation; (4) disciplinary knowledge building tasks (5) teacher support for learning; (6) instrumental support for learning; (7) epistemological framing; and (8) participation structures. In addition, we identified two themes related to student performance—(9) student engagement and (10) student learning. Themes capture both promising practices and missed opportunities, cases where lesson features have the potential to foster engagement and learning, but fail to do so.

Definitions of these themes are found in Table 1.

Table 1. Themes from Initial Constant Comparison Analysis

Theme	Definition
Features of instruction and classroom climate	
Texts	Features of texts and text use including: a. Texts and text properties b. How texts are used c. How texts are used in relationship with other texts
Close reading	Interactive negotiation of meaning at the local and global levels to unearth and evaluate possible meanings, individually or collaboratively. Characterized by approaching texts to understand vs. to find information. *Missed opportunities are tasks with the potential to foster close reading because there are possible supports for unearthing and evaluating possible meanings, but features of task and/or classroom life fail to elicit these.*
Argumentation	Making a claim or assertion that is supported by evidence that connects to the claim in a principled way. Involves consideration/deliberation of multiple possibilities and/or viewpoints. *Missed opportunities are tasks with the potential to foster argumentation because there are multiple possible understandings to negotiate, but features of texts, task and/or classroom life fail to elicit these.* Identify emphasis of argumentation: a. Arguing to learn: Argumentation as a tool for the construction and understanding of disciplinary knowledge and practices b. Learning to argue: Explicitly teaching language, structure and principles for argument and asking students to apply the structure to learn disciplinary argument
Disciplinary knowledge	Discipline-specific epistemologies and inquiry practices in reference to the overarching frameworks, concepts and themes of the disciplines. *Missed opportunities are tasks with the potential to foster disciplinary knowledge, but features of task and/or classroom life fail do this.*
Teacher support for learning from texts and higher level literacy and disciplinary knowledge tasks	Teacher modeling, guidance and support for learning and practicing meaning-making about text, argumentation and disciplinary knowledge. *Missed opportunities are instructional moves with the potential to support learning, but that fail do this.*
Instrumental support for learning from texts and	Routines, tools and strategies that support learning, such as metacognitive reading routines (e.g., Talking to the Text/annotating, think aloud), notetakers (evidence/interpretation, disciplinary

higher level literacy and disciplinary knowledge tasks	notetakers), etc. *Missed opportunities are routines, tools and strategies with the potential to support learning, but that fail do this.*
Epistemological framing	Signals communicated by teacher and students through tone of voice, word choice, interactions, routines, and explicit instructions and comments that convey understandings and expectations of a task or activity (e.g., "doing science" vs. "doing the lesson" (Jiménez-Aleixandre, Rodríguez, and Duschl, 2000)). Identify framing that instantiates a(n): a. *Procedural display orientation* that positions tasks and texts as information vs. inquiry, and promotes and rewards "doing school" over reading and learning for understanding b. Inquiry orientation that positions tasks and texts as inquiry, and promotes and facilitates students construction, representation and evaluation of knowledge
Participation structures	*Structural arrangements of interaction*, including interactions, routines, and explicit instructions and comments that create expectations for participation in individual, partner, group and whole class settings (Philips, 1974). Identify participation structures that: a. Communicate that the teacher vs. students has authority to set the topic, direct conversation, evaluate ideas—i.e., to do the work of sense-making b. Support student ownership, agency, engagement and participation, and convey authority to students to shape the topic and conversation, evaluate ideas—i.e., to do the work of sense-making
Indices of student engagement and learning	
Student engagement	Evidence of engagement and effort in relation to reading, argumentation and disciplinary knowledge building, including persistence and grappling, student ownership, agency and extended instructionally focused student talk. *Missed opportunities are evidence of lack of agency, engagement and participation*
Student learning	Evidence of reading comprehension, argumentation and disciplinary knowledge building reflected in construction, representation and evaluation of knowledge, and appropriation and use of disciplinary language, literacies, thinking and reasoning dispositions, skills and knowledge. *Missed opportunities are evidence that the enactment of the lesson does not result in reading comprehension, argumentation and disciplinary knowledge building*

Descriptive Analysis

Results from the thematic analysis informed a descriptive analysis of the 40 California lessons conducted in fall 2012. The descriptive analysis focused on opportunities to learn from texts and tasks.

Analytical Approach

Using NVivo qualitative data analysis software, we analyzed features of texts and tasks germane to evidence-based argumentation with multiple texts. Considerable time and effort went into developing a well-structured, conceptualized and operative coding scheme.

Code development was driven by a combination of inductive and deductive processes. Overarching categories were frequently instantiations of the theoretical framework or research questions underlying Project READI, informed by the initial constant comparison analysis, while specifics of the dataset often contributed subcodes. We started by creating a coherent coding architecture and importing coding from the initial constant comparison analysis into NVivo. Using qualitative analysis coding procedures (Miles & Huberman, 1994), we then added, revised and recast codes and restructured elements of our conceptual framework to accommodate new and promising themes, configurations and constructs that emerged as we conducted the analysis.

For example, our theoretical framework and research questions directed our attention to argumentation, which we defined *a priori* as making a claim or assertion that is supported by evidence that connects to the claim in a principled way (Toulmin, 1958). We coded as argumentation all tasks that asked students to make a claim or assertion supported by evidence, *whether or not the task was explicitly identified by the teacher as "argumentation."* Observers identified numerous episodes in which students generated claims and presented evidence to support their claims. Researchers analyzing the observation data coded these as "argumentation." However, argumentation episodes varied in a number of ways and were further broken down into subcategories and labeled. Some argumentation arose from tasks designed to teach key disciplinary principles, frameworks, and understandings. Researchers labeled these as "arguing to learn." Some argumentation emphasized the acquisition of canonical forms of argument. We labeled these "learning to argue" tasks. Some argumentation arose informally in the context of collaborative meaning-making around text. Researchers coded these tasks as "interactive argumentation."

In addition, we developed clear, operational definitions for codes and coding protocols to facilitate reliability within and across researchers. Descriptive text and task codes are found in Appendix A.

We present the major findings from the descriptive analysis in three parts: (1) Content delivery; (2) Text properties and usage; and (3) Task opportunities to learn.

We preface these results by offering two caveats:
1. Findings from the classroom observation study should be viewed in light of the relatively small number of lessons. This is particularly true for interpreting discipline-specific

results—especially in the case of science, where we observed only six lessons in California. Furthermore, because we observed many classes more than once, this analysis is based on only 18 teachers and 20 classes.

2. In addition, our observations of discrete lessons offer a snapshot of teaching and learning at a moment in time. While we conducted teacher interviews to situate observed lessons in the context of previous and subsequent teaching and learning, our observations provided an incomplete picture of instruction that unfolds and builds over time.

Demographic characteristics of observed teachers and lessons are found in Appendix B.

Results

Opportunity to Learn: Text Properties and Usage

The descriptive analysis of texts was designed to answer the questions, *Which texts are used and what were their properties? How texts are used? and How texts are used in relationship with other texts?* As part of the observation and analytic protocol, we identified all texts used in the lessons and obtained copies whenever possible. Text Properties constructs provide detailed descriptions of the features of texts used in observed lessons. The following section elaborates the two text-related dimensions that were the focus of the descriptive analysis, providing definitions of the constructs used to capture these lesson features.

1. Text Properties: This dimension consists of three molar codes, or constructs, related to the properties of texts: 1. *Media* (the form in which texts are presented to students, e.g., traditional print, audio recordings, video/film, hypermedia); 2. *Source* (whether texts are original materials, or have been filtered through interpretation or evaluation); and 3. *Genre* (text category defined by purpose, stylistic and disciplinary conventions, e.g., textbook, novel, historical document, photograph). Within each construct, we developed codes to both reflect important conceptual distinctions within each construct and capture the range of text types found across the dataset. Each text used in the lesson was coded for each of the three Text Properties constructs.

2. Text Usage: In addition to properties of texts themselves, we examined four constructs related to text use. As in the case of the Text Properties dimension, we generated codes to capture important conceptual distinctions within the Text Usage constructs, and coded each text used in the lesson for each of the four Text Usage constructs. Text Usage constructs include: 1. *Assignment* (whether texts were teacher assigned or involved student choice); 2. *Where reading/comprehending happened* (whether reading and comprehending happened at home, in class or some combination of the two); and, for lessons that involved multiple texts, 3. *Relationship between texts* (how multiple texts were related, e.g., providing multiple perspectives on the same topic, event, argument; ancillary text provides background knowledge/context for focal text; multi-media forms of same text) and 4. *Sequencing/Coincidence of Multiple Texts* (codes related to whether texts were presented sequentially, simultaneously or some combination of the two).

Text Properties

To answer the question *Which texts are used and what were their properties?* we calculated numbers and percentages of both lessons and texts for codes related to each of the three text property constructs. In addition to looking at the whole sample, we looked at text use by discipline. Findings from this analysis are reported by lesson and texts in Tables 4 and 5 below.

All lessons used at least one text; this was to be expected given that we asked to see lessons that included reading. History lessons used the highest average number of texts per lesson (3.39), followed by science (3.5) and English (2.52).

Media. Across disciplines, three quarters of texts were presented as traditional print materials or texts downloaded and printed from the internet. Slightly fewer than a quarter of the texts used in observed lessons were visual images, with or without sound. Science and history lessons were more likely to include visual texts and use more visual texts than ELA. This is consistent with traditional disciplinary differences. English emphasizes language processes, while science and history are based on a wide range of both written and visual texts, including photographs, maps, audio, video and film, artifacts and material objects—although traditional disciplinary distinctions related to written and visual sources have changed somewhat with the introduction of visual literacy standards and the debut of AP Language and Composition Exam items requiring students to synthesize various sources—including visual source— into an original argument.

Source. Because we were concerned with whether texts were original materials or had been filtered through interpretation or evaluation, we categorized each text as a primary, secondary or tertiary source. Student-generated notes that served as texts, instructional handouts and worksheets/study guides were not assigned to any of the three categories.

The majority of lessons incorporated primary sources. Seventy-eight percent of all lessons included original source materials, with 95% of ELA lessons, 62% of history lessons and 50% of science lessons using at least one primary source. In science, primary sources were all visual images of scientific phenomena (photomicrograph of phases of cell division and volcanic formations).

Table 4. Number and Percentage of Lessons with Various Texts Properties by Discipline

Text Characteristics	Total Lessons N=40		English N=21		History N=13		Science N=6	
	# lessons	% lessons	#lessons	% lessons	# lessons	% lessons	#lessons	% lessons
Media								
Traditional Print	39	98	21	100	12	92	6	100
Visual	13	33	4	19	5	39	4	67
Audio	3	8	3	14	--	--	--	--
Artifact	1	3	--	--	--	--	1	17
Source								
Primary	31	78	20	95	8	62	3	50
• *Subset: Primary sources reprinted in anthologies/ textbooks/teachers guides*	*18*	*58[1]*	*12*	*60*	*4*	*50*	*2*	*66*
Secondary	11	28	6	29	4	31	1	17
Tertiary	13	33	2	10	7	54	4	67
Total non-primary	23	58	8	38	10	77	5	83
NA/Unknown[2]	17	40	3	14	8	62	6	100
Genre								
Written genres								
Textbook	10	28	2	10	5	39	3	50
Additional non-textbook genres in anthologies/ Textbooks/teachers guides	16	40	12	57	4	31	2	33

[1] Percentage of lessons using primary source materials where primary source was from textbook
[2] Includes student generated texts, worksheets/study guides, handouts

	Total Lessons N=40		English N=21		History N=13		Science N=6	
	# lessons	% lessons	#lessons	% lessons	# lessons	% lessons	#lessons	% lessons
Total textbook use	25	63	13	62	8	62	4	66
Novel	10	25	9	43	1	8	--	--
Student generated text	9	23	1	5	5	39	3	50
Worksheet/study guide	7	18	1	5	3	23	3	50
Play	6	5	6	29	--	--	--	--
Instructional handout	6	15	1	5	5	39	--	--
Essay, opinion piece	5	13	5	24	--	--	--	--
Text set[3]	4	10	2	10	2	15	--	--
Historical document	3	8	--	--	3	23	--	--
Historical analysis	2	5	--	--	2	15	--	--
Expository (non-textbook)	2	5	1	5	--	--	1	17
Poetry	2	5	2	10	--	--	--	--
Test items	2	5	2	10	--	--	--	--
Legend	2	5	2	10	--	--	--	--
Short story	2	5	2	10	--	--	--	--
Autobiography	1	3	1	5	--	--	--	--
Diary	1	3	1	5	--	--	--	--

[3] Texts in text sets were also coded to specific genre if we had sufficient information about individual texts

	Total Lessons N=40		English N=21		History N=13		Science N=6	
	# lessons	% lessons	#lessons	% lessons	# lessons	% lessons	#lessons	% lessons
Illustrated historical document	1	3	--	--	1	8	--	--
Visual text								
Photograph	6	15	2	10	1	8	3	50
Painting/art image	2	5	--	--	2	15	--	--
Instructional video/film	2	5	--	--	1	8	1	17
Propaganda poster	1	3	--	--	1	8	--	--
Documentary film	1	3	1	5	--	--	--	--
Popular film	1	3	1	5	--	--	--	--
Student generated visual representation	2	5	--	--	--	--	2	33
Science illustration	1	3	--	--	--	--	1	17
Artifact								
Scientific specimen	1	3	--	--	--	--	1	17

Nearly half of all original source materials used across disciplines were reproductions in publications such as textbooks, anthologies, and teachers guides, with or without additional analysis or interpretation. Forty-nine percent of original source materials in ELA, 43% in history and 71% in science were from instructional publications. We discuss the reproduction of primary sources in instructional texts in the section on *Implications of text properties and usage for evidence-based argumentation with multiple texts.*

Secondary sources were uncommon, comprising 10% of texts across disciplines. Use of secondary sources was similar in history and English and accounted for 11% of texts used in both disciplines. Secondary sources in English included audio dramatizations of Shakespeare plays used as read alouds to increase accessibility of written text[4] and texts to inform persuasive writing assignments. In history, secondary sources most frequently assumed the form of historical analysis. Only one science lesson incorporated a secondary text— a drawing of a cell at a root tip.

Tertiary sources that surveyed or summarized content materials were used in a third of all lessons. Use of tertiary sources differed by discipline. Tertiary sources were included in 10% of English, 54% of history and 67% of science lessons, and accounted for 6%, 21% and 19% of texts in those disciplines, respectively. The majority of tertiary texts were textbooks. Textbook use will be considered in greater detail in the section on genre, below.

Lessons also frequently incorporated student-generated notes from previous lectures or readings and instructional materials such as outlines, study guides, and protocols as texts, materials that were not classified as primary, secondary or tertiary sources.

Genre. Given the disparate domain-specific reading and thinking practices in English, history and science, it is no surprise that observed lessons included a wide variety of written and visual genres. Textbooks were the single most prevalent genre across observed lessons. Textbooks were used in 28% of lessons, and accounted for 11% of all texts. When original sources reproduced in textbooks were included in the calculations, over 60 percent of lessons in all three disciplines incorporated textbook materials, and textbooks contributed 40%, 36% and 38% of all texts used in ELA, history and science respectively.

Lessons also frequently included other instructional genres, including student-generated notes used in lieu of original texts, consumable worksheets/study guides, and instructional handouts. Nearly half of all lessons included one or more of these instructional genres. Use of instructional genres was more likely in science and history than in English, with 100% of science, 69% of history lessons and 19% of English lessons incorporating instructional genres. When texts from textbooks were added, instructional genres comprised nearly 60% of all texts across lessons, and 47%, 68%, and 71% of texts in ELA, history and science respectively.

A diverse range of non-instructional written and visual text genres were also included in observed lessons. English language arts incorporated the widest range of non-instructional genres

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[4] Students did not compare print and audio versions or discuss whether the dramatizations were faithful to their reading of Shakespeare.

(N = 14), followed by history (N = 9) and science (N = 5). While many genres were specific to a single discipline—for example, historical documents were used only in history lessons, scientific specimens and illustrations were used only in science lessons, and poetry, plays, short stories, legends, autobiographies and diaries were used only in English language arts—genres occasionally crossed disciplines, as in the case of a novel used as a primary source in history[5] and exposition used in ELA. Aside from instructional genres which were used abundantly in ELA, history and science lessons, only two genres—expository text and photograph—crossed all three disciplines.

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[5] *Grapes of Wrath* was used as a primary source in a U.S. History class.

Table 5: Number and Percentage of Texts with Various Texts Properties by Discipline

	Total Lessons N=118		English N=53		History N=44		Science N=21	
	# texts	% lessons	# texts	% texts	# texts	% texts	#texts	% texts
Average texts per lesson	2.95		2.52		3.39		3.50	
Text Characteristics								
Media								
Traditional Print	85	72	45	85	29	66	11	52
Visual	28	24	4	8	15	34	9	43
Audio	3	3	3	6	--	--	--	--
Artifact	1	1	--	--	--	--	1	5
Source								
Primary	65	55	37	70	21	48	7	33
• *Subset: Primary sources reprinted in anthologies/ textbooks/teacher guides*	*32*	*49[6]*	*18*	*49*	*9*	*43*	*5*	*71*
Secondary	12	10	6	11	5	11	1	5
Tertiary	16	14	3	6	9	21	4	19
Total non-primary	28	24	9	17	14	32	5	24
NA/Unknown[7]	25	21	5	9	12	27	8	38
Genre								
Written								
Textbook	13	11	3	6	7	16	3	14
Additional non-textbook genres in anthologies/ textbooks	32	27	18	34	9	21	5	24

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[6] Percentage of total primary source texts from anthologies, textbooks or teachers guides
[7] Includes student generated texts, worksheets/study guides, handouts

Total textbook use	45	38	21	40	16	36	8	38
Novel	10	9	9	17	1	2	--	--
Student generated text	10	9	1	2	5	11	4	19
Play	9	8	9	17	--	--	--	--
Worksheet/study guide	8	7	2	4	3	7	3	14
Instructional handout	7	6	1	2	6	14	--	--
Essay, opinion piece	6	5	6	11	--	--	--	--
Text set[8]	4	3	2	4	2	5	--	--
Historical document	4	3	--	--	4	9	--	--
Expository (non-textbook)	4	3	3	6	--	--	1	5
Poetry	4	3	4	8	--	--	--	--
Autobiography	3	3	3	6	--	--	--	--
Historical analysis	3	3	--	--	3	7	--	--
Short story	2	2	2	4	--	--	--	--
Legend	2	2	2	4	--	--	--	--
Test items	2	2	2	4	--	--	--	--
Diary	2	2	2	4	--	--	--	--
Illustrated historical document	1	1	--	--	1	2	--	--
Total verbal genres	94	80	51	93	32	73	11	52

[8] Texts in text sets were also coded to specific genre if we had sufficient information about individual texts

Visual genres								
Photograph	8	7	1	2	1	2	6	29
Painting/art image	7	6	--	--	7	16	--	--
Propaganda poster	5	4	--	--	5	11	--	--
Student generated visual representation	2	2	--	--	--	--	2	10
Instructional video/film	2	2	--	--	1	2	1	5
Documentary film	1	1	1	2	--	--	--	--
Popular film	1	1	1	2	--	--	--	--
Science illustration	1	1	--	--	--	--	1	5
Total visual genres	27	23	3	6	14	32	10	48
Artifacts								
Scientific specimen	1	1	--	--	--	--	1	5

Text Usage

In addition to looking at text properties, to answer the questions, *How are texts used?* and *How are texts used in relationship with other texts?* we examined how texts were used during observed lessons. Results of this analysis are reported in Tables 6, 7 and 8 below.

Assignment. To assess the extent to which lessons provided opportunities for students' text preference and choice, we calculated the number and percentage of texts that were assigned by teachers and those selected by students, either from a limited teacher-selected set, or without restriction. Overwhelmingly, texts used in observed lessons were assigned by teachers. Across disciplines, 91% of all texts were teacher assigned. English language arts teachers provided the most opportunity for student choice, with 20% of texts selected by students, generally in the context of SSR. Students had no opportunity to select their own texts in any history or science lesson. In one science class, a student surreptitiously read a science trade book but did not make a connection between the book and the content of the lesson, despite striking relevance[9]. The text in question was not included in this analysis of texts used in observed lessons, but it will be considered in a later analysis of texts referenced by students. Our initial analysis revealed that students generally failed to make connections between in-school and out-of-school reading. When students did spontaneously reference outside texts to support their understanding of lesson texts or content, they almost always cited materials read previously in the same class. It is not clear whether this is because instructional support for reading made these texts more memorable, or because students failed to recognize the relevance of texts they encountered outside the boundaries of the particular class.

Where reading happened. Our initial analysis identified the importance of teacher- and peer-supported in-class reading and comprehending for teacher monitoring, modeling and mentoring, and collaborative meaning-making that contributes to disciplinary reading and thinking. Because opportunities for instructional support are influenced by whether reading and comprehending happen in or out of the classroom, we examined whether students read as homework, or had opportunities to read and/or comprehend assigned texts in class. In lessons with multiple reading tasks, reading location for each task was coded separately. Across disciplines, the vast majority of both reading and comprehending took place in class, with in-class reading and comprehending occurring in 93% of all observed lessons; 91% of ELA, 92% of history and 100% of science lessons included in-class reading and comprehending. In addition to reading and comprehending in the classroom, students in 33% of observed English language arts lessons also read for homework. History and science students read for homework less frequently. However, when reading was assigned as homework, ELA, history and science teachers always provided opportunities for students to revisit homework reading in class. High rates of in-class reading and comprehending activities likely reflect the influence of Reading Apprenticeship on this

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[9] The student was reading *Survival of the Sickest: The Surprising Connections between Disease and Longevity* for pleasure outside of class. He showed his partner a "creepy fact" about DNA from the book, but did not relate it to the lesson, which included a LINK activity in which students listed what they knew or thought they knew and what they wanted to know about DNA, or the chapter, which was on the structure of DNA.

subsample of California teachers, and we anticipate the incidence of in-class reading and comprehending to be lower in the Chicago sample.

Table 6. Text Usage

	Total Lessons N=40		English N=21		History N=13		Science N=6	
	# lessons	% lessons	# lessons	% lessons	# lessons	% lessons	# lessons	% lessons
Where reading happens								
Homework only	--	--	--	--	--	--	--	--
Reading as homework, comprehending in class	10	25	7	33	2	15	1	17
Reading and comprehending in class	37	93	19	91	12	92	6	100
Assignment by lesson								
Teacher assigned	38	95	19	91	13	100	6	100
Student choice from teacher-selected set	3	8	3	14	--	--	--	--
Student choice	3	8	3	14	--	--	--	--
NA/Unknown	--	--	--	--	--	--	1	17

Multiple texts. In keeping with the central role of multiple source literacy in the study, we also looked at multiple text use, sequencing of multiple texts—i.e., whether texts were read and/or comprehended serially or simultaneously—and relationships between texts. Multiple texts were used in 85% of observed lessons, with 76% of ELA, 100% of history, and 83% of science lessons incorporating multiple sources. On average, lessons included nearly three texts—3.39 in history, 3.5 in science and 2.52 in ELA.

Relationship between multiple texts. While multiple text use was high across ELA, history and science, relationships between texts differed by discipline. Science lessons frequently paired a content text with instructional support materials. In 33% of all science lessons, content texts were paired with worksheets or study guides. Half of all science lessons involved pairing content materials with student notes from previous lectures or readings. Significantly, because nearly half of all texts in science were visual texts, student notes based on previous reading or lectures often provided the only written text used in the lesson. Furthermore, heavy use of worksheets and study guides in science meant that science students frequently approached texts to find information, rather than for understanding. In one science lesson, for example, students' notes were verbatim facsimiles, with different handwriting, but identical wording, apparently copied from teacher notes or lecture during a previous lesson. Dependence on notes in lieu of original texts thus meant that subsequent tasks were far removed from original sources, and lacking opportunities for sense-making or developing new understandings. Only half of science lessons utilized multiple content texts. In two cases, these were thematically or topically related multiple texts of different genres—e.g., a lesson on cell division included a photomicrograph of plant cells, a film clip of cell division, and a teacher drawing of a cell at a root tip—and in a third class, students saw multiple images of volcano formations.

 Like science, history lessons also frequently paired content texts with instructional support materials such as study guides, worksheets or handouts. However, history lessons also frequently included multiple content texts, and the dominant role of multiple sources in history— characterizing over half of all history lessons— was to offer multiple perspectives on the same topic, event, genre, or argument. Nearly a quarter of history lessons included thematically or topically related texts of multiple genres—for example, historical analysis with primary source documents.

English language arts lessons included the greatest diversity in relationships between multiple texts. In nearly a third of all ELA lessons, multiple texts provided multiple perspectives on same topic, event, genre, argument. In nearly a fifth, students read thematically or topically related texts of different genres—e.g., reading a textbook passage about Tenochtitlan with an Aztec legend, or watching a documentary about the bombing of Hiroshima in conjunction with Ray Bradbury's *Martian Chronicles*. In 19% of ELA lessons, students worked with multimedia forms of the same text—written texts paired with audio or film dramatizations of the same piece of literature. Only 10% of ELA lessons involved pairing content texts with instructional support materials, and while notetakers and notetaking were common in English classes, there was no lesson in which student notes or written artifacts of previous readings or lectures stood in for the original text.

Table 7. Multiple Text Usage: Relationship Between Multiple Texts

	Total SLI N=40		English N=21		History N=13		Science N=6	
Average texts per lesson	2.95		2.52		3.39		3.50	
	# lessons	% lessons	# lessons	% lessons	# lessons	% lessons	# lessons	% lessons
Single text	6	15	5	24	--	--	1	17
Multiple texts	34	85	16	76	13	100	5	83
Relationship between multiple texts								
Alternative perspectives/ forms on same topic, event, genre, argument, phenomenon	14	35	6	30	7	54	1	17
Ancillary text(s) builds background/context for focal text	2	5	1	5	1	8	--	--
Multimedia forms of same text	4	10	4	19	--	--	--	--
Multi-genre texts thematically or topically related	8	20	3	14	3	23	2	33
Ancillary text(s) provide instructional support (e.g., study guides, protocols)	9	23	2	10	5	39	2	33
Student-generated notes used as texts	6	15	--	--	3	23	3	50
Other relationship between multiple texts (SSR, other recreational text, different students read different texts)	6	15	5	24	--	--	1	17

In addition to lessons that drew on multiple sources to understand lesson content, in a quarter of all ELA lessons, students read SSR books—either with or without instructional support— that were not necessarily related to disciplinary content, but increased personal repertoires and informal opportunities for students to make cross textual connections, and observers noted instances when this happened—or might have happened, but didn't.

Coincidence of multiple texts. To determine how students worked with multiple texts, in all lessons incorporating multiple texts, we examined whether students worked with texts serially, simultaneously, or a combination of serially and simultaneously. Where students worked with more than two texts, we coded all relevant categories. We considered student notes, study guides and worksheets, and recreational reading separately.

Coincidence of multiple texts revealed large disciplinary differences, with multiple texts sequenced differently in science than in ELA and history. Despite the fact that 83% of science lessons used multiple texts, students in science classes worked with texts serially, with the exception of student notes or study guides and worksheets, which were used simultaneously with textbooks or other content area texts in two thirds of observed lessons. Other than instructional support materials, students did not read multiple texts simultaneously in any observed science lesson.

In English and history lessons, on the other hand, serial reading was always followed by working with texts simultaneously, or accompanied by a common notetaker to support intertextual processing—e.g., using a PRO (Primary Source, Reason to Distort, Other Evidence) notetaking and discourse routine to read competing explanations of an historical event by two historians (notetakers and other routines and protocols as supports for synthesized multiple sources will be addressed in depth in the analysis of instructional support). In 14% of English lessons and 31% of history lessons, students read multiple texts simultaneously from the onset—e.g., examining relationships between the "Declaration of Independence" and the "Declaration of Sentiments," or comparing two literature passages from an AP English Literature and Composition release exam. Considering all forms of simultaneity, 62% of English and 85% of history lessons engaged students in working simultaneously with multiple texts.

Table 8: Multiple Text Usage: Sequencing of Multiple Texts

	Total SLI N=40		English N=21		History N=13		Science N=6	
Average texts per lesson	2.95		2.52		3.39		3.50	
	# lessons	% lessons	# lessons	% lessons	# lessons	% lessons	# lessons	% lessons
Single text	6	15	5	24	--	--	1	17
Multiple texts	34	85	16	76	13	100	5	83
Sequencing of multiple texts								
Serial reading of multiple texts	3	8	--	--	--	--	3	50
Serial reading with common notetaker[10]	2	5	1	5	1	8	--	--
Serial followed by simultaneous reading	15	38	9	43	6	46	--	--
Simultaneous reading of multiple texts	7	18	3	14	4	31	--	--
NA/Unknown sequencing of multiple texts:	15	38	9	43	2	15	4	67
Student-generated text/study guide	*8*	*18*	*2*	*10*	*2*	*15*	*4*	*50*
SSR	*5*	*13*	*5*	*24*	*--*	*--*	*--*	*--*
Students read different texts	*2*	*5*	*2*	*10*	*--*	*--*	*--*	*--*
Starter activity: non-disciplinary recreational text	*1*	*3*	*--*	*--*	*--*	*--*	*1*	*17*

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[10] In these lessons, a common notetaker was the primary connection between multiple sources. Many lessons employed a common notetaker across sources. Use of notetakers will be explored in subsequent analyses of instructional support.

Implications of text properties and usage for evidence-based argumentation with multiple texts
Across observed lessons, science lessons were characterized by the narrowest range of texts, while English had the greatest diversity of text types. History fell in between. While it may be tempting to attribute these differences to differences inherent in the disciplines, a survey of scientific texts—notebooks and field notes, explanation and exposition, diagrams, data arrays, mathematical expressions, and graphs—suggests a degree of text complexity and diversity comparable to texts in literature and history. Furthermore, access to a range of text types contributes to advanced levels of disciplinary literacy across disciplines, and studies of college readiness suggest the imperative of incorporating complex reading materials into all high school courses, not just English and social studies (ACT, 2006). Access to diverse texts in science helps students develop a deeper understanding of scientific phenomena (Duschl, 1990; Duschl, et al., 2007), and fosters disciplinary literacy in English (Moje, 2007; Shanahan & Shanahan, 2008), and history (Reisman, 2011).

In our observations of English and history classrooms, text types used in lessons reflected domain-specific reading practices. The greater average number of texts in history and the frequent inclusion of primary sources suggests that history teachers were attempting to incorporate opportunities for corroboration across documents that characterizes reading in history (Wineburg, 1998). In ELA classes, the greater diversity of genres and predominant use of original source material suggests that English teachers recognized the central role of text complexity and the importance of working with complex literary and informational texts for achieving high levels of literacy (ACT, 2006; CCSS, 2010).
.
Despite disciplinary differences in text characteristics, our observations of experienced Reading Apprenticeship teachers in middle and high school suggest that textbooks exerted considerable influence on text use across disciplines. Heavy reliance on textbooks has implications for disciplinary and literacy learning. On one hand, textbooks frequently were the source of primary source documents and materials included in observed lessons, suggesting that textbook use supports teachers to embed original sources in their lessons. On the other hand, by reducing complexity and the effort required of readers, reliance on textbooks to the exclusion of other materials may restrict disciplinary thinking, knowledge building and evidence-based argumentation opportunities (Kerlin, McDonald & Kelly, 2010; Reisman, 2011). In one history lesson focused on the textbook, the observer noted, "Limited opportunity for E-BA when using one text from the textbook, especially an introductory chapter primarily focused on defining terms. When the materials are not challenging enough…there is limited room for deeper understanding and no room for argumentation."

Furthermore, even when textbooks are used as a source for original literary materials and primary source documents, as they frequently were in the English and history lessons we observed, those texts may be altered through excerptation, annotations, sidebars, and ancillary activities. While students may read past these interpretations in some lessons, in other lessons, teachers explicitly direct student attention and activity to these ancillary materials. Textbook modifications of original source material were rarely acknowledged or explored in the classrooms we observed. A single extra credit history assignment that engaged students in analyzing differences between a passage in the novel *Grapes of Wrath* and an excerpt in their textbook shed a rare spotlight on the altered state of materials excerpted in textbooks.

Yet research suggests that textbook alterations of primary source material affect student learning. In a study comparing scientific explanation and argumentation based on simplified textbook data (i.e., "primary source" data published in a textbook) and more complex original data sources, Kerlin, McDonald & Kelly (2010) found that "primary source" data in the textbook, simplified to highlight patterns without the noise of complex datasets, encouraged students to argue at a theoretical level, while struggling with the complexity of primary source data moved students toward more complex scientific understanding and reasoning. The preponderance of textbooks and other school-specific genres thus potentially alters and constrains evidence-based argumentation and disciplinary knowledge building in unknown ways.

In addition to text types, the ways texts were used in many observed lessons limited the potential of evidence-based argumentation, particularly in science. The frequent substitution of students' notes and written artifacts from previous lectures or reading for texts themselves in science, and to a lesser extent in history, meant that students were not required to revisit texts during subsequent argumentation tasks. While research suggests that argumentation tasks themselves are unlikely to result in the development of substantive new knowledge (von Aufschnaider, 2008), argumentation around text has the potential to deepen disciplinary knowledge and reasoning (Chinn & Anderson, 1998; Kerlin, McDonald & Kelly, 2010). In three science lessons where classification tasks could have potentially deepened students' understanding of science content, the absence of texts to inform students' arguments during the classification activity forced students to rely on shaky prior knowledge and limited both the depth of argumentation and the potential growth of new knowledge.

Multiple text use in both the English and history lessons we observed reflected domain-specific reading and thinking practices, but that was not the case in science. Congruent with interpretive practices of history, every history lesson we observed incorporated multiple texts, generally on thematically or topically related texts, often with the purpose of presenting multiple perspectives in the service of historical inquiry. In addition, history students almost always worked with texts simultaneously during the lesson. In contrast, while ELA lessons also frequently included multiple texts, these were less frequently used to problematize a topic or theme. Consistent with disciplinary reading practices, English lessons most often organized multiple texts around genre (e.g., pairing two poems) or theme (e.g., alienation), paired print and audio or film versions of a piece of literature, or incorporated ancillary materials to highlight a single genre or focal text. Even in the case of persuasive essay writing where multiple texts presented multiple positions, the focus was on highlighting genre and rhetorical devices, rather than comparing and contrasting content *per se*. Unlike ELA and history, in science, text use did not mirror disciplinary practices and multiple texts were rarely used in the service of science inquiry. Nearly half of all content texts used in science were visual images, and students frequently worked with those in the absence of written texts. When students did work with written text, teachers frequently paired a single authoritative text with instructional materials. Our analysis of text types and usage suggests that reading in the science classrooms observed was dominated by school-specific genres and activities, and offered little to move students beyond the comprehension of individual texts to reconcile differing possible explanations, discrepant, contradictory information, or dubious science.

Opportunity to Learn: Content Delivery and Task Focus

In addition to investigating text usage, our descriptive analysis asked the question: *What opportunities do students have to engage in tasks and activities central to disciplinary learning and argumentation discourse?*

"Task parameter" codes capture the kinds of tasks and activities offered to students in observed lessons. Tasks were coded on two dimensions: Content Delivery and Task Focus. The following section elaborates the two text-related dimensions that were the focus of the Task parameters analysis.

Content Delivery: Content Delivery refers to the mechanisms by which students were exposed to content, both in the input phase that generally occurred at the beginning of an assignment and throughout, as students continued to work with lesson content. While the Text Properties *media* construct identifies properties of texts themselves, the *content delivery* dimension focuses on the intellectual work and language processing demands of various content delivery mechanisms, and the control students have over processes and pacing of content acquisition. For example, while it may take only 2-3 seconds to recognize the content in an image and 20–30 seconds to read a verbal description of the same image (Avgerinou & Pettersen, 2011), puzzling over a photograph on paper is different from viewing it as part of a PowerPoint presentation. To capture theoretically important conceptual distinctions across the range of *content delivery* mechanisms we observed, we developed a set of six *content delivery* codes. Unlike *media*, the primary conceptual distinction captured by content delivery codes is not between written, audio, visual and concrete object, but on how text is presented. The six codes within this dimension include:

1. *Reading*. This construct refers to tasks where students glean content by reading text(s), individually or collaboratively. While reading is defined broadly to include reading a wide range of materials, including graphics, etc., from a wide range of sources, including computer screens, not just connected text and traditional print material, what distinguishes reading from other Content delivery codes is that it affords the ability to look at text carefully and confers responsibility on the reader for making meaning. Audio and video recordings are not coded as *Reading*, since the intellectual work of learning from those texts is different from reading texts presented as print materials.

2. *Listening to professional read aloud*. This construct identifies tasks in which content is delivered by listening to text read/performed aloud by professional actors (e.g., through audiorecordings) or teachers. This may or may not involve following along in text, but the primary focus is on listening to content delivered orally.

3. *Viewing* identifies task content delivered through video/film, PowerPoint or other visual presentation that affords a receiver-oriented stance toward content acquisition.

4. *Student presentation* refers to content garnered by listening to a presentation by classmate(s). May be some interaction with other students or teacher, but primary focus is on content delivered in student presentation. Sharing out as the culmination of partner or group work or problem solving is not coded as *Student presentation* if

all students learned the presented content through some other content delivery mechanism.

5. *Lecture.* This construct identifies tasks in which content is delivered via teacher lecture, demonstration or PowerPoint, in which teacher has done the work of understanding and organizing material and delivers information to students. *Lecture* may involve some student interaction around presented material, but the primary focus is on teacher delivered content.

6. *Student read-aloud* identifies content delivered by students taking turns reading aloud or listening to classmates read aloud. Student read-aloud is a separate category from *Listening to professional read aloud* because its challenges and affordances are different from content delivered by professional actors or teachers. If the student read-aloud is in the form of readers' theater or other prepared presentation, Task description is coded as *Disciplinary knowledge building*, and Content delivery as *Reading*.

Task Focus: The purpose of this dimension is to identify what tasks asked students to learn and do. Task was defined broadly as a single activity/episode or series of activities/episodes unified around a common focus (e.g., reading multiple texts in a variety of participation structures to answer an essential question or inform a debate, etc.). In making decisions about whether to code a segment of instruction as a separate task, researchers looked for significant shifts in what activities asked students to know and do, and in the texts and supports required for them to learn and do those things. When tasks within a lesson involved different texts, required significantly different supports or ways of thinking and learning—even if they contributed to the same long-term culminating learning goal or activity— they were coded as separate tasks.

Task Focus captures opportunities to learn from tasks and activities in observed lessons. A task was either a single activity/episode or series of activities/episodes unified around a common focus (e.g., reading multiple texts in a variety of participation structures to answer an essential question or inform a debate, etc.). In making a decision about whether to code a segment of instruction as a separate task, we looked for significant shifts in what the activities asked students to know and do, and in the texts and supports required for them to learn and do those things.

Task Focus consists of 10 molar codes, or constructs, organized around three broad categories of tasks that emerged from our initial analysis: Close reading, Disciplinary knowledge building and Argumentation. Because our initial analysis suggested that promising opening routines that focus on learning and invite students to actively participate in the class may increase engagement and learning, we also created an 11th task construct, *Starter activities*. Within many constructs, molecular codes were generated to reflect important conceptual distinctions and variations across the dataset. Each task was coded for task focus. When tasks engaged students in multiple learning opportunities, we coded the task to all relevant Task Focus categories. Definitions of the 11 Task Focus constructs are presented below:

1. *Close reading: Literacy/sense-making focus.* This construct identifies tasks that ask students to engage in interactive negotiation of meaning at the local and global levels

to unearth and evaluate possible meanings, individually or collaboratively. Characterized by approaching texts to understand vs. to find information. Close reading reflects the basic understanding and attitude that reading means comprehending, interpreting, analyzing, and critiquing texts (Norris & Phillips, 2003).

2. *Close reading: Discipline-specific focus*. Like *Close reading: Literacy/sense-making focus*, this construct identifies tasks that engage students in interactive negotiation of meaning at the local and global levels to unearth and evaluate possible meanings, individually or collaboratively. However, *Close reading: Discipline-specific focus* is characterized by comprehending, interpreting, analyzing, and critiquing texts through interpretive practices of the discipline.

3. *Text search/fact extraction* refers to tasks characterized by approaching texts to find information, rather than for understanding, with little opportunity for sense-making.

4. *Cross textual analysis* identifies tasks that ask students to synthesize, evaluate, or critique information from multiple texts (e.g., comparing/contrasting across evidence/representations to notice, reconcile agreements/ disagreements).

5. *SSR, independent silent reading.* This category identifies reading activities that foreground independent reading with little or no formal guidance, to build reader preferences, fluency, etc.

6. *Argumentation* refers to tasks that ask students to make a claim or assertion that is supported by evidence that connects to the claim in a principled way. Tasks may or may not be explicitly identified as "argumentation." Argumentation tasks are framed as inquiry into multiple possibilities and/or viewpoints (i.e., asking students to find "evidence" to support a fact is not argumentation). Additional codes within argumentation identify more fine-grained features of argumentation tasks, such as whether the task is characterized by arguing to learn, or learning to argue. *Interactive argumentation* that is a byproduct of negotiating meaning is not coded as *Argumentation* if the task itself does not explicitly solicit claims and evidence.

7. *Disciplinary knowledge building* identifies tasks characterized by approaching the discipline and disciplinary knowledge building through overarching frameworks, concepts and themes. Disciplinary knowledge building may involve activities such as discussing, researching, preparing oral presentations, posters/illustrations, answering questions and drafting compositions focused on disciplinary questions, arguments and practices. These are generally summative tasks that follow an input phase in which students learn new information through reading, lecture, film, etc.—although they may involve returning to texts and artifacts for clarification and to gain deeper understanding of content. Disciplinary knowledge building tasks often ask students to identify or apply disciplinary epistemologies, frameworks, concepts and themes to specific cases, situations or contexts.

8. *Content focus: Limited narrow content focus*. In contrast to *Disciplinary knowledge building* tasks that engage students in using overarching epistemologies, frameworks, concept and themes of the discipline, this construct refers to tasks that focus on content in the form of facts, algorithms, and vocabulary such as answering study guide questions, defining vocabulary words, or filling in a worksheet, with little opportunity for sense-making. *Limited narrow content focus* tasks generally follow an input phase in which students learn new information through reading, lecture, film, etc.—although they may involve returning to texts and artifacts to find answers or information.

9. *Testing*. This category identifies activities focused on testing rather than teaching/learning, i.e., taking a test or quiz.

10. *Skills*. This category identifies tasks focused on teaching or practicing skills in isolation of reading or content knowledge development. *Skills* is reserved for decontextualized skills instruction. Learning and practicing comprehension supporting routines and disciplinary literacy practices in the context of reading are coded as *Close reading: Literacy/Sense-making focus* or *Close reading: Discipline-specific focus*.

11. *Starter activities*. These tasks are opening activities, generally focused on building motivation; accessing and building prior knowledge; and connecting the upcoming lesson with prior lessons or homework assignments.

To answer the question, *What opportunities do students have to engage in tasks and activities central to disciplinary learning and argumentation discourse?,* we calculated the number and percentage of lessons incorporating tasks and activities for each *Task focus* construct. In addition to looking at the whole sample, we looked at *Task focus* constructs by discipline.

Table 9. Content Delivery by Discipline

Content Delivery	Total N = 40		English N=21		History N=13		Science N=6	
	N	%	N	%	N	%	N	%
Reading	38	95	19	91	13	100	6	100
Listening to professional read-aloud	4	10	4	19	--	--	--	--
Subset[11]: Teacher read aloud	1	3	1	5	--	--	--	--
Viewing	4	10	2	10	1	8	1	17
Total electronic media (3 audio and 4 video/film)	7	18	5	24	1	8	1	8
Student presentation	4	8	1	5	1	8	2	33
Lecture	2	5	--	--	1	8	1	17
Student read-aloud	1	3	1	5	--	--	--	--

[11] Subset of Listening to Professional Read Aloud where students listen to teacher read aloud, rather than to audio recording of actors

Content Delivery

As shown in Table 9, although content in observed lessons was delivered in a variety of ways, content was overwhelmingly acquired through student reading of texts, either individually or collaboratively. This was not surprising, given our request to observe lessons in which reading and discussion played a central role. Only two lessons—both English— did not involve independent reading of texts. In these lessons, students listened to texts read aloud. In one case the teacher read a short story aloud. In the other, a subset of students read an unrehearsed teleplay aloud. While students in both lessons listened to text read aloud, challenges and affordances for students listening to the skilled reading of a teacher are different from those afforded by listening to classmates read aloud.

In 18% of lessons that included reading, content was also delivered through electronic media in the form of audio or video/film. This was more common in ELA classrooms, where nearly a quarter of all lessons included delivery of content through listening or watching. Listening to content read aloud—either by actors or by the teacher— occurred only in English language arts lessons.

Lecture was uncommon in these classrooms, perhaps because most of the teachers observed had long been working to implement Reading Apprenticeship in their teaching. Only two lessons incorporated lectures, and both of these instances would be more accurately characterized as brief *mini-lectures* that prefaced students' own reading. In three lessons, content that was not delivered through other mechanisms was delivered in student presentations.

While there was little diversity in the way students learned content in the California lessons, it is likely that the addition of the Chicago data will alter these findings, and greater diversity in content delivery in the whole sample will permit us to examine the role of content delivery mechanisms on student engagement and potential learning in future analysis.

Task Focus

Starter activities. The majority of observed lessons began with a starter or "do now" activity, either related or unrelated to the content of the lesson. In general, these activities involved responding to a teacher-generated prompt. Most starter activities were related to lesson content and generally connected the observed lesson to previous lessons or homework assignments. Forty percent of observed lessons began this way. Starters related to lesson content included: a vocabulary routine where the word of the day (*justification*) was woven throughout an entire English lesson; a metacognitive quick write about why it was becoming easier for students to read *Romeo and Juliet*; a "Do Now" where students recalled the previous day's reading to identify elements of classical, medieval and Renaissance art; and a prompt that linked homework reading with a biology lesson on cell division (*Which phase in cell division takes the longest amount of time? Hint: use homework)*. A quarter of the lessons began with teacher-generated starters that were not directly related to content of the upcoming lesson. In general, these focused on community building and fostering dispositions to learn. These included: a starter with a civics focus in an English class (*Copy the prompt below and answer it. Write at least 3 sentences using 2 amazing words: What is one duty you have in school? What I one duty you have at home?*

What's one duty you have to your friends); a community building activity where new group members shared SSR book choices; and a riddle game designed as a fun way to begin class.

In contrast to starter activities based on teacher-generated prompts, in 23% of lessons, teachers started the lesson by asking students to review their own annotations or notes from a previous lesson or homework assignment in preparation for the day's activities. We labeled these activities where students themselves did the intellectual work that prepared them to participate in the lesson "bootstrapping" activities. Future analysis will explore our hypothesis that bootstrapping routines are associated with lessons with high levels of student engagement, agency and learning.

Reading

Close reading. Our initial constant comparative analysis suggested that reading and discourse routines that require students to read with attention to evidence and interpretation are important building blocks for E-BA. We therefore looked at opportunities for students to engage in close reading tasks that that involved interactive negotiation of meaning at the local and global levels to unearth and evaluate possible meanings.

Given that we asked to see lessons in which reading played a central role, it is not surprising that nearly every lesson we observed included some kind of reading activity. The vast majority of reading in classrooms observed in California was close reading, characterized by approaching texts to understand vs. to find information, again not surprisingly given teachers' experience with Reading Apprenticeship. Opportunities for close reading with a literacy/sense-making focus occurred in 63% of observed lessons, while discipline-specific close reading tasks that engaged students in interpretive practices of the discipline occurred in 68% of lessons. Forty-three percent of lessons included opportunities for both literacy/sense-making and discipline-specific close reading. In over half the lessons, whether close reading had a literacy/sense-making or a discipline-specific focus or both, students returned to the same text multiple times. Multiple readings or revisiting of the same text occurred in over half of all ELA lessons, and over two-thirds of history lessons.

Close reading happened in a variety of instructional settings, and students frequently engaged in close reading in multiple groupings. In over a third of observed lessons, close reading occurred as a recursive cycle of individual, peer and teacher-facilitated whole class collaborative meaning-making. Only two lessons employed close reading solely as an individual activity.

In addition to social support, close reading was often supported by routines such as annotating (*Talking to the Text*) and think alouds that became the foundation for collaborative meaning-making conversations. The role of these and other close reading routines, tools and supports in supporting student engagement and literacy practice will be explored in subsequent analysis of instructional support in the observed lessons.

Close reading opportunities differed across disciplines. In both English language arts and history, close reading was nearly ubiquitous. Close reading was less common in science classrooms. Only one science lesson included a literacy/sense-making close reading task, and a second lesson

included a discipline-specific close reading activity. No science class included both literacy/sense-making and discipline-specific close reading in a single lesson, and only a single science lesson provided the opportunity for students to read or revisit the same text more than once. While fact extraction tasks characterized by approaching texts to find information rather than reading for understanding were rare across the 40 lessons, appearing in only 5% of observed lessons, they occurred in a third of observed science lessons.

Cross textual analysis. Because our definition of reading for understanding focuses on multi-source disciplinary literacy, we were interested in whether observed lessons included tasks that required students to synthesize, evaluate, or critique information from multiple sources (for details on texts types and relationships between multiple sources, see the discussion of multiple texts usage beginning on p. 34). Nearly two thirds of ELA and history lessons included cross textual analysis activities. In the majority of these lessons, the task explicitly required synthesis, evaluation, or critique of information across multiple sources. In a few cases, cross textual analysis was implied when students worked simultaneously with multiple texts to inform an essential question or disciplinary issue or argument. No science lesson included a task that required students to analyze across sources.

Disciplinary Knowledge Building

Most lessons included tasks that approached disciplinary knowledge building through overarching frameworks, concepts and themes of the discipline—engaging essential disciplinary questions or arguments, or learning and applying interpretive practices through activities such as discussion, research, preparing oral presentations, answering questions or drafting compositions. Disciplinary knowledge building tasks generally followed an input phase in which students learned new information, although they frequently involved returning to those sources for clarification and to construct deeper, disciplinary understandings of lesson materials and content[12]. While opportunities and support for sense-making and inquiry varied considerably across observed lessons, only three lessons involved tasks that framed content primarily by recall or rote learning with little or no attention to larger frameworks, concepts and themes. Findings related to disciplinary knowledge building tasks are found in Table 10.

Disciplinary knowledge building tasks were common across all three disciplines, and were included in 80% of observed lessons. (The somewhat lower incidence of disciplinary knowledge building tasks in ELA classes is likely an operationalization issue, due to the overlap between close reading and disciplinary knowledge building in English, where close reading—the basic understanding and attitude that reading means comprehending, interpreting, analyzing, and critiquing texts—is the heart of literacy reasoning and more formal interpretive practices of the discipline.) Features of disciplinary knowledge building tasks differed according to discipline, as shown in Table 11.

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[12] We have not included starter or "do now" activities in our analysis of disciplinary knowledge building activities. These tasks, which play a specific role in lesson design, will be included in subsequent analysis of lesson architecture.

In both English and history, disciplinary knowledge building tasks generally involved open ended inquiry questions with better or worse rather than true or false answers, and almost always required additional close reading.

Close to 90% of disciplinary knowledge building tasks in English and history involved working with texts, and that figure increases to 100% if students' own notes from previous readings and lecture are included. Disciplinary knowledge building tasks requiring discipline-specific close reading accounted for many instances of revisiting texts. Because they involved revisiting, reorganizing and reconstructing texts and meanings in new way— even when their ultimate goal was to demonstrate understanding, as in the case of disciplinary essay writing assignments— disciplinary knowledge building tasks in ELA and history provided opportunities for deepening learning. The following examples are typical of disciplinary knowledge building tasks in ELA and history:

1. After close readings of five World War II propaganda posters, students in a 9th grade history class were asked to synthesize information across texts/posters and write a paragraph answering the essential question, "How did countries use national pride to convince men to join the war?," drawing on evidence from the posters to support their claims.
2. After a whole class, teacher facilitated reading of the *US Constitution*, students in an 8th grade history class wrote everything they already knew about the Constitutional Convention. They then watched and discussed a clip of a video, *Liberty Kids*. Finally, as an "exit ticket" for the day, students wrote 3-5 things they learned during the lesson.
3. After an extended partner and teacher-facilitated whole class discussion of an essay surfaced alternative interpretations of author's purpose, individual students in an 11th grade English class returned to the text and used a disciplinary tool to examine syntax, figurative language, imagery and detail and how those communicated author's purpose.
4. In an 8th grade ELA class, students worked with a short story, "Coyote Steals the Sun." After completing a summary and literary analysis chart, they used the text and their notes to identify a message or moral in the story, and to find evidence that supported their claim. Finally, they were asked to write a paragraph with their claim and evidence.
5. At the end of a unit on *Romeo and Juliet*, students in a 9th grade English class began work on a compare and contrast essay of the written text and two film versions of the play. In the observed lesson, students looked for lines that stood out to them as a viewing lens to compare and contrast the written text and the two films. Students worked in groups to select lines and justify their selections. They then watched clips from one of the movies.

Table 10. Task Focus by Discipline

Task Focus	Total N = 40		English N=21		History N=13		Science N=6	
	N	%	N	%	N	%	N	%
Close reading: Literacy/sense-making	25	63	15	71	9	69	1	17
Close reading: Discipline-specific	27	68	17	81	9	69	1	17
Literacy/sense-making **only**	10	25	6	29	3	23	1	17
Discipline-specific **only**	15	38	8	38	6	46	1	17
Literacy/ sense-making **and** Discipline-specific close reading	17	43	11	52	6	46	--	--
Total close reading	35	88	21	100	12	92	2	33
Close reading groupings								
Close reading: Individual	*24*	*60*	*15*	*71*	*8*	*62*	*1*	*17*
Only individual	*2*							
Close reading: Peer	*27*	*68*	*18*	*86*	*8*	*62*	*1*	*17*
Only peer	*1*							
Close reading: Whole class	*27*	*68*	*16*	*76*	*9*	*69*	*2*	*33*
Only whole class	*3*							
Close reading: Recursive cycle	*14*	*35*	*10*	*48*	*4*	*31*	--	--
Text search/fact extraction	2	5	--	--	--	--	2	33
Cross textual analysis	21	53	13	62	8	62	--	--
Subset: Implicit cross textual analysis	*4*	*10*	*2*	*10*	*2*	*15*		
Subset: Explicit cross textual analysis	*17*	*43*	*11*	*53*	*6*	*46*	---	---
SSR, independent silent reading	4	10	4	19	--	--	--	--

Argumentation	24	60	13	62	8	62	3	50
Disciplinary knowledge building	32	80	16	76	11	85	5	83
Content focus: Limited/narrow content focus	3	8	--	--	1	8	2	33
Testing	2	5	--	--	2	15	--	--
Skills	2	5	1	5	1	8	--	--

Table 11. Subset of Lessons with Disciplinary Knowledge Building by Discipline

	Total N = 32		English N=16		History N=11		Science N=5	
	N	%	N	%	N	%	N	%
Source informing disciplinary knowledge building task								
Working with text	25	78	15	88	10	91	--	--
Working with student notes only	3	9	1	6	1	9	1	20
No texts	4	13	--	--	--	--	4	80
Grouping								
Individual only	2	6	--	--	1	9	1	20
Collaborative only	19	59	7	44	9	82	3	60
Individual and collaborative	11	34	9	56	1	9	1	20
Product of disciplinary knowledge building tasks								
Knowledge building product								
Writing for knowledge building	8	25	4	25	2	18	2	40
Exit ticket	4	13	1	6	3	27	--	--
Student seminar	1	3	1	6	--	--	--	--
Test review	1	3	--	--	1	9	--	--
Total knowledge building products	16	50	6	38	6	55	2	40
Knowledge demonstrating product								
Informal written or oral evidence-based analysis	6	19	3	19	3	27	--	--
Disciplinary essay	6	19	6	38	--	--	--	--
Student presentation	3	9	--	--	3	27	--	--
Classification	4	13	--	--	1	9	3	60
Poster	1	3	1	6	--	--	--	--
Total knowledge showing products	20	63	10	63	7	64	3	60

In science, disciplinary knowledge building tasks generally involved practicing and demonstrating mastery or comprehension of content material, and 66% occurred in the absence of content area texts. The most common disciplinary knowledge tasks in science, observed in three of six science lessons, were classification tasks that involved selecting the right answer from a limited set of possibilities by mapping characteristics onto a specific case or cases. These classification tasks depended on information students were given during a previous input phase—often in a previous lesson— and did not involve revisiting sources, although students occasionally drew on their own notes. Because these classification activities took place without reference to texts, even when students drew on prior knowledge to support their thinking, the tasks offered limited opportunities to learn. Following are typical interactions between members of small groups classifying volcanoes from four photographs of volcanoes:

[Image of Mt. St. Helens, Washington]
S1: That's a composite one.
S2: Yes.
S3: It's a shield.
S1: It's a composite, because remember like the fireworks was like a composite?
S3: Oh yeah.

[Image of Mount Fujiyama, Japan]
G1: Composite
G2: But it is kind of low.
G1: I think it is a composite.
G2: But it goes up-ish.
G1: It equals composite.
G1: I know it is composite [Mt St. Helens] because it is in the United States and most in the United States are composite.
T: The first, are you sure it is a composite?
G2: I said it was shield.
G1: But it looks like—
T: So everyone agrees?
B1: Japan right?
G2: The first one is a shield. I'm writing it.
B1: But look at it.
B2: Let's see the forth one.
G2: Smoke.
G1: Remember on tests she does some of each?
B2: I think the first one is shield.

In a variation on this classification task genre, students in one science class extracted facts about a single insect species from an informational text and filled in a worksheet, then presented their insect to the class. Both variations of the classification task involved mapping characteristics correctly onto limited, predetermined possibilities.

Open-ended disciplinary knowledge building tasks were offered in three science lessons. It is noteworthy that all three involved speculation and were not connected to evidence that could confirm or disprove students' opinions. While these tasks—and science classification tasks described above as well—were potentially evidence-based argumentation opportunities that might have served science inquiry, they were not designed to support students in connecting claims to evidence in a principled way. At the close of a subsequent lesson in the insect unit, students responded in writing to the prompt, *What would the world look like without insects*? Students were not asked to provide evidence for their thinking and the class ended before student responses were debriefed and analyzed. The second open-ended disciplinary knowledge building task in science was a LINK (List, Inquire, Note, Know) activity that introduced a new textbook chapter. Students Listed and shared what they thought they knew about the topic, then students used their thumbs to indicate agreement or disagreement for each item. Next students generated and shared Inquiry questions. But the subsequent textbook reading activity was a fact extraction task where students filled in a study guide without a second glance at their Inquiry questions. Finally, in another lesson in the volcano unit, students were asked whether they would prefer to live near a composite or shield type volcano and why. While students could draw on prior knowledge and notes to inform their answers, the activity was designed as a lead-up to a volcano classification task and students were not expected to support their opinions with evidence and there was little opportunity for learning:

S: Like if there is some traffic jam or something, the people who live near a shield would be worse because a composite volcano would – there would be less traffic jams.
T: Near a composite or shield?
S: Near a shield would be more congested if most choose to live next to one.
T: I see what you are saying.

Disciplinary knowledge building activities were almost always collaborative. In history and science, the tasks were often exclusively collaborative, while in English, students worked both individually and collaboratively on 56% of disciplinary knowledge building tasks. This may be related to the greater frequency of individual essay writing assignments as the focus of disciplinary knowledge building tasks in English, although in class time on these tasks was used for essay planning and collaborative meaning making, rather than writing *per se*.

Disciplinary knowledge building tasks resulted in a wide range of student products that served both knowledge building (e.g., journal entries, KWL charts, disciplinary notetakers or summaries of lesson texts or topics, and student seminars) and knowledge showing (e.g., informal written or oral evidence-based analysis, disciplinary essays, student presentations, and classifications). Disciplinary essays were found only in English lessons, where nearly 40% of disciplinary knowledge building tasks focused on supporting essay writing assignments. Disciplinary knowledge building in history and science produced less formal writing, oral presentations or activities.

Argumentation

Argumentation is a subset of disciplinary knowledge building. Because we consider reading for understanding to be the capacity to engage in evidence-based argumentation with multiple sources, we carried out a close descriptive analysis of argumentation tasks in the observed

lessons. We defined argumentation as tasks that asked students to make a claim or assertion that is supported by evidence that connects to the claim in a principled way, *whether or not the task was explicitly identified by the teacher as "argumentation."* Although they did not meet our rigorous definition of evidence-based argumentation, in order to support our understanding of disciplinary differences in argumentation, our analysis also included the classification tasks common in science lessons that only implicitly linked claims to evidence. Persuasive writing or opinion-giving tasks were included when they required evidence to support claims or opinions. Interactive argumentation that was a byproduct of negotiating meaning was not coded as argumentation if the task itself did not explicitly solicit claims and evidence. However, because our constant comparative analysis suggested that interactive argumentation is a potentially important building block for the development of more formal argumentation skills, we also looked at the frequency of interactive argumentation in the observed lessons.

In addition to looking at the frequency of argumentation, our analysis explored key distinctions that emerged from the initial constant comparative analysis. Specifically, we examined whether tasks focused on argumentation as a tool for the construction and understanding of disciplinary knowledge and practices (arguing to learn), or focused on explicitly teaching and applying language, structure and principles for disciplinary argument (learning to argue). We also looked at who generated arguments, claims and evidence. Results of this analysis are shown in Table 12.

Twenty-four of the 40 lessons included argumentation tasks that asked students to make a claim that is supported by evidence that connects to the claim in a principled way. Sixty-two percent of both ELA and history and half of all science lessons included argumentation tasks. The majority were disciplinary argument tasks, with a smaller number focused on classification and persuasive writing.

Table 12. Subset of Lessons with Argumentation by Discipline

	Total N = 24		English N=13		History N=8		Science N=3	
	N	%	N	%	N	%	N	%
Total argumentation	24	60	13	62	8	62	3	50
Argument context: Who generates claims and evidence?[13]								
Students determine correct answer from limited set of given possibilities	4	17	--	--	1	13	3	100
Teacher generates claim, students generate evidence	1	4	1	8	--	--	--	--
Students select from two alternative claims, students generate evidence	3	13	3	23	--	--	--	--
Students generate claims and evidence from teacher- or student-framed argument	13	54	9	69	4	50	1	--
Subset[14]: Students frame argument, generate claims and evidence	*3*	*13*	*3*	*23*	*--*	*--*	*--*	*--*
Students evaluate author's claim/s and/or evidence	3	13	--	--	3	38	--	--
Focus of argumentation: Arguing to learn								
Total arguing to learn	21	88	10	77	8	100	3	100
E-BA classification tasks	4	19	--	--	1	13	3	100
Disciplinary argument	18	75	10	77	7	88	1	33
Focus of argumentation: Learning to argue								
Total learning to argue	10	42	5	39	5	63	--	--
Persuasive essay: focus on rhetoric	3	13	3	23	--	--	--	--
Embedded learning to argue	7	29	2	15	5	63		
Of the 7 tasks that embedded learning to argue, numbers and percentages that addressed …								

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[13] Percentages of subset of 24 argumentation tasks

[14] Subset of total argumentation tasks where argument surfaced from students' close reading

	Total N = 24		English N=13		History N=8		Science N=3	
	N	%	N	%	N	%	N	%
Evaluating sources	4	57[15]	1	50	3	60	--	--
Identifying evidence	4	57	2	100	2	40	--	--
Rhetoric of argument	2	29	--	--	2	40	--	--
Interactive argumentation	35	88	21	100	12	92	2	33

[15] Percentage of the subset of embedded arguing to learn tasks that addressed this element of argumentation

Arguing to learn. Hillocks (2010) describes argumentation as an inquiry process that begins with looking at data: "When the data are curious, do not fit preconceptions, they give rise to questions and genuine thinking. Attempts to answer these questions become hypotheses, possible future thesis statements that we may eventually write about after further investigation" (p. 26). In the lessons we observed, argumentation rarely arose from student-generated hypotheses or questions. While argumentation tasks generally gave students responsibility for generating claims and evidence, in 88% of argumentation tasks, teachers framed a disciplinary question or issue and students generated claims, found supporting evidence and/or developed arguments.

The majority of argumentation tasks were organized around a disciplinary question that required students to generate claims and evidence connected to the claim in a principled way. Examples of these questions included: *Which union would you have joined if you had shared a workplace in the late 19th century*? *What traits do you think the Aztecs admired or felt were useful to their society*? and *How did countries use national pride to convince men to join the war*? There were disciplinary differences in arguing to learn tasks. Argumentation tasks in history mirrored domain-specific reading and reasoning strategies. While half the argumentation tasks in history classes required students to generate arguments in response to an event or phenomenon in history, 38% involved evaluating authors' claims and evidence in order to generate claims and evidence about the trustworthiness of sources. This argumentation task genre only appeared in history lessons and reflects the sourcing heuristic at the core of history reading and thinking.

While research on science teaching and learning identifies multiple roles for evidence-based argumentation in science instruction, argumentation tasks in the science lessons we observed were largely limited to a single argumentation genre. As noted earlier (see section on disciplinary knowledge building beginning on p. 43), argumentation tasks assumed the form of classification activities that asked students to determine the correct answer from a limited set of given possibilities. While these tasks could have potentially deepened disciplinary knowledge by asking students to describe and explain competing mechanisms for scientific phenomena, they were not structured to support evidentiary thinking or to explicitly require students to connect claims/explanations to evidence in a principled way. Students in science classes never engaged in disciplinary arguments to construct, critique, vet or verify ideas.

As a discipline, English language arts classes offered students both the most liberal and the most limited role in shaping argumentation tasks—perhaps because the discipline straddles literary analysis that values evidence-based argumentation, and rhetoric, which emphasizes "the faculty of observing in any given case the available means of persuasion" (http://www.public.asu.edu/~mdg42/ENG530rhetdef.html). Argumentation tasks in ELA included assignments that most closely approximated Hillocks' (2010) ideal, where thesis statements or claims surfaced from students' close reading and formed the basis for disciplinary analysis or essays. Nearly a quarter of arguing to learn tasks in English conformed to this model. In contrast, learning to argue tasks generally led with a teacher-framed argument and students approached the text to find evidence to develop and support a position.

Learning to argue. Three lessons involved argumentation tasks exclusively focused on learning to argue. These were all related to persuasive writing assignments in English. In contrast to disciplinary argument tasks, tasks focused on the rhetoric of argument tended to offer students a

more limited role in shaping the argument. While only 13% of total argumentation tasks in the observed lessons involved a forced choice between two alternative teacher-generated claims, tasks of this kind accounted for nearly 25% of all argumentation tasks in English. Two such tasks were modeled on the AP English Language and Composition Synthesis Essay and were designed to teach evidence based argumentation using multiple sources. In both cases, the task posed a two-sided argument and students read various sources to develop their argument. The topics were not literary, but drawn from social and public policy issues —*Are athletes role models*? *Should the penny be abolished*? Research on argumentation suggests that simplifying the problem context may support students to engage in other aspects of argumentation in more complex ways (Berland & McNeill, 2009), and this could explain why learning to argue tasks were characterized by more limited student choice than literary analysis and essay arguing to learn tasks. However, on the surface, persuasive writing tasks were designed in ways that could potentially encourage oversimplification and inadvertently promote rhetorical devices over evidentiary thinking. Future analysis will examine instructional support, classroom discourse, student work and lesson artifacts for evidence of student engagement and learning and to determine how learning to argue tasks might support and deepen argumentation as a disciplinary knowledge building tool.

While only three argumentation tasks focused exclusively on learning to argue, seven other argumentation tasks included elements of both arguing to learn and learning to argue. As the discipline traditionally responsible for teaching rhetoric, it is not surprising that over one third of argumentation tasks in English embedded a learning to argue focus. However, nearly two-thirds of history argumentation tasks also involved learning to argue. The most frequent focus of these arguments was evaluating sources. History argumentation tasks in the observed lessons also addressed identifying evidence and the language and structure of argument. Future analysis will determine if and how embedded support for learning to argue is related to domain-specific language and discourse practices.

Interactive argumentation. Finally, we looked at opportunities for interactive argumentation. Norris and Phillip's (2003) notion of *fundamental literacy* casts reading as argumentation where text processing assumes the form of argumentative inquiry: "lack of understanding is recognized; alternative interpretations are created; judgment is suspended until sufficient evidence is available for choosing among the alternatives; available information is used as evidence; new information is sought as further evidence; judgments are made of the quality of interpretations, given the evidence; and interpretations are modified and discarded based upon these judgments and, possibly, alternative interpretations are proposed…" (p. 229). When these individual close reading processes are made public through metacognitive conversation, the resulting collaborative negotiation of meaning provides opportunities for *interactive argumentation*. Interactive argumentation is a by-product of negotiating meaning and usually takes the form of a conversation rather than a formal argument (Chinn & Anderson, 1998). We identified interactive argumentation opportunities to learn as those tasks that encouraged reason-giving thinking by asking students to clarify confusions and figure things out in the context of negotiating meaning about texts in partner, small group and whole class settings.

Opportunities to learn interactive argumentation were identified in 88% of the observed lessons, including 100% of ELA lessons, 92% of history lessons, and 33% of science lessons. Given that

close reading almost always involved collaborative meaning making about text, it is not surprising that those percentages are identical to the figures for total close reading (see Table 13, below).

Table 13. Close Reading Routines by Discipline

	Total N = 40		English N=21		History N=13		Science N=6	
	N	%	N	%	N	%	N	%
Total close reading	35	88	21	100	12	92	2	33
Close reading routines								
Talking to the Text/Annotating	20	50	11	52	7	54	2	33
Think Aloud	4	10	--	--	4	31	--	--
Multiple readings	21	53	11	52	9	69	1	17

Implications of instructional tasks for opportunity to learn evidence-based argumentation with multiple texts. Even in the context of this analysis of texts and tasks, the role of instructional support and classroom climate in engagement and learning from evidence-based argumentation with multiple texts is apparent. Observations surfaced numerous promising practices and missed opportunities for evidence-based argumentation with multiple sources in the disciplines, related both to texts and tasks.

While most lessons incorporated multiple texts, teachers sometimes failed to grasp opportunities for cross textual analysis that might support their disciplinary learning goals. For example, one English lesson opened with a quick write related to a Zuni myth that was the focus of the lesson, in which students wrote about a hero from a book or movie. The starter activity was followed by SSR with novels. The two parts of the lesson were presented as separate reading tasks, and students did not seem to connect the texts, nor was this asked of them. The researcher speculated on the greater impact the lesson might have had if students had been encouraged to consider the concept of hero in relation to their SSR novels instead of simply drawing from their heads. Even when teachers themselves saw connections between texts, they sometimes did not make the connections clear to students. One science lesson was carefully designed around multiple texts of multiple genres that built toward identifying the processes and phases of cell division. But in the absence of explicit cross textual analysis or an essential question or inquiry to frame the lesson, the serial presentation of texts both failed to engage students or support disciplinary knowledge building.

Similarly, we witnessed potential evidence-based argumentation tasks flounder when students did not have texts to inform or deepen argumentation. In many cases, small changes in lesson design or implementation could have propelled a pro forma activity into a worthwhile evidence-based argumentation task. This was especially true in science lessons, where emphasis on right answers rather than student reasoning undermined potential learning. For example, students in one middle school science class created comic strips about a volcano formation in a prior to the volcano classification activity described earlier. The comic strips might have been used as a tool

during the classification task, but after briefly sharing with a classmate whose comic focused on a different volcano formation, students turned their comics in and performed the classification activity based on prior knowledge without any textual support.

Evidence-based argumentation was also compromised by failure to foreground reason-giving, evidentiary thinking and explanation. The observer of one science classification task noted: *The task of identifying the class of something (i.e. which phase in the cell cycle) is suitable practice for evidence based argumentation. The teacher modeled having reasons for assigning the phase. He did not, however, ask student to record their reasons as they worked on the 100+ cells in the photographs.* Although the instructions for cell classifying task explicitly asked students to use the textbook and notetaker, field notes documented that no student used the textbook and only a few referred to their own notes from previous lessons. Field notes indicated students were *mostly debating it without referencing the organizer, no referencing of the text*. Field notes from the second observer added, *The teacher modeled, but did not model going into another source (like the textbook) to corroborate. Instead he tried to highlight features of the specific phases of cell division.* Thus, while the task itself afforded opportunities for cross referencing and reading across multiple sources, instruction failed to support this. Yet in the pre-observation interview the teacher explicitly mentioned using texts deepen understanding of scientific phenomena as a goal of the lesson: *I would like students to be able to apply their prior learning and use class texts to further their understanding of cell division by identifying what stage cells are in from a photograph. I would also like the students to understand that interphase is the longest phase in cell division.* Likewise, another science classification activity carried instructions that invited students to refer to their textbooks for support generating a claim and evidence, albeit without mandating that they do so, "Now we will fill in these tables to compare composite and shield volcanoes. We can refer to pages 216-217 in your books."This suggests that teachers want to engage students in disciplinary argumentation, but need additional support to enact their own goals—a good starting point for building capacity for E-BA with multiple sources.

We also observed myriad routines and practices that fostered engagement and learning from evidence-based argumentation. In a history lesson where students were charged with *coming to consensus* about which early union they would have joined, the requirement of coming to consensus encouraged students to grapple with the full range of information and options— rather than zeroing in on a subset to support one position. In addition, argumentation tasks framed as real life problems appeared to increase student engagement and encourage them to ask questions and identify issues above and beyond a pro forma approach. In one argumentation task we observed in a science classroom, students were asked to choose whether they would rather live near a composite volcano or a shield volcano. Although the task shared shortcomings with other science argumentation tasks we observed—e.g., depending on prior knowledge and absent texts—students were considerably more engaged and inclined to offer reasons for their stance. Perhaps most significantly, many academic texts and tasks that were not related to students' own lives and experiences proved compelling and engaging to students. For example, with the support of close reading routines, students in a history class demonstrated perseverance and ingenuity as they grappled with World War II propaganda posters containing unfamiliar images and languages. Students in English classes discussed the complexities of Macbeth's character, and engaged in multiple close readings to understand similarities and differences between two poems about mothers by Harlem Renaissance poet Langston Hughes and feminist poet Edna St.

Vincent Millay. While instructional support and student outcomes were not the focus of this analysis, they intruded on the text and task analysis, because it was not possible to accurately describe texts and tasks in the absence of these factors.

Future Analysis

Subsequent analysis will build on the work of the descriptive analysis to identify and code features of texts and tasks that lay that foundation for investigating the complexity of teaching and learning multi-source disciplinary literacy.

1. Initial constant comparison analysis suggests that Chicago lessons differ from California lessons in a number of ways, and the descriptive analysis will be expanded to the full corpus of data. The greater diversity in the whole sample will permit us to examine the relationships and role of themes that emerged from the constant comparative and subsequent analysis on student engagement and learning.

2. The descriptive analysis reported here identified texts and tasks related to evidence-based argumentation with multiple sources, but how students engage with these opportunities to learn is mediated by instructional support and classroom climate. Subsequent steps in the descriptive analysis of this data will examine and refine dimensions of instructional and classroom climate identified by initial constant comparative analysis (see Table 3: Themes from Initial Constant Comparative Analysis, p. 15 of this report).

3. After completing the descriptive analysis of instructional support and classroom climate, we will perform an inferential analysis that examines the relationships and roles of instructional support and classroom climate in student engagement and learning in evidence-based argumentation with multiple texts.

This data can inform specific questions and hypothesis about disciplinary learning and evidence-based argumentation with multiple sources. We raised multiple questions—both small and large— in this report: what is the impact of different starter activities on subsequent engagement and learning? What is the role of learning to argue, and how can learning to argue tasks support and deepen argumentation as a disciplinary knowledge building tool? Other questions that we will examine include:

4. Argumentation and interactive argumentation. We have identified two types of argumentation—interactive argumentation and more formal argumentation. Subsequent analysis will look within and across segments to compare the features and affordances of student argumentation and teacher support for evidence-based argumentation with multiple sources in these two argument contexts.

5. Role of problem complexity in argumentation. Berland & McNeill (2009) found that "simplifying the problem context [e.g., Question is closely defined with two-three potential answers] may facilitate students in engaging in other aspects of argumentation in more complex ways" (p. 25). What is the impact of problem context on evidence-based argumentation with multiple sources? Interactive argumentation occurs around complex problem contexts, as students negotiate meaning around text. How does the

complexity of the problem context in interactive argumentation affect the complexity of other aspects of argumentation?

6. We will work backward from high engagement and learning lessons/segments identified through the video segmentation work to identifying ways texts, tasks, instruction and classroom climate affect engagement and learning.

7. We want to look at how evidence-based argumentation influences students' academic identities and mindsets—e.g., attitudes, academic identities, and academic persistence.

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Appendix A. Text and Task Coding Scheme

Text Parameters Coding Scheme

Code	Definition	Examples
TEXTS and text properties *The term "text" is used broadly and refers to both traditional, as well as electronic texts, visual or verbal modes, oral or printed, such as cartoons, scripts, videos, and audio-recordings.*		
Texts used in the lesson	Name and reference of texts used in the lesson	
Texts referenced by teachers (code under texts only when reference is in service of engagement and learning)	Texts that were not part of the lesson referenced by the teacher to support engagement or learning	
Texts referenced by students (code under texts only when reference is in service of engagement and learning)	Texts that were not part of the lesson referenced by students to support/reflect engagement or learning	Student: I was like wow, maybe the book was talking about this strike (The Jungle). Observer (ics) notes: Kenya references yet another source. She doesn't have The Jungle with her but was connecting the strike she read about in the history book to the one explained in the jungle novel
Media *This construct captures **the form in which text was presented to students**. The focus here is on what the text demands and affords in terms of language, reading and sensory processes, and moving linearly or non-linearly through the text.*		
Traditional print	Printed publication or text downloaded and printed— e.g., from the internet. Includes both written materials and graphics	▪ Photomicrograph of plant cell ▪
Audio	Text in form of audio recording	▪
Visual	Text in form of visual imagery, or successive visual images, with or without sound	▪ Video ▪ Film ▪ Photograph ▪ Slide show ▪ Film strip
Hypermedia/Internet	Graphics, audio, video, plain text, and/or hyperlinks intertwined to afford non-linear delivery of information,	▪ PowerPoint ▪ Website

Code	Definition	Examples
	including PowerPoint	
Artifact	Material object made by humans or a scientific specimen,	▪ Plant specimen ▪ Slide of cell ▪ Body part ▪ Fossil ▪ Educational manipulative or model
Source *Whether texts are original materials, or have been filtered through interpretation or evaluation (Note:* Types of information that can be considered primary sources may vary depending on the subject discipline, and depend how you are using the material)		
Primary	Original materials, not filtered through interpretation or evaluation. **Original texts such as paintings, plays, photomicrographs, historical maps that are reprinted in an anthology or textbook are coded as primary sources.** The presence/use of instructional supports such as glossaries, sidebars and footnotes should be captured under Instrumental Support.	▪ Artifacts (e.g. coins, plant specimens, fossils, furniture, tools, clothing from the time under study) ▪ Audio recordings (e.g. radio programs) ▪ Diaries ▪ Letters ▪ Internet communications on email, listservs ▪ Interviews (e.g., oral histories, telephone, e-mail) ▪ Journal articles published in peer-reviewed publications ▪ Newspaper articles written at the time ▪ Original documents (i.e. birth certificate, will, marriage license, trial transcript) ▪ Photographs ▪ Proceedings of meetings, conferences and symposia ▪ Records of organizations, government agencies (e.g. annual report, treaty, constitution, government document) ▪ Speeches ▪ Research (e.g., market surveys, public opinion polls) ▪ Video recordings (e.g. television programs, varies depending on use) ▪ Works of art, architecture, literature, and music

Code	Definition	Examples
		(e.g., paintings, sculptures, musical scores, buildings, novels, poems)
Secondary	Texts written after the fact that involve thinking about, interpretation or review of primary source material, events, etc. Note: Audio and video versions of literature (e.g., Shakespeare) that are used to support student reading of traditional print are coded as secondary sources because they involve interpretation. However, if audio or video are used as primary sources, e.g., to study the literary, historical or scientific period in which they were produced, they are coded as primary sources	- Textbooks - Bibliographies - Biographies - Commentaries, criticisms - Dictionaries, encyclopedias - Histories - Journal articles (depending on the disciple can be primary) - Magazine and newspaper articles (depending on use) - Web site (may also be primary, depending on use) - Non-historical maps that are a distillation and collection of primary and secondary sources
NA/Unknown	Texts that are not classified as Primary or Secondary, either because the source is unknown or use makes source difficult to classify. Student and teacher generated materials and most consumables (worksheets) are coded Unknown/NA	- Student notes from previous readings or lecture used to inform argumentation task - Student essays used as texts in lesson on writing - Teacher handout - Worksheets
Genre *Text category defined by purpose, stylistic and disciplinary conventions. May be drawn from Core Constructs informing disciplinary progressions*		
Textbook	Primary source materials reprinted in textbooks are coded to the genre of the original document	
• Additional non-textbook genres reprinted in anthologies/ textbooks	Non-textbook genre materials reprinted in textbook or anthology	- Literature - Paintings - Primary source historical documents
• Total textbook use	Sum of textbook and non-textbook genres reprinted in textbooks or anthologies	
Novel		
Student generated text	Student notes or artifacts—from previous readings or lectures—**used as texts in the lesson**. Student notetaking	

Code	Definition	Examples
	or writing activities used for knowledge-building or -showing are captured in instrumental support or disciplinary knowledge building, as appropriate	
Worksheet/study guide		▪ Teacher generated chapter outline
Play		
Essay, opinion piece		
Instructional handout	Handout that provides directions or guidance, e.g., rubrics, assignment instructions, etc.	
Expository text (non-textbook)		▪ Science article downloaded from the internet ▪
Case study text set		▪ Text set of assorted materials to inform a case study
Poem		
Test items	Test items used as text in a reading, argumentation or disciplinary knowledge building activity	▪ AP exam items used in a lesson about evaluating and comparing text passages
Historical document		▪ Declaration of Sentiments ▪ U.S. Constitution
Legend		
Short story		
Autobiography		
Diary		▪ Excerpts from Diary of Anne Frank
Illustrated historical document		▪ *The Constitution of the United States of America* by Sam Fink
Humor		▪ Book of riddles
Test/quiz	Test or quiz taken by students during observed lesson	▪ Quiz on US Constitution
Visual text		
Photograph		
Painting/art image		

Code	Definition	Examples
PowerPoint		
Instructional video/film		
Propaganda poster		
Documentary film		
Popular film		
Scientific illustration		
Artifact	Used for non-print, material objects only. Use of print materials used as artifact is coded under Primary source	
Scientific specimen		
Challenges/affordances *Disciplinary vocabulary, linguistic features, rhetorical features*		
Challenges		
Affordances		
Assignment How/why text was selected and read		
Teacher assigned	Teacher assigns text	
Student choice—limited set	Student choice from a teacher-selected set	
Student choice—open	Student choice, preference drives text selection	e.g., for SSR, expert groups, cases, science in the news articles, biographies
Where reading/comprehending happens (code for each text)		
Homework reading and comprehending	Both reading and comprehending are done as homework	
Reading as homework, comprehending in class	Students read as homework, but class time is allocated for comprehending	

Code	Definition	Examples
In class reading and comprehending	Both reading and comprehending are done in class	
Design implications for the intervention from texts and text use in this lesson (from initial coding notetakers, observation protocols)		
Design implications for the intervention from texts and text use in this lesson (from initial coding notetakers, observation protocols)	Brief interpretive statement of how features and affordances of texts and text use in this lesson contribute to or undermine high levels of engagement and learning	From initial coding notetaker
Relationship between multiple texts		
Multiple perspectives on same topic, event, argument, etc.	Texts provide multiple perspectives on the same topic, event, argument, etc.	▪ Historian A and Historian B texts on the Pullman Strike ▪ Majority and dissenting opinions for Supreme Court decision ▪ Articles presenting conflicting evidence about genetically modified foods
Background knowledge/context for focal text	Ancillary text provides background knowledge/context for focal text	▪ Psychology essay about identity to inform analysis of character in novel ▪ Text about ancient Greece as background for reading *The Odyssey*
Multi-media forms of **same text**	Multi-media forms of same text, content	▪ Print text coupled with audio recording of literature ▪ Print text coupled with film (e.g., Romeo and Juliet, Grapes of Wrath)
Multi-media on **same topic**	Multi-media/hypermedia presentation on same topic	▪ Website on mitosis
Multi-genre texts thematically or topically related	Multi-genre texts representing different forms/genres/representations of texts thematically or topically related	▪ Multiple texts about cell division: warmup student drawing on a notetaker, textbook homework assignment, short video clip, real onion in conjunction with teacher composed illustration connecting a real onion root tip to the cell diagram using the document camera and pen, textbook, and photomicrograph of plant cells in different stages of cell division

Code	Definition	Examples
		- Textbook chapter, manipulatives, and computer simulation related to organic molecules
Ancillary text/s provide instructional support (e.g., study guides, protocols)		
Student-generated text/notes used as texts		
Other relationship between multiple texts	Multiple texts related in another way (e.g., SSR, other recreational text, different students read different texts)	- SSR materials - Teacher read aloud of unrelated recreational text - Expert groups assigned different text/s
Sequencing/coincidence of multiple texts (in lessons with multiple texts)		
Serial reading of multiple texts	Students read texts sequentially (**if students use a common notetaker for texts read sequentially, also code to instrumental support and cross-textual analysis**)	
Initial serial reading, followed by simultaneous reading of multiple texts	Texts read serially, then reprised for cross textual reading/analysis. During the cross textual reading/analysis, students have multiple texts or text artifacts (notes) available, and/or task explicitly requires students to draw on multiple texts	
Simultaneous reading of multiple texts	Students have multiple texts or text artifacts (notes) available during lesson/task, and/or task explicitly requires students to draw on multiple texts	
Other sequencing/coincidence of multiple texts	Presentation of multiple texts other than serial or sequential, or serial followed by sequential	

Code	Definition	Examples
Design implications for the intervention of multiple texts and text use	Brief interpretive statement of how features and affordances of multiple texts and text use in this lesson contribute to or undermine high levels of engagement and learning	From initial analysis notetakers, observation protocols: ■ There is supposed plurality in the texts, however the texts do not seem particularly rich… The texts did not seem that hard for the students to read. I think the challenge will come in the synthesis and writing. ■ In terms of text, it important to note that students spent almost equal time with the tool that would help with reading and synthesizing across texts as with the text set of six texts. They worked to understand the process of reading across texts and then had the opportunity to try to read and synthesis.

Task Focus and Content Delivery Coding Scheme

Code	Definition	Examples/clarifications
TASK FOCUS: Focus of the task(s)—what students were asked to do in the lesson— in relation to reading, argumentation, and disciplinary knowledge building. Transcends specific activities. Code to all that apply.		
Close reading: Literacy/sense-making focus	Interactive negotiation of meaning at the local and global levels to unearth and evaluate possible meanings, individually or collaboratively. Characterized by approaching texts to understand vs. to find information. Close reading reflects the basic understanding and attitude that reading means comprehending, interpreting, analyzing, and critiquing texts (Norris & Phillips, 2003).	▪ Close analysis of text/data to understand and evaluate possible meanings ▪ Relating what is read in one part of the text to other parts of the text, to other texts, to what one already knows ▪ Determining word meaning through breaking down words into meaningful parts; relating unknown parts of words to known; using context to determine meaning; consulting glossaries and dictionaries, etc.
Close reading: Discipline-specific focus	Interactive negotiation of meaning at the local and global levels to unearth and evaluate possible meanings, individually or collaboratively. Characterized by comprehending, interpreting, analyzing, and critiquing texts through **interpretive practices of the discipline**. Close reading reflects the basic understanding and attitude that reading means comprehending, interpreting, analyzing, and critiquing texts (Norris & Phillips, 2003).	▪ Noticing author's use of language and differences in language with other subject matter discourses or informal discourse. ▪ Renegotiating text meaning to answer an essential question or apply an interpretive practice of the discipline ▪ Interpreting words and sentences in light of disciplinary discourse. (If close reading has a discipline-specific focus, also code to Disciplinary knowledge building)
Text search/fact extraction	Task characterized by approaching texts to find information, rather than for understanding.	▪
Cross textual analysis	Synthesis, evaluation, or critique of information from multiple texts (e.g., comparing/contrasting across evidence/representations to notice, reconcile agreements/disagreements).	▪
SSR, independent silent reading	Reading activities that foreground independent reading with little or no formal guidance, to build reader preferences, fluency, etc. Note: Code only to SSR; do not code Content delivery: Reading	▪
Content focus:	Task focused on content that references	1. Students are learning and practicing interpretive

Code	Definition	Examples/clarifications
Disciplinary knowledge building	overarching frameworks, concept and themes of the discipline, such as discussing, researching, preparing oral presentations, posters/illustrations, answering questions, drafting essays. These are generally tasks that follow an input phase in which students learn new information through reading, lecture, film, etc.—although they may involve returning to texts and artifacts for clarification and to gain deeper understanding of content. Disciplinary knowledge building tasks often ask students to identify or apply disciplinary epistemologies, frameworks, concepts and themes to specific cases, situations or contexts.	practices of the discipline: • English: Students are reading with attention to literary themes and structural devices employed: plot structures, character types, imagery, point of view, symbolism • History: Students are evaluating competing narratives, interpreting past actions in the context of patterns, beliefs and values existing at the time • Science: Students are developing coherent, logical explanations, models or arguments from evidence, advancing and challenging explanations, comparing/integrating across sources, evaluating sources and evidence 2. Students are learning and practicing disciplinary reading and thinking strategies: • English: Students' reading is guided by discipline-specific skills, e.g., from the Hillocks taxonomy or Rabinowitz strategies • History: Students read with attention to sourcing, contextualization, corroboration, questioning inclusiveness, questioning coherence • Science: Students read to formulate questions for investigation, find evidence to support and/or refute their own or others' explanations with data; learn about methods of inquiry that they can use in their own investigations; learn about how scientists think about the natural world, how they shape inquiries, and how they interpret evidence. 3. Students are learning and practicing distinctive oral and written discourse structures and practices (e.g., conventions, grammatical structures, technical and specialized vocabulary, rhetorical structures, argumentation practices):

Code	Definition	Examples/clarifications
		▪ English: plot structures, character types (trickster, tragic hero, anti-hero), imagery (e.g., metaphor, simile, parallel and contrasting description), narrative voice, figuration (e.g., symbolism, satire, irony) ▪ History: conventions of chronology, periodization, conventions of argumentation in oral and written forms (e.g., one-sided, two-sided, multi-sided), oral argument formats (debates, discussions, conversations), word choice as signals of author's perspective ▪ Science: text structures (e.g., cause/effect/correlation, problem/solution/findings, proposition/support), multiple representations (e.g., diagrams, equations, charts, simulations), genres (e.g., bench notes, field notes, journals, logs, press releases, science fiction), distinctive grammatical structures (e.g., nominalizations, passive voice), discourse signals of certainty, generalizability, and precision, signals of rhetorical and logical relations among ideas, argumentation 4. Students are learning and practicing general concepts and themes of the discipline: ▪ English: Moral and philosophical content, archetypal themes, types of texts, rhetoric of literature ▪ History: Categories of historical study, basic systems, relationships among phenomena, change over time, historical themes ▪ Science: Evolution, scale, equilibrium, matter and energy, interaction, forum and function, models and explanation, evidence and representation Examples of Disciplinary knowledge building tasks:

Code	Definition	Examples/clarifications
		English: After reading the essay "Alienation," expert groups discuss a chapter from the novel *Invisible Man*, focusing on the narrator's psychological state through the lens of alienation. Students fill in a notetaker with key quotes that illustrate aspects of alienation from the essay and discussion questions. Then students change groups so that each group has a member who read each of several chapters. Students use their notetakers to inform a common discussion. History: ▪ Partners examine the reasons authors of the "Declaration of Sentiments" give for demanding that women be acknowledged and respected by society. Partners translate text/reasons into their own words and present one reason to the class. ▪ After reading about the characteristics of different periods of artwork in their textbook, middle school students apply what they read to classify pieces of art. Students use the annotations from their reading as well as the text during the classification task. En
Content focus: Limited, narrow content focus	Task focused on content in the form of facts, algorithms, vocabulary, etc., such as answering study guide questions, defining vocabulary words, or filling in a worksheet that does not build knowledge related to overarching frameworks, concept and themes of the discipline. These are generally summative tasks that follow an input phase in which students learn new information through reading, lecture, film, etc.— although they may involve returning to texts and artifacts to find answers or information. *Limited, narrow content*	▪ Task focuses on copying information from the board, teacher notes or PowerPoint. ▪ Students learn or practice vocabulary words with flash cards

Code	Definition	Examples/clarifications
	tasks focus on details or facts rather than disciplinary epistemologies.	
Content focus: Testing	Students take test or quiz. Focus on testing rather than teaching/learning	
Skills	Task focused on teaching or practicing skills in isolation of reading or content knowledge development.	
Argumentation		
Argumentation	Task asks students to make a claim or assertion that is supported by evidence that connects to the claim in a principled way. Tasks **may or may not be explicitly identified** as "argumentation." Argumentation tasks are framed as inquiry into multiple possibilities and/or viewpoints (i.e., asking students to find "evidence" to support a fact is not argumentation). Note: Do not code interactive argumentation that is a byproduct of negotiating meaning if the task itself does not explicitly solicit claims and evidence.	Task may or may not be explicitly identified as "argumentation," as long as it requires students to make a claim/assertion supported by evidence that connects to the claim in a principled way. The goal of the definition is to insure that argumentation tasks do not fall through the cracks just because the teacher does not label them as argumentation and to clarify the distinction between argumentation task and interactive argumentation. In an argumentation task, the task itself must solicit claims and evidence. In interactive argumentation, claims and evidence are a byproduct of negotiating meaning (i.e., the focus is on sense-making). For example: ▪ In an English class, "crews" of students are engaged in a case study/simulation where people land on new planets and something goes terribly wrong. After modeling looking for evidence and writing an explanation, crews begin to do the same in two other situations. In small groups, students read together, form a theory and write an explanation. Groups then share a single explanation with the whole class. This is coded as *Argumentation* (sub-code: *Disciplinary analysis, essay*) even though it was not explicitly identified by the teacher as "argumentation." In contrast, a discussion of close reading where the teacher solicits evidence for a student's interpretation of a text or a partner conversation where a student offers evidence to support an interpretation would not

Code	Definition	Examples/clarifications
		be coded as Argumentation focus, unless the close reading task itself required students to generate claims and evidence. Interactive argumentation is captured in a separate *Interactive argumentation* code and in other coding—e.g., teacher support/facilitation, classroom culture, student behavior, etc.
Argumentation context		
Right answer from given possibilities	Students determine right answer from limited set of given possibilities. This is generally a classification task where students map characteristics that have been given to them through a previous input phase onto a specific case or cases	▪ Students read about the characteristics of different periods of artwork in their textbook, and use the information to classify six paintings ▪ Partners identify and color-code each cell in the photomicrograph according to phase of cell division
Teacher generates claim, students generate evidence	Teacher generates claim, or teacher generates argument that implies claim and limits argumentation task to finding evidence to support teacher claim/argument.	▪ As a warm-up, individual students complete two sentence starters focusing on discipline- and genre-specific rhetorical devices: *Complete the sentence below: Writing might use poetry to <u>speak</u> to readers in a different way because _____. The descriptive language that poets use can <u>enrich </u>their writing because it communicates _____.*
Students select from two alternative claims, students generate evidence	Students choose claim from limited set of possible claims presented by teacher in a potentially open argument. If students determine right answer from limited set of given possibilities, code to *Right answer from given possibilities*	▪ Students compare two poems using a prompt provided by the teacher: *Both of these poems are about mothers, but do they have the same message? Look back at both poems. Would you say they are more similar or different? Write a claim. Back it up with at least two reasons.*
Students generate claims and evidence from open argument framed by the teacher or students	Students generate claims and supporting evidence from text, input materials. Argument/essential question may be framed by teacher or students	▪ Individuals write a paragraph in which they generate a claim and evidence that answers the essential question, "How did countries use national pride to convince men to join the war?" ▪ After reading the essay Living Like Weasels, students in an English class generate claims and evidence for

Code	Definition	Examples/clarifications
		each of a disciplinary framework, SOAPSTone
▪ Subset: Students frame argument, generate claims and evidence	Students frame an argument, and generate claims and supporting evidence from text, input materials	▪ At the beginning of a compare and contrast essay assignment, students in an ELA class identify critical lines from the written version of Romeo and Juliet, then compare the text with two film versions of the play to generate an argument across texts ▪ At the culmination of a unit on *The Invisible Man*, small groups gather evidence to support student-generated themes and make posters to present their evidence. The class does a gallery walk, and viewers generate theme statements based on the evidence in each poster
Students evaluate author's claim/s and/or evidence	Argumentation task that focuses on evaluating author/s' disciplinary claims and evidence. This code implies a content focus, where students evaluate claims and evidence in the service of building disciplinary knowledge. If task is limited to evaluating sources without attention to learning content, code as *Learning to argue*	
Argumentation task focus		
Arguing to learn Note: Includes the following subcodes:	Disciplinary argumentation task that generally follows an input phase in which students learn new information through reading, lecture, film, etc.—although arguing to learn generally involves returning to texts and artifacts for clarification and to gain deeper understanding of content. Arguing to learn tasks comprise a subset of Disciplinary knowledge building. Code also to Disciplinary knowledge building. Less frequently, explicit E-BA tasks may serve literacy/sense-making, as when students are asked to evaluate focus their reading on evaluating evidence	
• E-BA classification task	Classification task with access to texts to inform disciplinary knowledge and argumentation	▪ Students classify six pieces of art according to historical period after reading a text about the characteristics of medieval, classical and

Code	Definition	Examples/clarifications
		Renaissance art
• Non-E-BA classification task	Task that asks students to classify in the absence of texts to inform disciplinary knowledge and argumentation	▪ In a science class, students are given strips of paper with facts about volcanoes and asked to "put them in order" and then sort them into the categories of *hot spot, divergent* or *subductive*. No texts are present to inform the classification activity ▪ Students classify plant cells by phases of mitosis without texts to provide evidence on which to base their classifications ▪ During a Truth and Reconciliation Commission (TRC) simulation, a history teacher reads out statements/scenarios about conditions for amnesty and pairs categorize each statement as Disclosure (D), Motivation(M), or Proportional (P). The activity moves quickly and students are not asked for evidence to support their classifications
• Disciplinary analysis, essay	Evidence-based analysis or essay in which students address a literary, historical/political or scientific phenomenon, issue or theme, used to build and/or demonstrate mastery and comprehension of content material	▪ In a Truth and Reconciliation Commission (TRC) simulation, students evaluate cases according to legal conditions for amnesty ▪ Students in a literature class create a list of possible suspects from characters in a play, along with evidence to support their suspicions ▪ After reading about a number of late 19th century trade unions, groups come to consensus about which union they would have joined and why ▪ In a history class, students evaluate sources and evidence to assess the reliability of alternative perspectives by two historians. Students assign validity values to each source on a scale of 1-5, corroborated by evidence. (Because students are learning and practicing sourcing as well as building knowledge of an historical event, also code to Learning to argue: Evaluating sources/evidence) ▪ In a history class, students craft 25-word abstracts

Code	Definition	Examples/clarifications
		for a chapter from *Grapes of Wrath*, then come to evidence-based consensus about which abstract most rigorously captures the essence of the chapter
• Persuasive essay writing	Argumentation task that foregrounds rhetoric of argument rather than evidence-based argumentation, generally in English, where it persuasive essay writing is a disciplinary practice	▪ In an English class, students write an essay for a Persuasive Opinion Project, based on a controversial topic of interest ▪ In an English class, students write a persuasive essay about whether or not athletes are role models
Learning to argue Note: Includes the following subcategories:	E-BA task focused on teaching language, structure and principles for argument	▪
• Evaluating sources, evidence		▪ Rating pieces of evidence in terms of reliability ▪ Labeling evidence as pro-, con-, or neutral ▪ In a history class, students are given statements of evidence, and are asked to line them up in the order of strongest to weakest ▪ In a history class, students evaluate sources and evidence to assess the reliability of alternative perspectives by two historians. Students assign validity values to each source on a scale of 1-5, corroborated by evidence. (Because students are also building knowledge of an historical event, also code to Arguing to learn: Disciplinary essay or analysis)
• Identifying evidence		▪ In a lesson leading up to a culminating literature essay, students return to the text to find evidence in the form of quotes to support their theme.
• Generating claim, position		▪ Students study a protocol for E-BA essays focused on synthesizing across multiple texts ▪ In anticipation of a culminating essay, students create posters with evidence that supports their theme, without including the theme itself. In a gallery walk of the posters, classmates generate a

Code	Definition	Examples/clarifications
		• theme statement based on the evidence on the poster ▪ In an explicit closed argumentation task defined by the AP test, with two possible solutions, students review and clarify the protocol, then generate tentative claims in response to the prompts. After reading and labeling 6 sources as (P), Con (C) or Neutral (N), student have the opportunity to revise their original claim before they are reorganized into groups based on their claims.
• Rhetoric of argument		▪ Students study a rubric embedding the structure and features of an argument in preparation for a persuasive essay writing assignment ▪ In an explicit closed argumentation task defined by the AP test, with two possible solutions, students read and label each of the 6 sources as Pro (P), Con (C) or Neutral (N).
Interactive argumentation	Interactive argumentation is a by-product of negotiating meaning and usually takes the form of a conversation rather than a formal argument. Interactive argumentation asks provide opportunities for interactive argumentation by asking students to clarify confusions and figure things out in the context of negotiating meaning about texts in partner, small group and whole class settings. Note: If argumentation task explicitly requires students to make claims connected to evidence in a principled way, code as *arguing to learn* or *learning to argue* and disciplinary knowledge building	▪ Students discuss their TttT notes with a partner to surface confusions, questions, interpretations, etc. ▪ During a close reading discussion, the teacher solicits evidence for a student's interpretation of a text ▪ During a partner conversation, a student offers evidence to support an interpretation.
CONTENT DELIVERY: Form(s) in which task content is delivered. Code all that apply.		
Lecture	Teacher lecture, demonstration or PowerPoint, in which teacher has done the work of understanding and organizing material and	

Code	Definition	Examples/clarifications
	delivers information to students. May involve some student interaction around presented material, but the primary focus is on teacher delivered content.	
Video/film	Content delivered through video/film.	
Student presentation	Students listen to presentation by classmate(s). May be some interaction with other students or teacher, but primary focus is on content delivered in student presentation. Do not code sharing out as student presentation **if all students learned** the presented content (e.g., sharing as the culmination of partner or group work or problem solving).	
Listening to professional read, perform aloud	Content delivered by listening to text read/performed aloud by professional actors (e.g., through audiorecordings) or teachers. This may or may not involve following along in text, but the primary focus is on listening to content delivered orally. Student read-aloud is a separate category from *Listening to professional read aloud* because its challenges and affordances are different from content delivered by professional actors or teachers.	
Reading	Students learn content by reading text(s), individually or collaboratively. Reading is defined broadly to include reading a wide range of materials, including graphics, etc., from a wide range of sources, including computer screens, not just connected text and traditional print material. NOTE: Audio and videorecordings should not be coded as Reading,since the intellectual work of learning from those texts is different from reading print materials.	
Student read-aloud	Content delivered by students taking turns reading aloud or listening to classmates read aloud. Student read-aloud is a separate category	

Code	Definition	Examples/clarifications
	from *Listening to professional read aloud* because its challenges and affordances are different from content delivered by professional actors or teachers. If the student read-aloud is in the form of readers theater or other prepared presentation, Task description is coded as *Disciplinary knowledge building*, and Content delivery as *Reading*.	

Appendix B. Characteristics of Observed Teachers and Lessons

School	% Free/Reduced Lunch	Teacher[16]	Discipline	Grade	Track	Lessons Observed
DN	32	GC	History	11	Honors	5
LN	42	BH	Literature	9	Intervention	1
LN	42	CV	Literature	9	General	4
LN	42	CV	Literature	12	General	3
LN	42	JG	History	12	General	1
IH	6	HG	History	8	General	1
IH	6	TS	History	8	General	1
HD	57	MS	Literature	11	AP	3
TN	67	PV	Science	10	General	1
HL	18	AP	History	9	General	3
LA	20	AO	Literature	12	AP	2
LA	20	KR	Literature	9	General	2
BF	54	AS	Literature	8	General	2
BF	54	LR	Literature	7	Honors	2
JL	40	BM	Science	9	General	1
BN	54	AH	History	7	General	2
BN	54	LD	History	7	General	1
BN	54	LD	Literature	7	Intervention	1
AL	34	VB	Science	6	General	2
OA	20	JH	Science	7	General	2
Totals						
12		18				40

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[16] Two teachers (CV and LD) observed teaching two courses