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Close Reading in Secondary Classrooms:
A 21st-Century Update for a 20th-Century Practice

by

Amy Koehler Catterson

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Education

and the Designated Emphasis

in

New Media

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor P. David Pearson, Chair

Professor Marcia C. Linn

Professor Kimiko Ryokai

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Abstract

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by

Amy Koehler Catterson

Doctor of Philosophy in Education

Designated Emphasis in New Media

University of California, Berkeley

Professor P. David Pearson, Chair

Close reading is an enigmatic term with a simple definition: special attention to texts. Key shifts in the Common Core State Standards have led to a renewed interest about close reading instruction among researchers and practitioners of K-12 education. Close reading is particularly salient in secondary settings, where calls to raise text difficulty and increase literacy instruction in the disciplines have placed new demands on middle and high school teachers. But even though close reading is now widespread in secondary classrooms, there is very little research to date on close reading instruction. As such we still do not know how these practices will affect students' reading skills and motivation.

In this dissertation, I offer three article-length contributions to the research base on secondary close reading instruction. First, I synthesize practice-based research on close reading instruction with the aim of identifying best practices for close reading in secondary classrooms. I then present two empirical articles that address gaps in the research literature on adolescent close reading instruction.

In chapter 1, previously published in *Adolescent Literacies: A Handbook of Practice-Based Research*, P. David Pearson and I offer a vision for a 21st-century close reading pedagogy. This vision was influenced by a historical account of close reading's place in adolescent classrooms over the past 75 years and a review of research on secondary close reading instruction. We argue that a 21st-century close reading pedagogy must encompass considerations of the reader and his or her sociocultural contexts, accept digital and everyday texts as candidates for close readings, and include purposes for reading beyond knowledge building. In light of these goals, we suggest five principles of adolescent close reading instruction: background knowledge, authentic reading and writing, metadiscursive awareness, critical literacy, and dialogically organized discussion.

In chapter 2, I draw on the principles of close reading instruction outlined in chapter 1 to co-design tests of close reading instruction with a high school chemistry teacher. In this formative experiment, I tested the effect of background knowledge activation on amount and types of questions written about a scientific article; I also tested whether allowing students to choose texts to read about a

scientific issue affected the amount of information written on that topic and their motivation to read. In a challenge to Common-Core-era recommendations that background knowledge should be held at bay when closely reading texts, I found that students who had their background knowledge activated with pre-reading activities prior to closely reading an article wrote more argument-generating questions than students who did not engage in pre-reading activities. I also argue that students who were able to choose a text to read closely about a scientific topic online recorded as much accurate information about that topic as students who were assigned a text to read by their teacher.

In chapter 3, I explore an understudied area of close reading instruction: students' everyday digital close reading practices. This article is an ethnographic case study of students' out-of-school digital close readings and their teachers' approach to digital close reading instruction in the classroom. By comparing these two realms through the lens of cultural historical activity theory, I am able to surface tensions and synergies that may lead to recommendations for close reading instruction that leverages students' existing funds of knowledge about digital literacies. Specifically, I found that when teachers designed digital close reading instruction in the service of promoting student-directed learning, it aligned well with students' goals when they performed everyday close readings of digital texts at home.

Together, these three chapters suggest new directions for adolescent close reading instruction and research. In chapter 4, I synthesize across the three articles to highlight common themes and conclude with ideas for future research and lingering questions about the nature of close reading.

For Gabriel.

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Introduction

I first encountered the concept of “close reading” in a high school English class. I remember writing a paragraph of literary analysis about *Midsummer Night’s Dream* that incorporated three (no more, no less!) pieces of textual evidence to support my thesis. As an English major in college, I followed these guidelines of close reading to a T, analyzing literature from Chaucer to Borges without ever reading anything beyond the “four corners of the text.”¹ I was thrown for a loop the first time a professor asked me to write an argument by pulling together a “constellation” of texts – though I had valuable text analysis skills, I realized that I had no idea how to read across texts or to incorporate historical or cultural information into my writing. I blundered my way through that conundrum, and by the grace of a lot of privilege and educational opportunity, I now possess a wide array of reading and writing tools.

As a result of the Common Core State Standards (CCSS) and Revised Publisher’s Criteria for the Standards (RPC) many students in the U.S. will have a similar conception of close reading as I had as a teen, only reinforced earlier in school and spread across all subject areas. In this view, a text is the only evidentiary source you need to build knowledge and construct arguments. Unfortunately, however, most students will not have the educational opportunities that allowed me to expand my vision of what close reading could and should be. The project of this dissertation is to re-envision close textual analysis for the 21st-century, taking into account the changing nature of our students as well as the changing demands of our world.

I began thinking about close reading for the first time since college in 2012, shortly after the Revised Publisher’s Criteria for the Common Core State Standards (RPC, Coleman & Pimentel, 2012) was published. My advisor and chair of this dissertation committee, P. David Pearson, asked me if I wanted to help him critique the RPC’s vision for close reading and offer recommendations for a better vision. And so the first chapter of this dissertation, “A Close Reading of Close Reading: What Does the Research Tell Us about How to Promote the Thoughtful Interrogation of Text?” was inspired, presented, developed, and eventually published in *Adolescent Literacies: A Handbook of Practice-Based Research*. For my dissertation, I wanted to expand on the work of this project with empirical studies of close reading instructional design in adolescent classrooms. My overarching research questions were:

1. What psychological and material tools (content knowledge, cultural funds of knowledge, linguistic practices, and literacy practices) relevant to close reading in the 21st century are available to teachers, students, and researchers before curriculum design takes place?
2. During the close reading curriculum design and testing process, what major contradictions, tensions, or conflicts emerge between interacting activity systems (school, district, teachers, students, families, and researcher)? How do these contradictions, tensions, or conflicts affect close reading curriculum design, instruction, or student practice?
3. How does digital technology mediate students’ close reading practices over the course of the design and testing process?

¹ This language comes from Coleman & Pimentel’s (2012) Revised Publisher’s Criteria for the Common Core State Standards.

4. How do students' close reading practices change over the course of the design and testing process? How do these practices relate to adolescent reading and writing outcomes agreed upon by the teachers and researcher (e.g. standardized reading/writing measures, motivation to read and write, critical literacy acumen, metadiscursive knowledge, compositional skill, etc.)?

Chapters 2 and 3 of this dissertation stem from a single data collection effort in a northern California charter school that I call Bright Futures Academy. With chapter 2, a formative experiment of secondary close reading instruction in a science classroom, I hoped to gain insights on open questions in the close reading research literature and help a teacher develop close reading instruction that worked for him and his students. With chapter 3, an ethnographic case study of students' digital close reading practices and teachers' digital close reading instruction, I hoped to learn more about how digital technology mediated students' close readings in and out of the classroom, and what tensions or synergies might emerge between teacher approaches and student approaches.

In the coming pages, chapter 1 can be viewed as a literature review, introduction to the main issues surrounding secondary close reading instruction, and a vision for what close reading could look like in schools. Chapter 2 is an attempted enactment and test of that vision in one teacher's classroom. And chapter 3 looks through the lens of close reading to explore two topics vital to a 21st century pedagogical vision of any kind: digital media and student voices. All of these papers respond to a common question: What can and should close reading look like in middle and high school classrooms to empower, engage, and inform students?

Chapter 1: A Close Reading of Close Reading: What Does the Research Tell Us about How to Promote the Thoughtful Interrogation of Text?²

So what's the deal with close reading anyway? Is it even anything new?

—A colleague, commenting on this chapter's topic

The practice of close reading has experienced a recent “revival” in adolescent literacy instruction, due to its appearance in the Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects (CCSS; National Governors Association for Best Practices & Council of Chief State School Officers [NGA & CCSSO], 2010) and the Revised Publishers' Criteria for the Common Core State Standards (RPC; Coleman & Pimentel, 2012), an influential curriculum development guide. The first anchor standard for reading asks students to “read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text” (NGA & CCSSO, 2010, p. 10). Close reading, or a synonym of close reading (e.g., careful examination), appears more than 50 times in the RPC.

Upon reading the CCSS and RPC, and considering the broad implications of these documents for classrooms across the United States, many scholars and educators are asking the question our colleague poses in the opening epigraph: What's the deal with close reading? Is it a brand new practice, is it the resurrected ghost of a bygone practice from midcentury New Criticism, or is it a practice that has never really disappeared from classrooms? And how will Common Core era close reading affect adolescent literacy instruction?

Though school districts across the country are now enacting the RPC's vision of close reading instruction, many scholars and practitioners are questioning the theory and research underlying this vision (Applebee, 2013; Pearson, 2013; Smith, Appleman, & Wilhelm, 2014; Snow & O'Connor, 2013). We worry, along with others (e.g., Beers, 2013; Compton-Lilly, 2013), that in an attempt to revive critical engagement with texts in classrooms, the authors of the RPC have swung the pendulum too far away from considerations of the reader's background knowledge and culture, and have marginalized the role of the sociocultural contexts in which texts are written and read. Curriculum developers, school leaders, and instructors who follow the RPC's version of close reading may, we fear, devalue the background knowledge and cultural ways of making meaning that diverse students bring into the classroom and therefore limit what thoughtful textual interrogation can accomplish in adolescents' lives.

Against this backdrop we offer our own vision of adolescent close reading instruction, one that more fully accounts for interactions among the reader, text, activity, and sociocultural context during the reading process (Snow, 2002). To develop this vision, we have traced the history of close reading through key theories taken up by secondary educators in the past 75 years. We have also reviewed empirical work on close reading written from 2000–2015, focusing on studies of, examples of, or critical perspectives on close reading instruction in middle and high school classrooms. In keeping with the theme of this handbook, we have also sought out practice-based methods of adolescent close reading instruction that have been developed by educators over the past 15 years. Our vision of adolescent close reading instruction is also informed by our perspectives

² Previously published in *Adolescent Literacies: A Handbook of Practice-Based Research* (Hinchman & Appleman, 2017).

as scholars and former teachers and our belief that there is never just one monolithic best “reading.” Instead, readers should engage in multiple reading practices and a range of culturally appropriate ways of understanding (Gee, 2007; Heath, 1983; Street, 2003; New London Group, 2000). We hold that prior knowledge and social experiences allow some readers to access and interpret texts within these multiple literacies more competently than others (Bransford & Johnson, 1973; Brown, Collins, & Duguid, 1989; Pearson, Hansen, & Gordon, 1979) and that some reading practices are more valued than others by society (Smagorinsky, 2001).

Keeping our perspectives on language and literacy in balance with the research literature, we propose five principles for adolescent close reading instruction:

1. Background knowledge: Learn about students’ cultural backgrounds, areas of expertise, and existing literacy practices, and adjust close reading instruction to leverage and build students’ content and discursive knowledge.
2. Authentic reading and writing: Present students with authentic opportunities to use close reading strategies that mirror the types of reading that happen in the real world, and to draw from these close readings to compose authentic texts.
3. Metadiscursive awareness: Promote students’ metadiscursive awareness by helping them understand the purposes and structures of texts in different disciplines and genres, and which close reading strategies work for these purposes and structures.
4. Critical literacy: Involve students as critics of themselves, texts, and the world as they read closely.
5. Dialogically organized discussion: Guide students to ask and answer authentic questions while reading texts closely, and engage them in rich and rigorous conversations about their questions and interpretations.

In the coming pages, we contrast what we are calling a Common Core close reading paradigm with our vision of a 21st-century close reading paradigm for adolescent classrooms. Then, we turn to our five principles of adolescent close reading instruction. In our discussion of each principle, we offer a definition, explain its importance to adolescent literacy, summarize its research base, and describe examples of close reading instructional practices from the research literature that exemplify the principle. For each principle we attend to close reading within both new and digital literacies (Cope & Kalantzis, 2000; Gee, 2010; Knobel & Lankshear, 2014; Kress, 2003; Leu, Kinzer, Coiro, Castek, & Henry, 2013; Mills, 2010) and traditional and print-based literacies, as we argue that close reading instruction must adapt to the “pluralized, hybridized, intertextual, immediate, spontaneous, abbreviated, informal, collaborative, productive, interactive, hyperlinked, dialogic (between author and reader), and linguistically diverse” digital new literacies (Mills, 2010, p. 255), as well as traditional literacies that have been with us for millennia. Finally, given that we have found very few empirical tests of particular approaches to adolescent close reading instruction, we conclude with directions for future research.

A Version of the Old, A Vision for Now: Comparing Common Core Close Reading with a 21st-Century Adolescent Close Reading Paradigm

Searching for Common Ground: What All Close Reading Shares

Since the premise of this chapter assumes that Common Core “close reading” is different from 21st-century “close reading,” here we strive for a simple, ecumenical definition of close reading that can offer common ground for discussing alternative perspectives. In the introduction of Lentricchia and DuBois’s (2003) compilation of close reading analyses, DuBois crafts a “common sense” definition of close reading that will serve this purpose well: “Reading with special attention” to a text (p. 2). A reader conducting any type of close reading will scrutinize a text; this is the common element across close reading paradigms. Close reading paradigms, however, may differ along many other dimensions. For example, educators may differ in their goals for close reading, ideas about what constitutes a text worthy of close reading, and assumptions about where meaning resides. These beliefs may lead to differences in instructional practice, such as the types of texts chosen, types of questions posed to students, participation frameworks designed, and the overarching curriculum in which close reading is embedded. We argue that the 21st-century close reading paradigm we have imagined differs along these dimensions from the Common Core close reading paradigm in ways that more accurately reflect what we know about the construction of meaning from texts, the needs of a diverse adolescent population, and the demands of literacy in the 21st century.

A Version of the Old: A Common Core Close Reading Paradigm

From our vantage point, the Common Core close reading paradigm, as presented by the CCSS and RPC, resembles a New Critical close reading paradigm that has endured as the dominant mode of textual analysis in English classrooms for much of the 20th century.

The phrase close reading originated with the New Criticism, a literary school most active from the 1930s through the 1970s (Gallop, 2007). Though the New Critics did not share a common set of goals for close reading, assumptions about where meaning resides, or notions about what constitutes a text worthy of close reading, they were united in the belief that the text should serve as a touchstone for rigorous interpretive work (Ransom, 1937). Robert Penn Warren and Cleanth Brooks’s New Critical close reading paradigm was most influential in secondary classrooms, as their book, *Understanding Poetry* (Brooks & Warren, 1938) was widely used for over 5 decades, with new editions released in 1950, 1960, 1976, and 1978 (Golding, 1995). Within Brooks and Warren’s paradigm, close readings could best be accomplished by holding reader bias and consideration of the text’s historical context at arm’s length: Only then could one appreciate the meaning inherent in the text. As Brooks (1979) puts it, “To use a metaphor drawn from the law courts, ‘evidence outside the poem’ is always secondhand (or even hearsay) evidence as compared with the evidence presented by the text itself” (p.600).

While populist approaches to textual analysis, such as reader response or critical literacy paradigms, replaced New Critical formalist approaches in research journals by the 1980s, secondary classrooms maintained the status quo of Brooks and Warren-esque close reading (Applebee, 1993; Burroughs & Smagorinsky, 2009; Dressman & Faust, 2014), perhaps because this paradigm was ensconced in advanced placement (AP) English assessment, popular pedagogical resources such as

Adler and Doren's (1972) *How to Read a Book*, and instructional methods such as the Junior Great Books program and Paideia Seminars. Since close reading in the New Critical tradition never really gave way to reader response or critical literacy approaches to textual interpretation, many teachers in U.S. classrooms will recognize the Common Core close reading paradigm as reinforcing practices that are all too familiar.

If anything, the Common Core close reading paradigm may be more text-centric than New Criticism. The Common Core close reading paradigm situates meaning entirely within the text, without acknowledging the role of the reader or sociocultural context in interpretation. The authors of the RPC assert that meaning "lies within the four corners of the text" (Coleman & Pimentel (2012, p. 4), and can therefore be extracted through a process of answering "text-dependent" close reading questions that "do not require information or evidence from outside the text or texts" (p. 6). Such language reveals Coleman and Pimentel's (we believe, problematic) assumption that meaning lies in wait like an archeological artifact to be excavated and placed in a reader's mind, as long as he or she had the appropriate tools to dig it out. We like better Louise Rosenblatt's (1978) metaphor of meaning-as-poem, crafted anew each time a reader encounters a text in a specific social, cultural, and historical moment.

The Common Core close reading paradigm is also "old" in its approach to what constitutes a worthy text for close reading. Curriculum designers are asked to provide "short, challenging" texts, as well as "novels, play, and other extended full-length readings," which should all be "worth reading closely and exhibit exceptional craft and thought or provide useful information" (Coleman & Pimentel, 2012, pp. 3–4). We agree with Rabinowitz (1992) that such a limited vision of texts may exclude the analysis of culturally or historically important texts and "privilege figurative writing over the realistic portrayal of material social conditions, deep meaning over surface meaning, form over content, the elite over the popular, and indirect expression over direct" (p. 233). Furthermore, both the CCSS and the RPC demand the close reading of print text only (Chandler-Olcott, 2013; Drew, 2012). Multimodal and digital texts are excluded from the reading standards, and the RPC warns that non-print multimedia such as videos should "[engage] students in absorbing or expressing details of the [print] text rather than becoming a distraction or replacement for engaging with the [print] text" (Coleman & Pimentel, 2012, p. 13).

Finally, the Common Core close reading paradigm is marked by limited goals for close reading: "The criteria make plain that developing students' prowess at drawing knowledge from the text itself is the point of reading; reading well means gaining the maximum insight or knowledge possible from each source" (Coleman & Pimentel, 2012, p. 1). The RPC's emphasis on gaining knowledge from text excludes a wide range of desirable goals for adolescent close reading, such as social action, identity construction, or even pure enjoyment.

We offer an alternative vision of adolescent close reading instruction for the 21st century, one that assumes and asserts that (1) meaning is constructed at the intersection of a unique reader, text, and activity within sociocultural contexts; (2) the term "text" entails print and digital, short and long, carefully crafted and hastily jotted, official and popular; and (3) close reading should build identity, equity, and action, as well as knowledge.

A Vision for Now: A 21st-Century Close Reading Paradigm for Adolescent Classrooms

Our vision of how meaning is made during adolescent close reading draws from the RAND Research Study Group (RRSG), whose members imagine reading as a simultaneous interaction among text, reader, activity, and the encompassing sociocultural context.

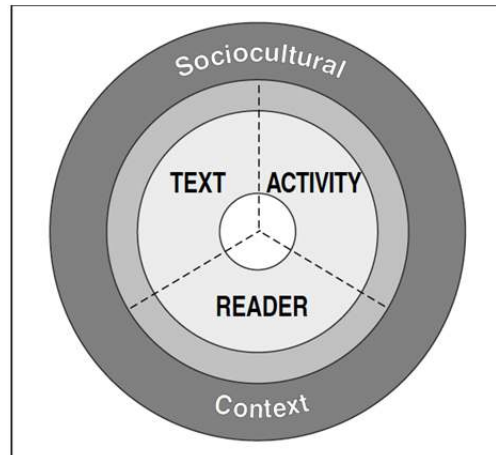


Figure 1. A heuristic for thinking about reading comprehension. Found in (Snow, 2002, p. 13; Figure 26.1). Copyright 2002 by RAND. Reprinted by Permission.

As the heuristic suggests, meaning making during close reading is much more complicated than reader-meets-text, reader-extracts-meaning. Instead, textual interpretation is a bit different for every reader, depending on his or her knowledge and motivation to read, the features of the text he or she encounters, and the activity in which reading occurs. Furthermore, the macrocultures of society and the microculture of the classroom sanction what readings are acceptable, and the sociocultural backgrounds of the reader and text further shape interpretations (Smagorinsky, 2001). Thus, the power structures, discourses, and cultures in society surround and infuse all other components in the heuristic.

A 21st-century close reading paradigm must also expand the category of texts that are worthy of close reading. It is our belief that close reading instruction that does not incorporate networked digital technology and texts is not 21st-century close reading instruction, since digital literacies and a participatory ethos (Knobel & Lankshear, 2014) have influenced how adolescents read at home (Ito et al., 2010) and how they will some- day have to read in college and in careers (Warschauer & Matuchniak, 2010). We also consider popular texts (Alvermann, 2008) and texts from adolescents' peer and home cultures (Lee, 2001) as fair game for close reading instruction.

Our goals for adolescent close reading instruction also move beyond the knowledge-building demanded by the Common Core close reading paradigm. We believe that teachers should aim to engage adolescents' interest in reading and composing (Alvermann, 2002; Guthrie, Klauda, & Ho, 2013), for without engagement, there is no reading, close, distant, or otherwise. We also believe that teachers should guide students to read and write a wide array of texts in different disciplines and genres (Adolescent Literacy Committees and the Adolescent Literacy Task Force of the International Reading Association, 2012), prepare them to be active citizens in a culturally diverse

global world (Gutiérrez, 2008; New London Group, 2000), and to help them analyze, critique, and change the cultural ideologies reflected in texts (Freebody & Luke, 1990).

We now turn to our five principles for 21st-century adolescent close reading instruction as a way of illustrating this paradigm at a finer grain of detail for practitioners and researchers alike.

Principles of 21st-Century Adolescent Close Reading Instruction

Background Knowledge

Learn about students' cultural backgrounds, areas of expertise, and existing literacy practices, and adjust close reading instruction to leverage and build students' content and discursive knowledge.

Researchers converge on the finding that an adolescent reader's content and discursive knowledge (what we refer to as background knowledge) has a significant effect on his or her reading practices and reading comprehension (Anderson & Pearson, 1984; Kintsch, 1998; Langer, 1984), particularly as texts increase in complexity (Fisher, Frey, & Lapp, 2012).

The mechanism underlying background knowledge's importance to readers is theorized by the construction–integration (CI) model of reading comprehension (Kintsch, 1988) that arose from the schema theory models of the 1970s and 1980s (Anderson & Pearson, 1984). This theory suggests that in order for readers to learn from a text, they must create what Kintsch (1988) terms a situation model, or a mental representation of the text that is linked to long-term memory. Prior knowledge is crucial in this phase of the process, since they must have a schema on which to “hang” the ideas they encounter.

Sociocultural researchers tie this background knowledge explicitly to culture; for example, Juzwik (2014) has argued that students raised in Biblical evangelical religious traditions may be better positioned than many of their peers to undertake the type of close reading outlined in the CCSS and RPC. Thus, culture and embodied experience are as much a part of background knowledge as is semantic knowledge.

Implications for close reading instruction. Because of the importance of background knowledge to meaning construction, teachers should learn what content and discourses students already know, and look for opportunities to add to this knowledge as students read with special attention to text. Cultural modeling approaches to close reading instruction (Lee, 2001; Orellana & Reynolds, 2008) are one way to address the gaps between students' existing linguistic and literacy practices and those expected in school settings. Carol Lee (2001), for example, drew on her African American high school English students' knowledge of language play in African American English to build close reading strategies for poetry. Teachers following Lee's approach might learn all they can about their students' cultural and linguistic back- grounds, use discourses from these backgrounds as a launching point for close reading strategy building, and think carefully about how to organize texts such that students are gradually improving their knowledge over the course of the year.

Teachers might also draw on digital technology to scaffold adolescents' background knowledge in the form of multimedia vocabulary hyperlinks, graphics illustrating word meanings, and supplemental multimedia supports such as maps, timelines, and videos (Dalton & Proctor, 2007). Over the course of a curricular unit, teachers might plan which digital technology will build knowledge, practice close textual analysis of digital texts, and gradually release responsibility to

students for finding and analyzing new knowledge sources (Boche & Henning, 2015). Teachers may also learn about students' existing digital literacies, and leverage them to teach close reading skills and content, for example, "using Minecraft to design the town of Maycomb may promote [a student's] close reading of *To Kill a Mockingbird*" (Curwood & Fink, 2013, p. 426).

Authentic Reading and Writing

Present students with authentic opportunities to use close reading strategies that mirror the types of reading that happens in the real world, and to draw from these close readings to compose authentic texts.

Too often, when we ask high school students to conduct close readings in English classrooms, we are leading them to craft what Burroughs and Smagorinsky (2009) term codified discourses, or those that are valued only in school settings. For adolescent close reading instruction to be authentic, it would have to take into account the "text uses" (Luke & Freebody, 1999) that students will encounter in college, careers, and life, while providing them the instructional support they need along the way.

We borrow Purcell-Gates, Duke, and Martineau's (2007) definition of authentic literacies: "(a) reading and writing of textual types, or genres, that occur outside of a learning-to-read-and-write context and purpose, and (b) reading and writing those texts for the purposes for which they are read or written outside of a learning-to-read-and-write context and purpose" (p. 14). Theories of situated cognition (Brown et al., 1989), the sociocultural learning of higher mental functions (Vygotsky, 1978), and legitimate peripheral participation (Lave & Wenger, 1991) all suggest that in order to learn in a given domain, learners need to be immersed in the authentic experience of that domain's discourses and culture while guided by more expert others. The theoretical basis for authentic literacy instruction is strong, and the few studies that test the effects of authentic texts and tasks on student outcomes show promise for authentic close reading instruction (see Purcell-Gates, Degener, Jacobson, & Soler, 2002; Purcell-Gates et al., 2007).

Implications for close reading instruction. Andrew Turchon, a middle school social studies teacher, exemplifies an authentic approach to close reading instruction in his unit on map literacy (Dakin, Eatough, & Turchon, 2011). Turchon asked his "student geographers" to read maps closely to discover their purpose: inform, persuade, explain, or compare and contrast. Students drew on their knowledge of maps to provide text-based evidence for their answers—phrases, symbols, or images from the map. Teachers following Turchon's example might think about the reading practices used by experts in the field of study, choose authentic texts that would be read in that community, and lead students through close reading activities designed to make them more aware of the texts' features and purpose.

Digital literacies may offer multiple pathways for students to engage in authentic reading of texts of their own choosing, thus increasing engagement (Alvermann, 2008; Neugebauer, 2013). We can imagine a close reading lesson at the high school level, in which teachers ask students to choose a digital game they play outside of school or a social media platform they frequent, then guide them to develop close reading strategies that would foster new interpretations of these media.

Teachers can also learn much from the authentic close reading that occurs in digital forums, which are heavily intertwined with writing, composing, and creativity. In fan forums, for example, fans share and debate their close readings of television, movies, and books with other fans (Jenkins, 2013). Instruction modeled after online participatory culture might use close reading as an entrée into creative, transformative writing. For instance, teachers testing a Teachers' Strategy Guide for New Media Literacies led students to perform close readings of *Moby Dick* across multiple platforms (e.g., film, song, book), then craft comic strips, plays, music videos, and fanfiction in response (Kelley, Jenkins, Clinton, & McWilliams, 2013).

Metadiscursive Awareness

Promote students' metadiscursive awareness by helping them understand the purposes and structures of texts in different disciplines and genres, and which close reading strategies work for these purposes and structures.

We define metadiscursive awareness as knowledge about texts and reading practices (Schoenbach, Greenleaf, & Murphy, 2012). More specifically, the purpose of metadiscursive awareness "should be to identify and explain differences between texts and relate these to the contexts of culture and situation in which they seem to work" (New London Group, 2000, p. 14). In everyday terms, metadiscursive awareness might be construed as how, when, where, and why a learner adapts reading and writing practices to a particular context, such as a discipline (biology vs. literature), a kind of text frame (description vs. argument), or a task (summary vs. critique). As adolescents gain this metadiscursive awareness, it should inform the lenses, purposes, and strategies they choose when closely reading texts in different genres and disciplines. Due to shifts in the CCSS and research that has revealed disciplinary differences in expert reading approaches (Shanahan, Shanahan, & Misischia, 2011), many researchers have asserted that adolescents should be taught to read closely using discipline-specific lenses (e.g., Lee, 2014; Moje, 2008; Shanahan, 2012). In addition to performing these discipline-specific close readings, we want students to be able to approach multimodal and hybrid text genres with a metadiscursive toolkit at their disposal.

One empirical body of work that focuses on developing metadiscursive awareness during adolescent close reading instruction comes from a systemic functional linguistics approach (Halliday, 1978). Working in this tradition, Schleppegrell, Greer, and Taylor (2008) have created and tested close reading instruction that helps students develop a metalanguage for examining the language patterns in history texts. Teachers lead students through a series of questions that help them recognize and interpret what the authors term "reference devices": pronouns, demonstratives, synonyms, verbs, nouns, conjunctions and other features of language. Drawing from these reference devices, students and teachers discuss common processes captured by historical texts (e.g., cause-effect), historical participants and their agendas, and the circumstances in which historical events occur. Above all, students develop a metalanguage for closely reading, discussing, and learning from historical texts. Students whose teachers participated in a summer institute to learn this close reading instructional strategy significantly outperformed comparison group students in all facets of a historical essay aligned with the California State Standards.

Implications for close reading instruction. Functional language analysis presents one instructional model for close reading instruction; multiliteracies pedagogy (Cope & Kalantzis, 2000; New London Group, 2000) provides another. Whereas functional language analysis zeroes in on the implication of grammatical features of text for interpretation, multiliteracies pedagogy seeks to foster a metalanguage about different modes (e.g., visual, linguistic, audio, spatial, gestural). This metalanguage includes understandings of features of genre, such as common patterns of textual organization, as well as understandings of how the verbal, visual, and aural contribute meaning to texts. Cope and Kalantzis (2000) detail how a teacher at William Ross High School organized metadiscursive close reading instruction within a multiliteracies pedagogy using a music video. The teacher first asked students to analyze the song's written lyrics, then she asked what the music, colors, imagery, and editing add to the meaning of the music video. As this example illustrates, multiliteracies pedagogy can develop students' metadiscursive awareness around multimodal text genres, as well as traditional print literacies.

Digital texts are not often bounded and linear; rather, they are interwoven, changeable, and multilinear (Looy & Baetens, 2003). A student may begin to read a webpage about graffiti laws in his or her city and navigate by the end of the session to the Instagram #graffiti hashtag. Close reading digital texts, then, takes metadiscursive knowledge about how genre features, intertextuality, and multimodality work together to make meaning. Internet reciprocal teaching, in which students teach their classmates about digital text features and reading strategies, may also hold promise as a 21st-century close reading approach (Leu et al., 2013).

Critical Literacy

Involve students as critics of themselves, texts, and the world as they read closely.

Allan Luke (2012) defines critical literacy as “use of the technologies of print and other media of communication to analyze, critique and transform the norms, rule systems and practices governing the social fields of everyday life” (p. 5). Teachers designing close reading instruction through a critical literacy lens would demonstrate to their students that texts represent particular points of view and silence others, and that texts can be used as jumping off points for social action (Luke & Freebody, 1999). We believe, with Franzak (2006), that “critical pedagogy that incorporates effective literacy instruction seems to hold the most potential for both improving reading achievement and working toward equitable social arrangements” (p. 221).

One widely cited theoretical framework in the research literature is Hillary Janks's (2000) four dimensions of critical literacy in education: domination, access, diversity, and design. Close reading pedagogy from a domination perspective might focus on how symbolic forms of representation (written language, visuals, sound) reproduce existing power structures. Close reading pedagogy from an access perspective might focus on critiquing and learning dominant genres. Close reading pedagogy from a diversity perspective may call for a wide range of texts to be read and for student's cultural reading practices to be valued. And close reading pedagogy from a design perspective may emphasize that close reading should be but one step on the path to crafting new narratives that effect social change.

In a review of critical literacy interventions at the secondary level, Behrman (2006) claims that while there are many different pedagogical approaches represented in the literature, there are common threads running through studies. Students in critical literacy interventions might read multiple texts, with the goal of highlighting key differences in author perspectives; read from a resistant perspective, with the goal of unmasking power structures represented by texts; produce countertexts, with the goal of lending legitimacy to marginalized voices; conduct student-choice research projects, with the goal of learning about social forces; and take social action, with the goal of engaging literacy for change.

Implications for close reading instruction. We think that instructional frameworks such as Borsheim-Black, Macaluso, and Petrone's (2014) critical literature pedagogy (CLP) hold promise for promoting close reading from a critical literacy standpoint. Teachers using the CLP would lead students through close readings with and against the text. Close reading with a text "includes familiar approaches of comprehending storylines, analyzing literary devices, making personal connections, understanding historical contexts, and developing thematic interpretations" while close reading against a text "examine[s] how it is embedded and shaped by ideologies" (Borsheim-Black et al., 2014, p. 124). The authors of the CLP suggest that teachers lead students through interrogating a wide variety of texts, canonical and popular, along five dimensions: canonicity, contexts, literary elements, reader, and assessments. Behrman (2006) argues that close reading for critical literacy is also possible in the content areas. Content-area teachers seeking to promote critical literacy might ask questions such as "How do[es] specific text content, [modes of inquiry, and text genre] gain acceptance and prominence? What counts as 'true' within the discipline, and who makes that determination? Why?" (p. 496).

The proliferation of texts, digital platforms, and tools on the Internet increases the need for critical literacy in close reading instruction (Leu et al., 2013). In 2010, Google CEO Eric Schmidt observed that every 2 days, Internet users create more data than humans created from the dawn of man through 2003 (Siegler, 2010). Partially because the sheer quantity of information on the Internet is staggering, it is necessary to ensure that students develop the tools to recognize that Internet texts and platforms, as literacy objects, are created by authors with agendas (Brandt & Clinton, 2002). Facebook, for example, allows certain types of interaction (e.g., the "like" button), while discouraging others (e.g., making one's profile invisible to advertisers is arduous). This commercial side of the Internet, coupled with the reality that anyone can publish anything, raises the stakes for solid critical reading pedagogy in modern classrooms. Judging the credibility of sources, the validity of arguments, and the subtexts encoded in surface texts are necessary in any close reading context, but especially so in this new digital world of texts.

Though the Digital Age has increased the need for critical literacy in close reading instruction, it has also increased the opportunities for students to engage in close reading. Students can, for example, now analyze multiple versions of texts online (Webb, 2007), remix texts to create alternative narratives (Gainer & Lapp, 2010), and distribute these counternarratives to authentic audiences to promote social change (Avila & Moore, 2012).

Dialogically Organized Discussion

Guide students to ask and answer authentic questions while reading texts closely, and engage them in rich and rigorous conversations about their questions and interpretations.

Dialogue is a medium through which classroom communities can reach collective interpretations of a text (Wells, 2002), students can articulate their thoughts and then reach for those thoughts as new interpretive tools (Smagorinsky, 2001), or students can confront alternative perspectives, therefore moving toward new patterns of reading activity (Engeström, 2015) or belief systems (Bakhtin, 1986). When students are asked to sustain “special attention to a text,” often over repeated readings, we think dialogue between teachers and students can drive richer and more nuanced interpretations.

All classroom dialogue is not equal in its effects on student learning, however. In a large-scale study, Nystrand (1997) found that dialogue in the vast majority of studied classrooms was monologically organized, in which the teacher held the discussion floor (and the topic of discussion) far more than did students and adhered to IRE (initiation–response–evaluation) discourse patterns (Cazden, 2001). But in the classrooms in which teachers posed more authentic questions and elaborated on student ideas, students improved their analytic skills to a point where they performed significantly better on standardized writing measures. Nystrand (1997) terms the latter approach “dialogically organized” instruction, drawing on Bakhtin (1986). Dialogically organized instruction typically elicits more student voices and encourages students to build on each other’s ideas, incorporates authentic questions to which there is no “right” answer predetermined by the teacher, and scaffolds student offerings with the goal of creating access to more complex ways of reading (Gutiérrez, 1993).

Large-scale empirical studies (Applebee, Langer, Nystrand, & Gamoran, 2003; Murphy, Wilkinson, Soter, Hennessey, & Alexander, 2009) have demonstrated that dialogically organized classroom discussion correlates with positive reading outcomes in adolescent classrooms, with some caveats. Applebee et al. (2003) showed that dialogic instruction, envisionment building, and extended curricular conversation effected better student reading and writing outcomes, but that this type of instruction was rarely present in low-tracked classrooms. In their analysis of the effects of nine dialogically organized discussion approaches for literacy, Murphy et al. (2009) found that increases in levels of student talk did not always correlate with improvements in comprehension, and conclude that talk should be a means to an end, and not an end in itself. These studies suggest that teachers of close reading should create opportunities for all of their students to engage in high-quality, rigorous, and authentic discussion about texts. This is especially true for teachers of low-income or low-tracked classes, who are too often pressured to steep students in basic skills instruction at the expense of rich classroom discourse.

Implications for close reading instruction. Smith et al. (2014) offer an alternative to the version of close reading championed in the RPC that allows for dialogically organized discussion. Specifically, they provide a counterlesson responding to Coleman’s close reading of Martin Luther King’s “Letter from Birmingham Jail” (Engage NY, 2012). Unlike in Coleman’s lesson, students in Smith et al.’s imagined classroom would talk about issues in the text before reading, reflecting, for

example, about times when they felt weak, strong, or persuasive. As they closely read King's "Letter" and supplementary texts, students would participate in discussion guided by authentic questions, such as "What giants oppose equality and the achievement of civil rights in Dr. King's time and our own?" The authors also provide ideas for participation strategies (e.g., a whole-class brainstorm, jigsaw activity, think-pair shares, role play) to organize the close reading discussion, so that students take up each other's ideas and elaborate on their own. This reimagined lesson better capitalizes on the experiences of all readers in the classroom and frames close reading as a collaborative process that takes place in an interpretive community.

New digital literacies offer more opportunities for dialogically organized close reading pedagogy than ever before. Social media platforms such as Facebook, Instagram, and Snapchat, discussion forums such as Reddit or Stack Exchange, blogs and media platforms such as YouTube, or crowd-sourced informational resources such as Wikipedia all offer pathways for collaboration or discussion on the web. Chandler-Olcott (2013) envisions an approach to dialogically organized close reading in which students read an online article and its accompanying comments, critically analyze the arguments made, discuss the role of comments in our culture, collaboratively craft class guidelines for comment writing, and author their own comments. Teachers might also introduce digital tools into their classrooms to increase collaboration and discussion as students closely read texts. In a classroom observed by Castek and Beach (2013), seventh-grade students used the annotation app Diigo to highlight key information in a web text about wind energy, type questions, and respond to their classmates' annotations. While the use of such apps has promise for promoting dialogically organized discussion, teachers should still generate authentic questions, choose motivating topics for discussion, make sure that students have adequate time and knowledge of technology to communicate online, and organize classroom participation frameworks in a way that supports online interactions (Castek & Beach, 2013; Leu et al., 2013).

Conclusion

So now that we have traced the journey of close reading across many decades and offered our personal reading of its virtues and vices, what are we to make of close reading? Does it deserve the close reading we have given it? Is it worthy of our collective and individual attention in classrooms and schools around the world? Will it set comprehension activity, classroom instruction, and conversations about text on a more productive pathway than we have been traversing over the past 40+ years?

Our qualified answer is "Yes...maybe...under certain conditions." At the risk of being regarded as equivocal on close reading, our statement is as positive an assessment as we can muster in the uncertain state of its implementation in today's schools. Whether close reading represents an advance in our teaching and learning about text does depend on which principles and practices get privileged as it is rolled out.

If close reading promotes a "special attention to a text" that requires, as does the RPC, that it stay within the "four corners of the text" (Coleman & Pimentel, 2012), then the answer is "No." Such a stance will promote, at best, reading for gist (getting the author's key idea(s) and supporting details) and for craft (examining how the author uses language and image to persuade, position, or amuse readers). That's a start, but it falls far short of providing students with a full kit of

comprehension tools or a full range of discussion experiences. Likely to be ignored is the all-important practice of critical literacy—examining the assumptions and consequences of the text—what we like to call “what is said by silence.” And at its worst, such a stance will promote a dogged adherence to literal comprehension practices—in Nystrand’s (1997) language, known-answer questions. That would be a setback for both reading comprehension and classroom conversations, because it would deny learners access to the cornerstone of democratic discourse—a skeptical and critical disposition.

But if close reading promotes “special attention to a text” (Lentricchia & DuBois, 2003, p. 2) that acknowledges all reading involves the three other elements in the RAND model (reader, activity, and sociocultural context), then the answer can be “Yes.” Just such a model of close reading is what various scholars—including Rosenblatt (1978), Fish (1980), Luke and Freebody (1999), Hinchman and Moore (2013), and Smith et al. (2014) have in mind. This approach begins with the recognition that even the simplest act of close reading—a sentence, a phrase, or even a word—cannot be enacted without acknowledging, either directly or indirectly, the resources and constraints of prior knowledge, activity, and context. For starters, how can a reader monitor his or her reading to determine whether it makes sense without invoking background knowledge? It’s impossible! To say that the text makes sense is tantamount to saying that it is consistent with (1) the model of the text base that we, as readers, have constructed to that point in the reading, and (2) the wellspring of knowledge and experience we bring to the act of reading (see Pearson [2013] or Pearson & Cervetti [2015] for a more elaborate version of this argument). So, too, with task: A close reading to determine the gist of the author’s position is not the same as a close reading to pinpoint strategic deployment of figurative language designed to shape readers’ attitudes toward a character, or a close reading to evaluate the validity of the argument made. And so, too, with context: A close reading of the validity of an argument in anticipation of a test is not the same as a close reading of an argument when researching material for an essay. In taking this position, we also side with one of the most revered proponents of close reading, Mortimer Adler (1941), who, in a classic essay entitled “How to Mark a Book,” provided this account of the relationship between a reader and the author of a text:

And that is exactly what reading a book should be: a conversation between you and the author. Presumably he knows more about the subject than you do; naturally, you’ll have the proper humility as you approach him. But don’t let anybody tell you that a reader is supposed to be solely on the receiving end. Understanding is a two-way operation. (p. 12)

Adler’s account is remarkably similar to the definition of reading in the RAND report as the process of simultaneously extracting and constructing meaning through interaction and involvement with written language. We use the words extracting and constructing to emphasize both the importance and the insufficiency of the text as a determinant of reading comprehension (p. 11). We rest our case. Close reading is all the closer, all the more accurate, all the more critical, all the more helpful when the text gets a little help from the resources brought to bear from the reader, the activity, and the context.

Research about Close Reading

We would be remiss if we did not close with a plea for more research on the construct of close reading. In part because it was born and bred in the interpretive research traditions of literacy criticism rather than the experimental lens of psycholinguistic studies or the ethnographic lens of critical literacy, there is not much empirical evidence to guide our decisions about what versions of close reading to endorse; we just don't know enough about the consequences of different models. Granted, we have learned a great deal from the work, cited earlier, of Nystrand (1997) and his colleagues and Murphy and her colleagues (2009). But even though we know something about the impact of steady diets of known-answer questions or an emphasis on critique, the findings lack the sort of specificity needed to make precise pedagogical recommendations. So here is our wish list of research issues we'd like to promote in our scholarly community:

- Text length: Most of the recommendations for close reading involve short texts— poems, letters, speeches, or excerpts. What does close reading look like when extended over a book or a course of study?
- Disciplinary literacy: Is close reading the same phenomenon in science, history, mathematics, and literature? We doubt that it is, but documentation of similarities and differences seems crucial to the future of close reading.
- Authenticity: If we can only manage close reading when texts are selected intentionally for the typical sorts of analyses we do in close reading, what does that say about its generalizability? And what about digital texts? Can any text be read closely? Or just some?
- Relationships to writing: Most close reading approaches assume that students will be able to draw evidence from their readings that they will then use in their writing. In short, how do ideas from close reading lessons or independent close reading make their way into student compositions?

Close reading will be a better resource for teachers and students when it receives full benefit from the research of the past and the research we can collectively undertake in the future.

Coda

I had the opportunity to receive feedback about this chapter from multiple colleagues after its publication, and many of them wanted to better understand the boundaries of close reading – when can we call a reading a close reading, and when is it just reading? Thanks to this thoughtful feedback on an issue I am still puzzling out for myself, I close chapter 4, and this dissertation, with a reflection on the nature of close reading.

Transition to Chapter 2: A Formative Experiment on Close Reading Instruction in a Chemistry Classroom

As chapter 1 argues, there is little research on close reading instruction in high school science classrooms. More research is needed at the intersection of close reading and disciplinary reading to ensure that every young person has the skills to critically and carefully examine challenging scientific texts. In the second article, I draw from the pedagogical principles suggested in chapter 1 to co-design and test close reading instruction with a high school chemistry teacher in a charter school in northern California. This multi-phase mixed methods formative experiment assessed students' comfort, skill, and motivation to read science texts as they engaged in A/B tests of alternative forms of close reading instruction drawn from the principles of 21st century close reading outlined in chapter 1. An A/B test of background knowledge activation's effect on students' ability to write questions about a text suggested that students whose background knowledge was activated before reading wrote more argument-generating questions, whereas students who read the text without pre-reading activities wrote more fact-generating questions. An A/B test of student choice of text on students' motivation to read and ability to write information about a topic suggested when students had the ability to choose internet texts under certain conditions, they were able to access as much accurate information about a topic than students who were assigned a text by their teacher. Based on the findings of this study, science teachers might problematize Common-Core-era recommendations to eliminate or greatly reduce pre-reading activities, and instead involve students in a rich array of before, during, and after reading activities. Additionally, science teachers might consider supporting students to choose internet texts to read about scientific topics of discussion.

Chapter 2: A Formative Experiment on Close Reading Instruction in a Chemistry Classroom

To prepare American adolescents to be informed citizens and to enter STEM fields, it is important that researchers and educators place close reading of scientific texts at the forefront of instruction. In the current new media landscape, at once blooming with open-source science journals and littered with fake science news on social media, it is harder than ever before for a citizen to choose reliable texts about science issues and to read scientific arguments closely and critically. As President Barack Obama told *The New Yorker's* David Remnick: “An explanation of climate change from a Nobel Prize-winning physicist looks exactly the same on your Facebook page as the denial of climate change by somebody on the Koch brothers’ payroll” (Remnick, 2016). Young citizens need close reading skills to sift through the evidentiary basis for hot-button scientific issues ranging from fracking to legalization of marijuana.

Adolescents who hope to become scientists as well as informed citizens also need instruction in science-specific close reading skills, since science textbooks and journal articles often include text features (e.g. charts, graphs, diagrams), organizational structures (e.g. an evidence-based argument), syntax (e.g. complex embedded clauses), and vocabulary (e.g. Greek and Latin roots) distinct to the discipline (Lee & Spratley, 2010). The authors of the Common Core State Standards (CCSS) reacted to the need to develop adolescents’ science close reading skills with standards for science and technical subjects in 6-12; according to the CCSS for example, students should be able to “cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions” (National Governors Association for Best Practices (NGA Center) and Council of Chief State School Officers (CCSSO), 2010, p. 62). Due to the institutionalization of the CCSS and increased calls by educational reformers for discipline-specific reading approaches (e.g. Shanahan & Shanahan, 2008), researchers have developed and tested many promising approaches to science reading instruction.

Past research shows the effectiveness of approaches to science reading instruction that “are embedded in inquiry-based science instruction;...engage learners in text-based inquiries along with hands-on science investigations;...bring together teams of literacy and science experts;...and require extensive teacher learning through professional development and/or educative curricular materials” (Pearson, Moje, & Greenleaf, 2010, p. 461). Seeds of Science/Roots of Reading (Cervetti, Pearson, Bravo, & Barber, 2006), Guided Inquiry supporting Multiple Literacies (Palinscar & Magnusson, 2001), and IDEAS (Romance & Vitale, 1992, 2001) are all examples of such an approach. Each of the programs above demonstrated better reading and science learning outcomes for participating students in the K-5 age range.

Though the aforementioned studies focused on elementary-age students, there is a small but growing body of research that has developed and tested science reading interventions for adolescents. The Textual Tools Study Group (Moje, Sutherland, Cleveland, & Heitzman, 2010) aimed to increase the integration of authentic real-world science texts and discipline-specific reading strategy instruction with middle school hands-on science inquiry. When students read science textbook passages alongside popular science texts and translated between the two, they gained in scientific concept knowledge and wrote better scientific explanations (Textual Tools Study Group, 2006). Additionally, cross-institutional Project READi strives to give teachers and students in grades

6-12 the tools to engage in evidence-based argumentative reading of authentic scientific sources. Units of “text-based investigations” into issues like MRSA infection “emphasize close reading attuned to the vocabulary, core ideas, cross-cutting concepts, and practices of science and metacognitive conversations about learning processes” (Greenleaf, Brown, Goldman, & Ko, 2013, p. 4). A randomized control efficacy study demonstrated significant effects for the READi approach in 9th grade biology as compared to traditional approaches to science instruction (Goldman et al., in preparation).

While researchers have proposed close reading strategies and instructional frames for science classrooms (Fisher & Frey, 2012; Lapp, Grant, Moss, & Johnson, 2013) and some of the aforementioned approaches include close reading as a goal (Greenleaf et al., 2013) there is little research that takes a deep dive into close reading in high school science classrooms.

I hope to build on past research into adolescent science reading instruction by offering a mixed-methods case study of my collaboration with one high-school chemistry teacher to test close reading instructional frames for a variety of reading tasks. Drawing methods from the design-based research tradition (Bell, 2004; A. L. Brown, 1992; Cobb, Confrey, DiSessa, Lehrer, & Schauble, 2003; Collins, 1992; Reinking & Bradley, 2007; Wang & Hannafin, 2005), this collaboration took place over one semester in an northern California charter school. I worked with the chemistry teacher to develop tests of close reading instructional frames based on recommendations for 21st-century close reading instruction a colleague and I developed (Catterson & Pearson, 2017). The study proceeded in four phases, and each phase was guided by a research question:

1. Before the study began, how comfortable did students feel reading scientific texts? When given the task to closely read a chapter from a chemistry textbook, how well were students able to interpret and apply the texts’ information?
2. How does activating students’ background knowledge before a close reading influence the number and types of questions they write about a text?
3. How does allowing students to select a text influence their ability to use close reading strategies to retrieve information about a topic? How does it affect their motivation to read that text?
4. How did students’ approach to and comfort reading scientific texts change over the course of the semester?

To answer these questions, I will enact a set of steps: First I summarize Catterson & Pearson’s (2017) recommendations for 21st century close reading instruction, which acted as a lens through which I developed research questions and data collection methods, vetted potential instructional designs, and analyzed data for this study. Then, I will explain this study’s methods and findings. Lastly, I will discuss the findings, limitations, and future directions for research in close reading instruction in science classrooms.

Conceptual Framework

What is “close reading?” An ecumenical definition of close reading on which perhaps everyone can agree is simply “reading with special attention” to a text (Lentricchia & DuBois, 2003). But in practice, close reading means different things to different people, depending on beliefs about how meaning is constructed, what constitutes a text worthy of close reading, and what the purposes

for close reading should be. As we discuss at length in chapter 1, many of my colleagues and I feel that the RPC's vision of close reading (what Catterson & Pearson (2017) term the "Common Core close reading paradigm") is text-centric to a fault; the authors assume that meaning lies within "the four corners of the text" (Coleman & Pimentel, 2012, p. 4) and do not acknowledge the important role of the reader and the reader's sociocultural context in meaning construction. Furthermore, the common core close reading paradigm has a limited vision of what counts as text (Chandler-Olcott, 2013; Drew, 2012) and limits goals for close reading to gaining knowledge. We feel that this paradigm looks backward to New Critical versions of close reading pedagogy (Brooks & Warren, 1960), fails to deal at all with the reader response paradigm that was so influential in the 1980s and 1990s, and completely ignores the need to look forward to the skills and dispositions that readers need now, in the 21st century. As we say in Catterson & Pearson (2017):

We offer an alternative vision of adolescent close reading instruction for the 21st century, one that assumes and asserts that (1) meaning is constructed at the intersection of a unique reader, text, and activity within sociocultural contexts; (2) the term "text" entails print and digital, short and long, carefully crafted and hastily jotted, official and popular; and (3) close reading should build identity, equity, and action, as well as knowledge. (p. 461)

To provide more specific guidance for educators to enact this vision, we proposed five principles of 21st century close reading instruction in the following categories: background knowledge, authentic reading and writing, metadiscursive awareness, critical literacy, and dialogically organized discussion. Catterson and Pearson's (2017) 21st-century close reading paradigm and these instructional principles guided data collection and close reading A/B test design.

Conceptual Framework and Data Collection

Pre- and post-surveys, found in appendices A and B, were designed to capture students' existing background knowledge about topics. Students were asked, for example, what types of printed and digital texts they spent time reading at home, and to list topics about which they would teach others. In collecting these types of data, I hoped to "learn what content and discourses students already [knew], and look for opportunities to add to this knowledge as students read with special attention to text" (Catterson & Pearson, 2017, p. 463). I also collected data on students' comfort with science reading, since in our paradigm comfort and enjoyment while closely reading texts are important goals alongside building knowledge. The planning protocol that the chemistry teacher and I used to plan tests of close reading instructional frames was also guided by the paradigm and principles. I asked the chemistry teacher to brainstorm challenges with close reading in his classroom, then to choose the most pressing challenge. We then used Catterson and Pearson's (2017) close reading principles to come up with multiple solutions to these challenges and craft two instructional frames that would test our proposed solutions.

Conceptual Framework and Close Reading A/B Test Design

The paradigm and principles guided instructional frame design in two main ways: 1) by allowing the teacher to set the purpose for closely reading science texts (rather than imposing "knowledge building" as would common core close reading paradigms) and 2) by offering ideas for

A/B instructional frames that might help students reach the teacher's goals. For example, one goal the chemistry teacher identified in the planning sessions was that students could "write authentic inquiry questions about a scientific topic." One candidate A/B test example under the category of "metadiscursive awareness" was "one group will do a close reading of the visuals of a chemistry text to explain how visuals contribute to textual interpretation while the other group will do a close reading of the features of the written text in a chemistry text to explain how those features contribute to textual interpretation." The instructional frames within these groups were always based on one of the five principles of the paradigms and aimed to answer questions about close reading in science classrooms for which there is a gap in the research literature.

Methods

Context and Participants

When I first walked into Bright Futures Academy³, I was cheered by the high ceilings, fresh paint in warm colors, and the lively chatter of the students in the brand new building. This charter high school, situated in a low-income neighborhood in northern California, boasts a better than 90% college acceptance rate.

Robert Thompson's mixed-grade chemistry classroom sat across the hall from an expansive bank of windows that overlook a mezzanine garden. Though Mr. Thompson is a young man and had been teaching for just 4 years at the time of the study, school administrators identified him as committed to students and reflective about his instructional practice. After a conversation in the summer about the goals of my study, Mr. Thompson agreed to co-design and enact 21st-century close reading A/B tests in his classroom. Perhaps because of his undergraduate degree in biochemistry, Mr. Thompson understood the need for random assignment into A/B groups, and was eager to plan science literacy interventions and discuss the results of our collaboration. Mr. Thompson was better prepared than many science teachers to incorporate close reading instructional frames into his instruction as he had discussed best practices in science reading with his teaching team and administration, was drawing from the Common Core State Standards for Literacy in Science (National Governors Association for Best Practices (NGA Center) and Council of Chief State School Officers (CCSSO), 2010), and had participated in WestEd's Reading Apprenticeship professional development, which research has shown to increase teachers' use of metacognitive inquiry routines, reading comprehension instruction, and collaborative learning structures in the classroom (Greenleaf et al., 2011).

Mr. Thompson appeared to be well-liked by his students. He greeted each of them with a smile and a handshake as they walked through the door of his classroom, made silly jokes during his lessons, and conducted class with a calm, positive energy. After school, he coached the basketball team, and students would sometimes come by to get one of the basketballs he kept behind his desk. Students often hung out in his classroom after class and had drawn a cartoonish picture of him garbed in a lab coat that hung outside his door. In his classroom, motivational posters lined the walls. On one entitled "Our Big Goals" was written "1. 80% mastery of all learning targets," and "2. Think and communicate like college chemists." On the wall above the board and on all class materials was written "I matter. My future matters. This matters."

³ All names of schools and teachers are pseudonyms.

The 28 chemistry students in this study were in 4 different non-AP classes and ranged in age from 14-17. The population of the classes reflected the population of the school and the surrounding neighborhood. Of the 28 students in the study, 27 students were Latinx and one student was African-American. 5 of the 28 students reported that English was their first language, while 17 said that English was not their first language (6 declined to answer or did not take the pre-survey). Of the students who reported that English was not their first language, all reported that Spanish was their first language. Students reported that they learned English at a mean of 4.16 years old; the earliest students reported learning was at age 2, and the latest was at age 8. 11 students identified as male, while 17 students identified as female. Over 90% of students received free or reduced lunch.

During Mr. Thompson's classes, students sat in mixed-sex groups of 4 on high stools around lab tables. Each student brought to class a Chromebook that the school assigned to them, and during my observations all students quietly and quickly opened their Chromebooks at the beginning of classes to complete a "Launch" activity. Mr. Thompson often asked students to break into groups to work on mini-labs or to discuss issues relevant to the lesson, and in each of my field notes I noted that most students seemed focused on the task, approached each other and Mr. Thompson in good spirits, laughed often, and freely offered ideas about the questions Mr. Thompson posed. In short, my impression of the students was that they were engaged, curious, and eager to contribute to the community of learning that Mr. Thompson had established.

Formative Experiment Methodology

To capture the successes, failures, and unexpected outcomes of 21st-century close reading A/B tests in Mr. Thompson's chemistry class, I conducted this study in the tradition of design-based research (Bell, 2004; Brown, 1992; Cobb et al., 2003; Collins, 1992; Reinking & Bradley, 2007; Wang & Hannafin, 2005). The design-based research paradigm has its roots in the design experiments of Brown (1992) and Collins (1992), which moved educational research out of controlled laboratory settings into real world classroom contexts. In their review of design-based research (DBR) paradigms, Wang and Hannafin (2005) note that all DBR is pragmatic, grounded, interactive, iterative, flexible, integrative, and contextual. I situate myself within cultural psychological and cultural anthropological paradigms of design-based research (Bell, 2004), which emphasize the importance of understanding phenomena from the participants' perspective and providing opportunities for them to influence the intervention design. Though I acted as the "change agent" during this study (Bell, 2004), I collaborated with Mr. Thompson and documented his reactions and the reactions of his students to proposed and enacted designs. Furthermore, I consider this study not a design experiment but a formative experiment, a subtle but important difference explained by Reinking & Bradley (2007):

Those who gravitate toward the use of the term formative experiment...tend to be guided by a...local, less formalized workability grounded in a more pragmatic and qualitative stance. They see their work as legitimate and useful independent of any contribution it may make to conventional methodologies and as geared more toward informing practitioners than to creating a design science. They are less concerned

about establishing specific causal relations, and they view generalization more broadly than simply extrapolating findings from a sample to a population. (p. 15)

With the affordances of the formative experiment in mind, I envisioned a four-fold set of goals for this study 1) to help my chemistry teacher collaborator learn how to design close reading instruction that works in his classroom 2) to suggest instructional guidelines for other practitioners based on the analysis of the experiment 3) to shed light on open questions about close reading in Catterson and Pearson's (2017) 21st century close reading paradigm and 4) to generate theories about close reading for others to explore in future studies.

As the timeline in figure 2 demonstrates, this study moved through four phases of data collection. Phase 1 took place in the beginning of the fall 2015 school semester. The intention behind this phase was to establish, through interviews, observation, and surveys, a baseline of students' overall comfort and skill close reading scientific texts; I also wished to develop "thick description" (Reinking & Bradley, 2007) of Mr. Thompson's classroom interactions with students and beliefs about instruction. After I analyzed the data collected in phase 1, during phase 2 I co-planned an A/B test of two close reading instructional frames with Mr. Thompson and randomly assigned students to each group. After I analyzed the data collected in phase 2, Mr. Thompson and I designed another A/B test of two close reading instructional frames and randomly assigned students to each group for phase 3. Finally, during phase 4, I conducted a final interview with Mr. Thompson and administered a final survey to student participants, in order to track changes in comfort reading science texts over the course of the semester. See tables 1-4 for a detailed description of data collected.

Data Analysis

In keeping with the formative experiment methodology of this case study, I followed a pragmatic approach to data analysis; when appropriate to the research question, I conducted either quantitative analyses (such as t-tests) or qualitative analyses (such as inductive coding or ethnographic interpretation). Some of my analyses relied on quantitative data that were less open to being skewed by my biases and perspectives as a researcher. For example, to answer research question 3, I compared students' self-reported motivation ratings across groups using t-tests. For other analyses, while my perspective is present in analysis, I attempted to achieve a measure of consistency and rigor in interpretation by relying on inductive coding schemes drawing from constant comparative analysis in grounded theory approaches; the question-type coding scheme I use to answer research question 2 is an example of this. And finally, I also relied on my own "close reading" and interpretation of students' work without the added rigor of coding, such as when I elaborate on the qualities of students' written questions in phase 2 of the research. I believe that all of these types of analyses have something to offer readers of this case study. The quantitative analyses allowed me to compare students at different points in time, for example. But there is also value to the analyses that require more of my own perspective to shine through. Qualitative approaches allow me to embrace the "messiness" of classroom life, describe a richer picture of students' writing, and zoom in closely on outliers and unexpected outcomes, all through my lens of

knowledge of theories and pedagogies of close reading in the discipline of science. In the following section, I further describe analyses and findings from each phase of this case study.

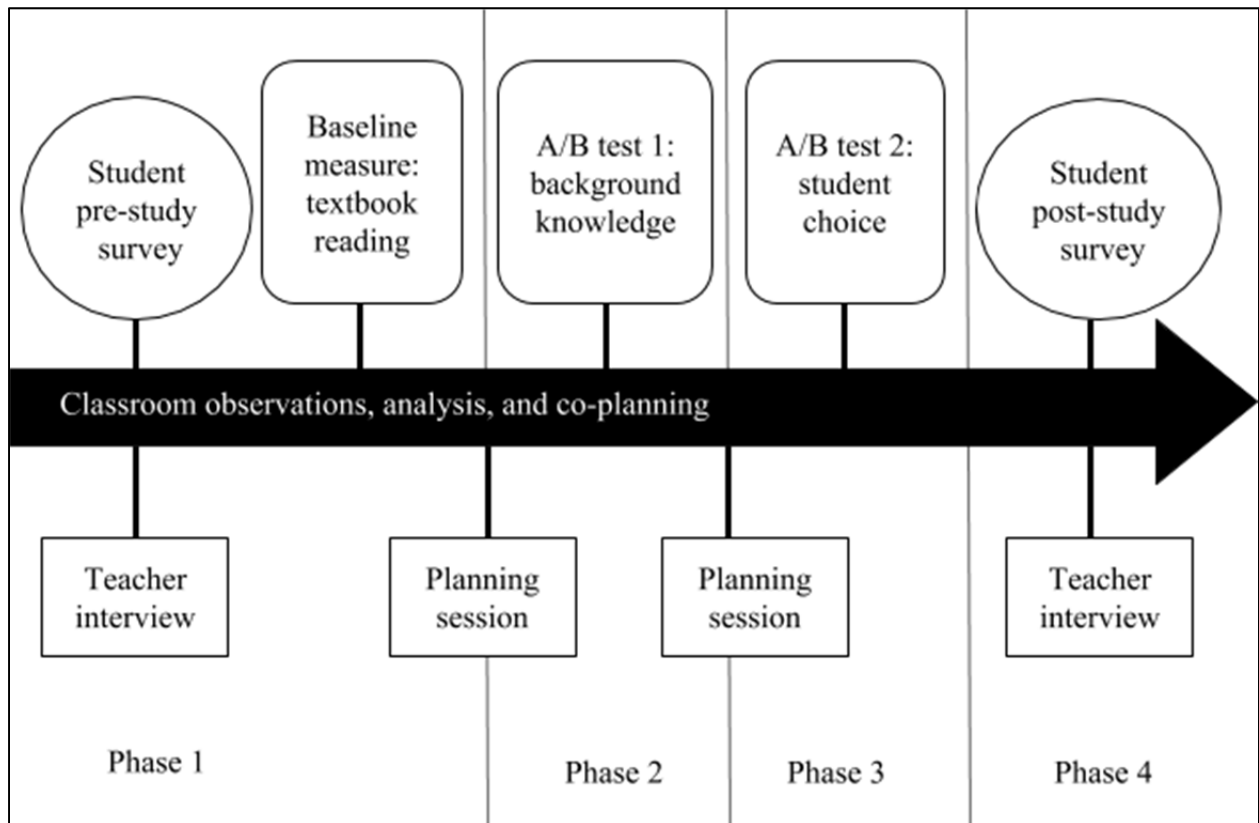


Figure 2. Study timeline. This figure shows the progression of the four study phases. Data collected from students sits above the arrow. Data collected from teachers sits below the arrow.

Table 1

Phase 1 Data Sources, Type, Format, and Description

<u>Source</u>	<u>Data type^a</u>	<u>Data format</u>	<u>Description</u>
Teacher	Pre-study interviews (2)	Notes	Researcher and Mr. Thompson discussed his approach to reading instruction and goals for his class.
	Planning session	Recording	Researcher and Mr. Thompson discussed his current reading and writing instruction and planned a baseline reading task.
Students (n=22)	Pre-study survey	Spreadsheet	Survey assessed student demographics, reading motivation, reading habits, and comfort with reading scientific texts.
	Baseline textbook reading measure	Spreadsheet, written work	Students read an excerpt from their science textbook about atomic numbers and answered comprehension and application questions.
Teacher & Students	Classroom observations (5)	Field notes	Researcher documented teacher-student and student-student interactions, collected instructional materials, and wrote memos connecting observations to research questions.

Note:^aIf a data source has a number in parentheses, that indicates the frequency of data collected. If no parentheses, that data type was only collected once for that phase.

Table 2

Phase 2 Data Sources, Type, Format, and Description

<u>Source</u>	<u>Data type</u>	<u>Data format</u>	<u>Description</u>
Teacher	Planning session	Recording	Researcher and Mr. Thompson debriefed the baseline reading measure, planned an A/B test to assess the role of students' background knowledge as they generate authentic questions about a text, and discussed the role of technology in Mr. Thompson' classroom.
Students (n=25) Group A=15 Group B=10	Background knowledge A/B test	Text files (Google Docs)	Students were randomly assigned to two groups: those in the Before Reading group brainstormed knowledge and questions about nuclear disasters before reading an article about Chernobyl, while those in the While Reading group wrote questions as they read the article about nuclear disasters.
Teacher & Students	Classroom observations (2)	Field notes and recordings	Researcher documented teacher-student and student-student interactions, collected instructional materials, and wrote memos connecting observations to research questions.

Table 3

Phase 3 Data Sources, Type, Format, and Description

<u>Source</u>	<u>Data type</u>	<u>Data format</u>	<u>Description</u>
Teacher	Planning session	Email exchange	Researcher and Mr. Thompson debriefed the background knowledge instructional frame A/B test and planned another A/B test to assess the role of student choice of text as they write information about a topic.
Students (n=24) Group A=13 Group B=11	Student choice A/B test	Text files (Google Docs)	Students were randomly assigned to two groups: those in the Teacher Choice group were assigned an article to read about the sun, while those in the Student Choice group selected a webpage to read about the sun. Students in each group then used the texts to answer a question they had about the sun.
	Student choice A/B test survey	Spreadsheet	Students were asked how motivated they were to read the text, how well they understood text, and how helpful they found working with a partner.
Teacher & Students	Classroom observations (4)	Field notes and recordings	Researcher documented teacher-student and student-student interactions, collected instructional materials, and wrote memos connecting observations to research questions.

Table 4

Phase 4 Data Sources, Type, Format, and Description

<u>Source</u>	<u>Data type</u>	<u>Data format</u>	<u>Description</u>
Teacher	Interview	Recording	Researcher and Mr. Thompson debriefed successes and challenges in science reading instruction for the semester.
Students (n=27)	Post-study survey	Spreadsheet	Researcher administered survey about reading motivation, reading habits, use of Chromebooks in class, and comfort with reading scientific texts.
Teacher & Students	Classroom observations (5)	Field notes and recordings	Researcher documented teacher-student and student-student interactions, collected instructional materials, and wrote memos connecting observations to research questions.

Findings

Phase 1

In keeping with design-based research and formative experiment methodology, this study commenced with a period of observation and data collection that preceded close reading A/B test design. I interviewed Mr. Thompson twice before the semester began, observed his class five times at the beginning of the semester, administered to his students a survey about demographics, reading motivation, reading habits, and comfort with reading scientific texts (appendix A), and co-planned and administered a baseline chemistry textbook reading task with Mr. Thompson. The purpose of this initial data collection was to answer the research question:

1. Before the study began, how comfortable did students feel reading scientific texts? When given the task to closely read a chapter from a chemistry textbook, how well were students able to interpret and apply the texts' information?

According to the survey, student participants were most comfortable "reading" science video and animation, and least comfortable reading their chemistry textbook. In a task designed to assess how well students could learn from and apply information from their textbook, students had a high rate of success answering low inference questions about the text and seemed to be able to apply basic understanding of atomic number and mass to new problems. However, they struggled to answer high inference questions in the text.

Comfort reading scientific texts. At the beginning of the semester, I asked students to rate their comfort with reading science texts. All ratings were made on a scale from 1 (*Not at all comfortable*) to 5 (*Very comfortable*). They rated 9 different types of scientific texts: chemistry textbook, scientific graph, scientific table/chart, scientific animation, image explaining a scientific concept, magazine article about a scientific issue, website about scientific issue, video about a scientific concept, and article in a science journal. Student responses were also amalgamated into a composite variable to assess overall comfort with science reading. Past research indicates that students may not have much experience with disciplinary reading, due to a pedagogical shift away from textbook-reading-as-science to hands-on scientific inquiry (Fang, 2014; Fang & Coatoam, 2013; Hillman, 2014; C. Shanahan et al., 2011; T. Shanahan & Shanahan, 2008). I designed this question to learn more about participants' current comfort with reading different types of scientific texts.

Table 5 shows the mean, standard deviation, and range of students' responses to each of the 9 scientific text types and composite scores. Overall, students expressed the least comfort with reading the science textbook ($m=3.09$). They expressed the most comfort reading videos about scientific issues and animations ($m=3.96$, $m=3.73$). These scores, along with Mr. Thompson's desire to draw from his chemistry textbook as a source of science readings for his lesson, led us to design our baseline reading task around a chemistry textbook reading, with the goal of ultimately increasing students' comfort with these types of texts.

Table 5

Students' Comfort with Reading Nine Types of Scientific Texts (n=22)

<u>Text type</u>	<u>Mean</u>	<u>SD</u>	<u>Range</u>
Chemistry textbook	3.09	1.15	1-5
Scientific graph	3.23	1.19	1-5
Scientific table/chart	3.32	1.13	1-5
Scientific animation	3.73	0.83	2-5
Image explaining a scientific concept	3.41	1.01	1-5
Magazine article about a scientific issue	3.59	0.85	2-5
Website about a scientific issue	3.77	0.97	2-5
Video about a scientific concept	3.95	0.79	3-5
Article in a science journal	3.36	0.95	2-5
Overall comfort with science reading	31.45	7.04	22-44

Close reading of a chemistry textbook excerpt. In a phase 1 planning session, Mr. Thompson explained that one of the ways he wanted to use textbooks in his classroom was as “a replacement for direct instruction.” He wanted students to be able to understand and learn definitions of major terms from the text, understand and use text features, represent isotopes as symbols, calculate the number of neutrons in an atom from atomic mass and atomic number, and apply understandings from the text to new problems. Though he hoped that students would be able to independently read the chemistry text, Mr. Thompson expressed uncertainty that the text could fully take the place of a person showing students how to do problems:

I think the hard thing with a math or a science book is when a problem is given...we're not used to reading a problem and being able to do a problem...we're used to having someone show us how to do it, you know, in person or on a video or whatever, and then we can replicate. But is there a way -- can students look at this and recognize that, okay, “Lithium has a mass of seven because it has three protons and four neutrons.” Okay, now if I gave them another atom; let's say the mass was ten, and there were six neutrons, could they figure out the number of protons from that based on the example that they saw before?

Based on the goals he stated in this interview, he and I co-planned a baseline chemistry textbook reading task. The planning protocol used for this session and the sessions described in

phases 2 and 3 can be found in appendix C. Students were assigned an excerpt from a chapter of their chemistry textbook titled “Atoms by Numbers: Atomic Number and Atomic Mass” (Stacy, 2012). Mr. Thompson instructed students to read the text and annotate. Then he instructed students to reread the text and answer questions about it in a Google form, found in appendix D. Students answered a range of questions about the text; they paraphrased definitions, answered literal comprehension questions, identified what information they would need to perform calculations, performed calculations, and drew a model of an atom.

This baseline reading task was not standardized, and thus cannot provide normative information about students’ overall reading skills in comparison to other students in the nation. But the decision to use a co-designed assessment built within the course curriculum rather than a one-size-fits-all reading assessment was intentional. In keeping with the formative experiment methodology (Reinking & Bradley, 2007), our goal here was to design a test of reading skills relevant to Mr. Thompson’s goals for his class.

I collected and analyzed students’ answers to the baseline chemistry textbook reading task (n=21). One question asked students to explain in their own words what it meant for an atom to be neutral. I graded answers to this open-response question from 0-4 on a rubric, included in appendix E. Questions with binary right/wrong responses were assigned 4 points if correct and 0 points if incorrect. Several questions were awarded half credit (2 out of 4) if the student wrote a partially correct answer. The measure included 6 questions, and its range was 0-24 points. The mean score on the baseline task was 17.85, or 74% (sd=4.03, min=9, max=23).

After reviewing students’ work on the baseline task, Mr. Thompson expressed concern that some students’ conceptual understanding of atomic number was lacking:

They also totally are just taking what they learned literally and not actually understanding...“The reason we’re subtracting the protons from the mass is because the protons and neutrons are the only the thing that have mass. The electrons don’t weigh anything.”...they didn’t get a conceptual understanding out of what they were reading. And maybe it’s just the way that it was written and presented and the questions that I asked afterwards, but half of the kids said that, “Oh, electrons weigh nothing, so therefore five plus six equals eleven.” Like, a ton of kids could argue it conceptually, but there was a small percentage that was noticeable enough to be like, oh, they just -- they took this very literally, and they just kind of applied it very literally.

To some extent, his concerns were validated by the baseline chemistry textbook reading task analysis. For example, one question asked students, “What information could you use to figure out the number of neutrons in an atom? Check all that apply.” The correct answer was both “Number of protons and atomic mass” and “Atomic number and atomic mass.” The first correct answer was “right there” (Raphael, 1982) in the text, so to speak: “If you know the mass of an atom and you know how many protons it has, you can find out how many neutrons it has by subtracting the number of protons from the atomic mass” (Stacy, 2012, p. 59). However, the second correct answer required a complex inference on the students’ part that the number of protons in an atom equal an

atom's atomic number. Of the 21 students completing the task, 14 (66%) correctly chose the first response, demonstrating ability to literally comprehend the task. However, only 7 of the 21 (33%) chose both the low inference and high inference statements.

Ultimately, for this task students approached Bright Futures Academy's 80% mastery goal (74%). And overall, Mr. Thompson was pleased that students seemed to be able to learn from the text to reach the learning targets he set, even when assessed on them during a quiz later that week. Therefore, in phase 2, Mr. Thompson and I decided to shift away from using the text as direct instruction to using the text as a catalyst for inquiry.

Phase 2

In phase 2, Mr. Thompson and I designed the first of two A/B tests of close reading instructional frames. In this case, the test was designed to explore the effect of background knowledge activation on the types of questions students wrote about a text.

During a planning session at the end of phase 1, Mr. Thompson expressed his desire to use a text about the Chernobyl nuclear disaster (Lallanilla, 2013) as a launching point for inquiry, in keeping with the goals of his science department:

What I'm kind of hoping to do -- and we talked about it as a science department also -- is, going into our next department meeting, we really want to use texts in that kind of way [as a hook or introduction to the lesson]...not -- a lot of us had been using it as an extension if we get to finish early or as a way to get direct material, but we kind of want to use them as this launching point to really get students to be asking questions. And then that gets toward an inquiry-type of lesson where those lessons build off, kind of, what we're going to do. So I'm gonna kind of provide them that, and I want them to come up with questions that they have about it, and it doesn't necessarily have to be about content, right? But it can be connections to their own life or what they've heard, and they might naturally make, like, "Oh, is this similar to what happened in Japan when the earthquake hit?" Or "Has this ever happened in the United States?" I just want to see what kind of questions we can get.

Mr. Thompson mentioned a few question types during the course of the planning session. He discussed comprehension questions, such as "What does this word mean? What is this sentence?" But he also wanted students to generate inquiry questions with no right or wrong answer and research questions for which answers could be found online, such as "Has this happened in the US?"

In the conversation that followed, we brainstormed several possible A/B tests, and decided that we would manipulate whether or not we activated students' background knowledge before they performed a close reading of the Chernobyl article. The role of background-knowledge activation in post-Common Core close reading instruction has been contentious, with the authors of the Revised Publisher's Criteria for the Standards suggesting that pre-reading activities too often take the place of rigorous textual inquiry (Coleman & Pimentel, 2012). However, the literacy research literature

indicates that background-knowledge activation strategies can improve students' reading comprehension (e.g. Langer, 1984). Furthermore, science education researchers have shown that when students are asked to make predictions or write down existing understandings before learning about a scientific topic, they are better able to understand the material (Linn & Eylon, 2011; White & Gunstone, 1992). The research question for this phase was designed with the goal of testing Common-Core-era close reading recommendations against recommendations from literacy and science education research:

2. How does activating students' background knowledge before a close reading influence the number and types of questions they write about a text?

Types of questions asked before or while reading. Students were randomly assigned to two groups. In group A (n=15), students were asked "What do you already know about nuclear energy and nuclear disasters? Brainstorm as many details as you can" and "What questions do you have about nuclear energy and nuclear disasters? Write as many questions as you can think of before reading." They were then asked to read the Chernobyl article to understand what they were reading, and to annotate as they read. Next, they were asked to read the article again to generate questions about what they were reading, and to write these questions in the margin. Finally, they were instructed to choose a question that the article did not answer for them and write it down, and to choose three questions that they had after reading the article and write them down. Group A's instructions can be found in appendix F. As the purpose of these activities was to activate students' background knowledge before reading, from this point forward, I refer to group A as the "Before Reading" group.

Students in group B (n=10) were not asked to generate questions or information about nuclear energy and nuclear disasters before reading. Instead, they were asked to read the article to understand what they were reading, and to annotate as they read. Then, they were asked to write a question after rereading each section of the text. Group B's instruction can be found in appendix G. As the purpose of these instructions was for students to write questions while they read without engaging in background knowledge pre-reading activities, I refer to group B from this point on as the "While Reading" group.

To answer the phase 2 research question, I then analyzed the types of questions students in each group generated. My question codes were developed inductively, by reading through student work, generating candidate codes and recording in a codebook, revising the codebook after each read-through, and ultimately creating three pattern-codes (Miles & Huberman, 1994) that I felt captured the character of the writing that each type of question would produce: fact-generating question, explanation-generating question, and argument-generating question.

Fact-generating questions are easily answered by one textual resource or a quick Google search. The answers to fact-generating questions may take the form of scientific knowledge, an interviewee's words, recorded historical events, or other widely accepted information. The answer to a fact-generating question is not arguable, in the sense that it is based on vetted scientific or historical evidence. Most fact-generating questions can be answered briefly, in one or two sentences—maybe in a word or two. For example, one student asked "Was the company sued?" After researching this question online, I found an answer from a reliable source: "Yes, European

and American governments litigated against the Soviet Union for lost wages and costs of agricultural and water testing after the nuclear fallout” (Malone, 1987). The process for locating this fact was entering Google search terms “Chernobyl lawsuit,” assessing the reliability of sources, then finding the information I needed from a single source.

Explanation-generating questions are similar to fact-generating questions in that the answers to these questions take the form of widely accepted scientific or historical knowledge. However, students answering explanation-generating questions will produce a longer piece of writing – a paragraph or multiple paragraphs - than when they answer fact-generating questions. Students may also need multiple sources or a longer single source to generate explanations that answer this type of question. Explanations are also not arguable in the sense that they are reiterations of scientific phenomena or historical events. An example of an explanation-generating question in this data set is: “What happens to nearby animals that are exposed to high amounts of radiation?” In order to answer this question, students would have to locate one or more reliable sources about the effects of radiation on animal health, and then write a paragraph describing all of the medical problems that animals may suffer due to radiation exposure.

Unlike fact-generating or explanation-generating questions, argument-generating questions pose authentic, arguable inquiries that have a debatable answer. Students would require multiple text sources to answer an argument-generating question in order to compare the quality of evidence for and against explanations of phenomena. The answer to an argument-generating question will take the form of a report or presentation - a written or oral argument. Many students in the sample asked some form of the question “Are nuclear power plants dangerous?” This is a question that is still debated among scientific and political communities today. A student answering this question would need to find and evaluate multiple sources, some of which defended the position that nuclear power plants were dangerous, and others of which defended the position that nuclear power plants were safe. They would then need to take a position in an essay, report, or presentation that compared and contrasted the arguments made in the literature.

After I coded each students’ work for these three question types, I tabulated the frequency of each type of question by group, and ran paired t-tests to see if there were differences between the Before Reading and While Reading groups in the numbers and types of questions they generated. Table 6 shows the frequency of each question type written by group. Figure 3 shows boxplots of the means and confidence intervals of each type of question written by group.

Total questions. Students in the Before Reading group wrote a mean of 5.27 questions, while students in the While Reading group wrote a mean of 7.60 questions. There were no significant differences in mean total questions written between test groups ($t = -1.1073$, $df = 9.6209$, $p\text{-value} = 0.2951$). While there was no difference in the total number of questions written by each group, there were differences in the types of questions students wrote. Students in the While Reading group wrote significantly more fact-generating questions than students in the Before Reading group, and students in the Before Reading group wrote significantly more argument-generating questions than students in the While Reading group.

Table 6

Frequency of Three Question Types by Background Knowledge Group

Question type	Before Reading (n=15)	While Reading (n=10)
Fact-generating	16 (20.25%)	39 (51.32%)
Explanation-generating	41 (51.90%)	31 (40.79%)
Argument-generating	22 (27.85%)	6 (7.89%)
Total	79 (100%)	76 (100%)

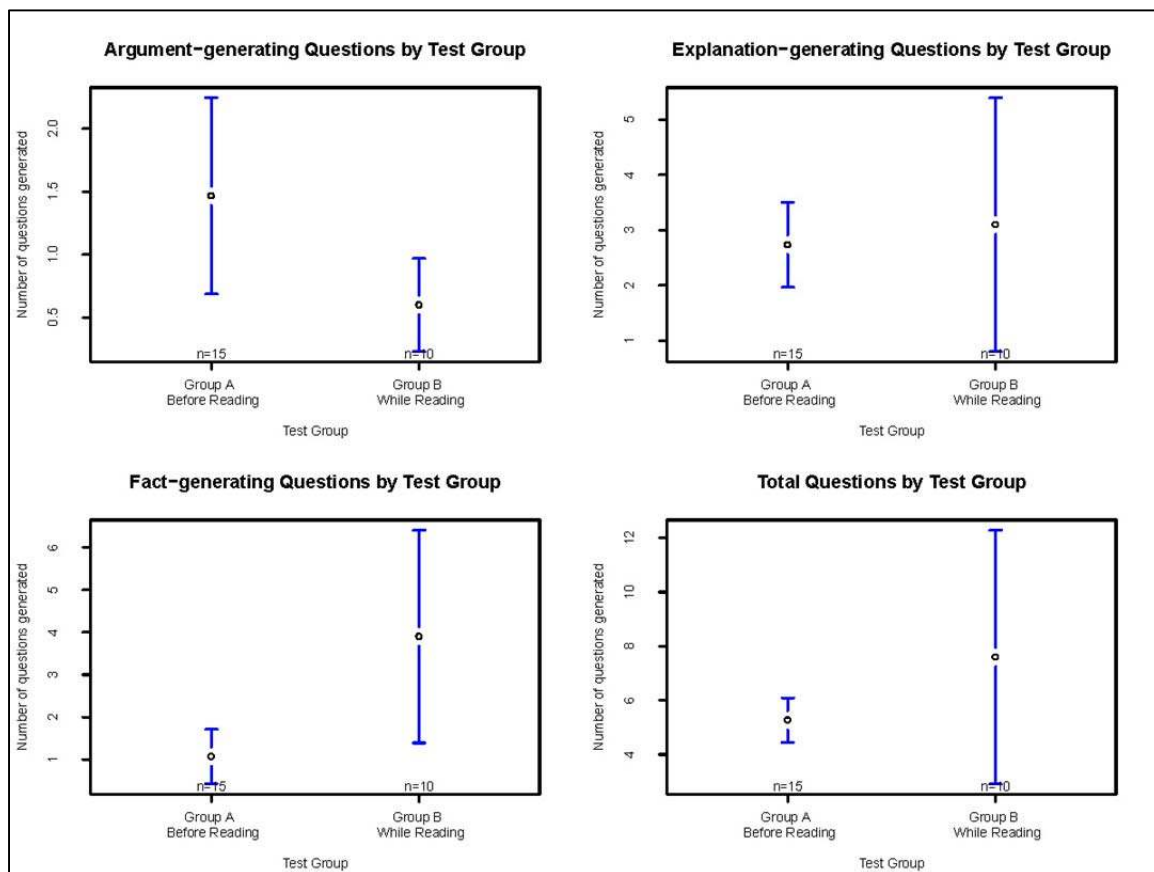


Figure 3. Means and confidence intervals of question types written by group.

Fact-generating questions. The While Reading group (mean=3.90) had a significantly higher mean of fact-generating questions than the Before Reading group (mean=1.07) ($t=-2.46$, $df=10.33$, $p=.03$). Students who generated questions while reading, pausing at certain intervals, perhaps were able to use the short excerpts of text as a tool when writing questions.

The content of the fact-generating questions in the two groups seems to lend credence to this interpretation. When writing fact-generating questions, students in the Before Reading group

tended to ask questions about the topic of nuclear energy and nuclear disasters broadly, that did not rely on specific information from the text. Many of these questions could have been written after reading just the title or a short synopsis of the article. A few examples of fact-generating questions from the Before Reading group are below:

- Did Chernobyl ever have another power plant?
- How long does the radiation last?
- How many nuclear disasters has (sic) there been recorded?

Students in the While Reading group, however, often drew from specific information in the text to write their questions. These questions could not have been written without carefully reading and referring to details from the text. A few examples of fact-generating questions from the Before Reading group are below:

- Of the 31 people that died from this disaster, how many of them were children?
- Did they [pregnant women affected by Chernobyl] go through with the abortion?
- So because Cesium has a half live (sic) of 30 years its (sic) still affecting people who live there today?

One potential benefit of writing questions while reading, then, might be that the content of the text may lend detail, specificity, and complexity to students' quest for more facts about a topic.

Explanation-generating questions. There were no significant differences between the mean explanation-generating questions written by the While Reading group (mean=3.10) and the Before Reading group (mean=2.73) ($t=-0.34$, $df=11.26$, $p=.74$). In this case, however, both groups seemed to write explanation-generating questions that were tied to details in the text. Students in the Before Reading group, for example, wrote questions like:

- Why weren't people evacuated right away? Did they not know the damage it would cause?
- Why did the operator violate the safety regulations?
- How were animals still allowed to stay in the area but humans were not?

Students in the While Reading group wrote similar explanation-generating questions tied to details from the text:

- Why would they disable the only safety they had to stop the reactor if something ever went wrong?
- How were the people who complained about radiation sickness treated? Did they receive any medical help to stop these signs?
- What does the routine maintenance do?
- Why did they use Uranium?

One potential reason for this similarity in level of detail between groups is that ethical questions worthy of further exploration may have remained with students in the Before Reading group even after reading, although more text-focused facts did not. The detailed questions that the Before Reading group wrote tended to revolve around the moral dilemmas that the Chernobyl disaster posed - issues of health, accountability, and response. Although some students in the While

Reading group also posed moral questions, their writing was characterized by procedural questions, such as queries for explanations about how the nuclear plant worked.

Students from the Before Reading group who wrote questions before reading also linked their questions to social and geopolitical issues beyond the text in ways that I did not observe in the While Reading group's work. For example:

- Where is nuclear energy used the most, and what is it mostly used for?
- Why are nuclear disasters so big when they happen?
- After a nuclear disaster happens, how do things go back to normal?

It makes sense that students in the Before Reading group asked questions that did not focus on information in the text, since they wrote many of their questions before reading. But it is also notable that the While Reading group's explanation-generating questions remained closely tied to the text, and did not extend much beyond facts in the text itself.

Overall, while the explanation-generating questions of the Before Reading group and While Reading group both demonstrated ties to textual details, the Before Reading group's questions were additionally marked by an interest in ethical dilemmas and issues beyond the events recounted in the text. Possibly, the background activation pre-reading activities encouraged students in the Before Reading group to access their moral and broader geopolitical schema when writing questions.

Argument-generating questions. The Before Reading group (mean=1.47) wrote a significantly higher mean of argument-generating questions than the While Reading group (mean=0.60) ($t=2.18$, $df=19.02$, $p=.04$). Students who wrote questions before reading, drawing from their background knowledge, perhaps approached the topic with a broader inquiry lens, whereas the students who wrote questions while reading may have donned more of a fact-finding lens. Below are some examples of the argument-generating questions written by the Before Reading group:

- Is there anything positive about nuclear energy?
- Was it really necessary for women to get abortions?
- Who would build [why would someone build] a nuclear power plant close to the border of another country? (That can cause problems between the countries, even war.)

All of these questions have debatable answers that would require extended inquiry, and none of them are simply answered in a paragraph or with a single source. The While Reading group also had examples of argument-generating questions, though demonstrably fewer. Many students in the Before Reading group generated some form of the argument-generating question "Is nuclear energy harmful?" before reading, whereas students in the While Reading group did not write this type of question, maybe because they were greeted with evidence that it is harmful while reading the article about the Chernobyl disaster. Students in the Before Reading group, then, may have started reading with a wider view of the field of nuclear energy, aware that nuclear energy's potential to cause harm could be an issue for debate. Without accessing their background knowledge and asking questions before reading, however, the While Reading group's ability to consider two sides of an argument may have been constrained, leading some to accept the text as an authoritative source that answers a closed issue. This interpretation is supported by science education research that suggests that students should be led to offer their own ideas as well as consider opposing ideas when learning about a scientific topic. Eliciting students' ideas about nuclear energy may have allowed students in

the Before Reading group to weigh multiple sides of the nuclear energy debate (Linn & Eylon, 2011).

Summary: Why not both/and? The extent to which teachers should guide students to access their background knowledge before reading is a subject of recent debate. David Coleman, the author of the Revised Publisher's Criteria for the Common Core State Standards, said in an interview with Engage NY (2012):

And I think that careful reading can be the basis for then making wonderful, deeper connections. But you need time for the text to live almost on its own...I think the movement away from the text is a lot...to engage students, to interest them, to try to make it more interesting, it's interesting to talk about myself, what do I feel, how I connected to it, how it resembles my life. Often people describe it as the golden hook that gets kids interested in what they're reading. And so I do think there's a challenge here, at the heart of teaching, which is how do we develop a fascination with what the text is up to?...how can we create interesting sequences that help get kids interested in this work so we don't have to go outside the text for excitement?

Common-Core-era lesson plans designed after recommendations in the RPC most often exhort teachers to have students jump right into close textual analysis, without the type of background knowledge-activating prelude that the Before Reading group in this study worked through. The rationale for this decision is that students who spend time connecting the text to their lived experience before reading do not spend enough time on actual textual analysis. My analyses of the data in this case study suggest that *both* background knowledge activation before reading (the Before Reading group) *and* closer attention to small excerpts of a text while reading (the While Reading group) may have distinct advantages for students as they write questions about a scientific text. Both groups wrote the same number of questions about the topic of nuclear energy. A larger proportion of the Before Reading group's questions were argument-generating and seemed to take a wider geopolitical and social perspective on the issue. However, a larger proportion of the While Reading group's questions were fact-generating, and did seem to include more specific textual details than the questions written by the Before Reading group. This data provides no evidence that students' engagement with the text was harmed by approaching it in either way, but rather supports the claim that each instructional frame was helpful for some goals but not others. Future lessons may choose either approach; teachers who wanted students to write detailed, text-focused questions about a topic may choose the While Reading group's frame, while teachers who wanted students to develop broader inquiry questions that may carry them throughout a unit of study may choose the Before Reading group's instructional frame. Or perhaps even better, teachers might choose a both/and approach that combines the benefits of background knowledge activation before reading with close reading of short segments of a scientific text. As science instructional frameworks like Linn & Eylon's (2011) knowledge integration framework suggest, if teachers just focus on background knowledge elicitation without added close textual analysis and discussion, students may

cling to non-normative ideas about a scientific topic and not integrate new knowledge about the material into their understanding. On the other hand, if teachers skip background knowledge elicitation in favor of close textual analysis, then they have missed a valuable opportunity for students to build new understandings from their existing knowledge. Science close reading approaches that begin with background knowledge elicitation, then proceed to close textual analysis, discussion, and integration of students' understandings in writing, seem best poised to help students learn new scientific topics.

The next A/B test of instructional frames, described in phase 3, did take a both/and approach. For the next test, students completed a KWL chart before reading an article about the sun but also closely read a short segment of text.

Phase 3

In phase 3, Mr. Thompson and I designed an A/B test to explore the effect of student choice of text on quantity of information generated about a topic and motivation to read.

Co-planning for phase 3 took place over email. Mr. Thompson expressed that he wanted the next reading activity to act as an introduction to the class' mini unit on energy. He had attended a Reading Apprenticeship (Greenleaf et al., 2011; Greenleaf, Schoenbach, Cziko, & Mueller, 2001) workshop, and sent me a reading activity structure he had learned there and wanted to use for this lesson:

1. Students complete graphic organizer, kinda like a KWL (What they KNOW about the sun, What they want to LEARN about the sun, QUESTIONS they have about the sun)
2. Pair share
3. Students individually skim the entire article (titles, diagrams etc only), preferably hard copy
4. Students select a passage they want to focus on and pair share
5. Students read their section, annotating for interesting facts/questions they have
6. Group share
7. Whole class shareout

I suggested several options for research questions that we could test by varying some aspect of this structure or content for two different groups of students. For example, in one candidate A/B test of instructional frames, some students would be assigned an annotation lens during part 5 of the above structure, while others would be free to annotate however they saw fit. In the end, we decided to focus on student choice of text as the instructional framing to vary. When students are given the prerogative to choose texts to read about a topic, they are often more motivated to read (Alvermann, 2002; Guthrie, Wigfield, & You, 2012). However, in close reading curricular examples (e.g. "Text-Dependent Analysis in Action: Examples From Dr. MLK, Jr.'s Letter from a Birmingham Jail - YouTube," n.d.), students are most often assigned short excerpts of texts to read and analyze. Few studies or examples of curriculum and instruction have explored what happens when students choose the text that they are to read closely. The research question for phase 3, then, was:

3. How does allowing students to select a text influence their ability to use close reading strategies to find information about a scientific topic? How does it affect their motivation to read that text?

Students in group A (n=12) first answered two questions: “What do you already know about the sun?” and “What do you want to know about the sun?” They were then asked to share something from each side of the chart with a partner and to write down one thing their partner knew and wanted to know. Next, they were asked to take a few minutes to skim the article about the sun that Mr. Thompson handed out, noting text features. After skimming, students chose a short section to read more closely and justified this decision. They were instructed to read this segment twice, once to get the gist, and another time more closely. Finally, they wrote down questions they still had about the text and interesting facts about the sun they learned from the text. Group A’s instructions for the phase 3 A/B test can be found in appendix H. Since group A’s text was chosen by the teacher, I will refer to this group from this point on as the “Teacher Choice” group.

After writing down what they knew and wanted to know about the sun and sharing this with a partner, students in group B (n=13) were instructed to find a webpage that might help them answer their questions. Like the students in the Teacher Choice group, they were asked to skim the webpage and choose a section to read closely, justify that choice, then read the section twice. They were also asked what questions they still had and what interesting facts about the sun they learned from the webpage. Group B’s phase 3 instructions can be found in appendix I. I refer hereafter to group B as the “Student Choice” group, since they selected a webpage to read for the task. After completing the activity, students in both groups were asked how motivated they were to read the article about the sun on a Likert scale from 1 (*Not at all motivated*) to 5 (*Very motivated*).

Facts about the sun. I predicted that students in the Teacher Choice group would write more facts because they did not have to expend cognitive energy finding a webpage to read, and thus would have more time to process and write down information they learned from the text. Table 7 describes the mean, standard deviation, and range of facts written by group.

Table 7

Mean, Standard Deviation, and Range of Number of Facts Written by Student Choice Group

	<u>N</u>	<u>Mean facts</u>	<u>Min</u>	<u>Max</u>	<u>Sd</u>
Teacher Choice	13	1.85	0	3	0.99
Student Choice	11	3.18	0	9	2.68

There were no significant differences between the two groups in number of facts written ($t=-1.57$, $df=12.30$, $p=0.14$). In fact, the mean of the Student Choice group’s written facts was higher than the Teacher Choice group’s mean, though these differences were not significant. This ran contrary to my prediction that the Teacher Choice group would write more facts. One interpretation for this finding might be that some students in the Student Choice group very quickly located a website of interest to them, and that the nature of the information’s organization on the website (such as charts, lists, animations, graphs, etc.) allowed them to efficiently locate and write down facts of interest about the sun. At the very least, it does not appear that asking students to choose a text

to learn about a topic stymied their ability to find and record information, since we saw no differences between the groups in this sample.

Motivation to read. I also analyzed student’s motivation ratings, predicting that students in group B, who were able to choose a text to read, would be more motivated to read than students in the Before Reading group, who were assigned a text to read. The results of this analysis are in table 8.

Table 8

Mean, Standard Deviation, and Range of Self-Reported Motivation to Read about the Sun

	<u>N</u>	<u>Mean facts</u>	<u>Min</u>	<u>Max</u>	<u>Sd</u>
Teacher Choice	13	3.77	0.72	3	5
Student Choice	11	4.09	0.70	3	5

While the mean motivation score of the Student Choice group ($m=4.09$) is slightly higher than the mean motivation score of the Teacher Choice group ($m=3.77$), this difference is not statistically significant ($t=-1.1029$, $df=21.57$, $p=0.28$). Both groups were more than neutrally motivated to read about the sun.

When asked to explain the rationale behind their selected motivation score, students in both Teacher Choice group and Student Choice group pointed to the topic and the questions they had about the topic as motivating factors as they read:

Teacher Choice group responses.

- I chose this level of motivation because I wanted to actually read about the sun and how much electricity it conducts, to see if Chevron is really important to us here, or we can get rid of it.
- Because the sun is there all day so I wanted to know the interesting facts about it and I wanted to get my questions answered.

Student Choice group responses.

- Because i wanted to know how and why the sun will explode and in how long
- It [the question I wrote] was actually a really interesting question and I wanted to know if something so ridiculously was possible
- I choose this level because I was interested already in the sun the fact that it changes colors depending how old it is.

Only one student in the Student Choice group made a reference to being able to choose the text he or she read as a motivating factor, saying that “I like looking through articles and learning new info.” In this small test, while choice may have been one motivating factor, it seems that the instructional frame of the KWL chart as well as the topic selected by the teacher were likely more important to students’ motivation to closely read texts about a scientific topic.

While these findings do not provide evidence that students were more motivated by being allowed to choose a text to read about the sun, it also does not provide evidence that students that chose a website to read learned less about the sun through close reading than students who were

assigned a topic, or were less motivated to read. If science teachers are comfortable with students' ability to choose reliable texts about a topic, these data suggest that it is possible for students to locate accurate information as an introduction to a scientific unit when given freedom to choose a text to read closely.

Phase 4

During the final phase of this study, I re-administered the comfort with science reading scale to student participants at the end of the semester. I also asked open-ended questions to better understand how students' approach to reading scientific texts had changed over the course of the study. This post-survey can be found in appendix B. The research question for this phase is:

4. How did students approach to and comfort with reading scientific texts change over the course of the semester?

There were no significant differences found between student participants' pretest and posttest scores ($t=-0.79$, $df=29.93$, $p=0.43$). However, some students, especially those who had lower than average science reading comfort ratings at the beginning of the year, did report feeling more comfortable by the end of the year. Below are some comments from students who scored below the mean ($m=31.45$) on comfort with science reading at the beginning of the semester and who felt more comfortable reading science texts by the end of the semester.

- I didn't really read scientific things as much before but now I find them a bit more interesting and spend more time reading them
- I know [to] look at a text in parts instead of as a whole that way I don't feel extremely overwhelmed.
- I've become more comfortable with [scientific texts] and I don't feel intimidated by [scientific texts]
- I learned to see that some of [scientific texts] might be quite interesting and appealing to me that i would never have really [sic] thought id [sic] have an intrest [sic] in.
- I find it better to annotate and highlight important details to get the text better. I realized when i don't annotate or highlight i tend to misinterpret the text or i learn nothing from the text.

Mr. Thompson also told me that when he surveyed his students to find out what he could do to help them during the rest of the school year, many students requested to keep reading:

[They said] we should keep reading science articles and science texts because we need to know how to do that in college. Which I don't think any kid would have said in the past because I never explicitly framed anything like that or provided rationale for why we were reading. I have...anecdotally just noted more curiosity about things...maybe that promoting of asking questions through reading has lent to a little bit more curiosity.

His (and his students') positive feelings about the reading instructional frames that we tried out in class led Mr. Thompson to design a "completely student-driven" research project on molecular structure for the following semester. Disciplinary close reading would continue to have a place in his classroom after this work was done.

Discussion

Implications of this Study for Close Reading Instruction in Science Classrooms

Design close reading instruction with authentic scientific text-use in mind. As I worked with Mr. Thompson throughout the semester, I was struck by the myriad purposes for reading he envisioned for his classroom. He drew on texts to introduce a new topic, to interest students in an issue relevant to them, to help students write inquiry questions that would drive scientific investigation, and to provide evidentiary sources for debate about chemistry-oriented social issues. These purposes for reading mirror the authentic text-uses of a 21st century paradigm of close reading. Mr. Thompson noted that it was common for most close reading instruction to be aimed at reading comprehension, but that this study reminded him that other uses of text in the classroom may also be important:

The natural tendency is to immediately go for comprehension and...leveraging that is a very important thing, especially in science, but also...getting students to realize that there are other ways to use text rather than just understanding the main idea. How can this spawn a question that you have that can then inspire you to go find the answer to it?

Many discussions of disciplinary reading in science focus on the textual differences in scientific textbooks or journal articles, and the strategies that teachers can use to help students approach those differences (Fang, 2014; Lee & Spratley, 2010). It may be just as important to close reading instruction in science, as we found in this study, to acknowledge the wide variety of reasons why scientists bring texts into their practice, and to design instruction not only to tackle difficult text-structure and vocabulary, but to accommodate these end-goals for reading.

Consider a both/and approach to reading activities for science texts. The creators of the RPC and advocates of the common core close reading paradigm seem to assume that if students engage in pre-reading activities with the intent of activating their background knowledge, they do so at the expense of active engagement with the text (Coleman & Pimentel, 2012). This assumption, I argue, sets up a false choice for teachers: either you spend a lot of classroom time getting students to connect to a text before reading without ever looking at the text, or you spend all of your time asking students to closely read text while holding their own preexisting knowledge at bay. This study suggests that when the goal of reading a chemistry textbook is to write questions about a topic, a both/and approach may be possible and beneficial to students. Prompts before and while reading guided students to write rich inquiry questions about nuclear energy; however, the two types of activities seemed to promote different kinds of inquiry. Students who brainstormed about nuclear energy before reading wrote more argument-generating questions, while students who wrote questions while reading short segments of the text wrote more detail-oriented fact-generating questions. Each type of question, if pursued, could enrich students' understanding of nuclear energy. Science teachers, then, might problematize the false choice of the common core close reading approach and instead provide a rich range of instructional strategies designed to engage their students with text, before, during, and after reading.

Linn & Eylon's (2011) knowledge integration framework offers one promising both/and approach to the close reading of scientific texts. In following this approach, teachers would *elicit* students' knowledge about a topic, in this example, nuclear energy. Then, teachers would lead students to *add* ideas to their existing knowledge, through reading, experimentation, or interaction with visualizations or animations. Students would then need guidance to *distinguish* among the various ideas they have collected about nuclear energy to select the ideas best supported by scientific evidence. Finally, teachers would lead students to *reflect* on their ideas about nuclear energy by writing explanations about the phenomena. Processes like the one described by the knowledge integration framework, when applied to science reading, should allow students to synthesize their background knowledge with what they read. With the support that approaches like knowledge integration provide, students should be less likely to cling to their ideas even when presented with contradictory textual evidence, or to uncritically accept ideas from a source (Linn et al. 2014).

Consider allowing students to choose texts to learn about new scientific topics. We know that students are more motivated to read when they are allowed a choice of texts (Guthrie et al., 2012). But Common-Core-era close reading curricula most often provide texts to students, out of concern that students may not choose texts appropriately complex or rigorous. Beyond the issue of rigor, science teachers may worry that students may seek out unreliable texts when learning about a topic, especially in the current era of destabilized information on the internet. But this study showed that with the proper guidance, it is possible for students to find rigorous, reliable texts about a topic online and to learn from those texts using close reading strategies. Students in both the Teacher Choice and Student Choice groups generated the same number of (accurate) facts about the sun. Most students in the Student Choice group also chose reliable websites, managed by organizations like NASA. It was clear from the language that students used to describe why they chose their texts that they had had prior training in critical media literacy, and already knew strategies (such as vetting the source of a website) that allowed them to choose texts appropriate to the task. And while there were no statistically significant differences between students' motivation by group in this case, students in the chosen-text group did report higher motivation scores than those in the first group; with a bigger sample, we might have seen significant results in keeping with past research on text-choice and motivation. Teachers may then consider allowing students more opportunities to research scientific topics online and read webpages closely, with the caveat that critical media literacy instruction is especially important for 21st century close reading instruction.

Study Limitations

Though researchers conducting formative experiments have not fully agreed upon shared criteria for rigor, there are some hallmarks of rigor that this study strived to attain, such as a close alignment of theory, research, and practice, attention to a wide range of factors affecting learning, collection and analysis of multiple sources of data, and documentation of the unexpected (Reinking & Bradley, 2007). However, in several ways this study could have been improved to increase methodological rigor and my ability to construct findings about the phenomena of interest, close reading in a chemistry classroom. Firstly, the quantitative analyses in the study were underpowered due to a small sample size. Future such studies would benefit from more advance recruitment efforts, additional buy-in from the administration, and direct outreach to parents to explain the

study's goals and requirements. And though flexibility in intervention design is a key component of a good formative experiment, that flexibility can pose challenges for the precision of a study. It might have yielded more focused and compelling findings if I had directed Mr. Thompson with a firmer hand to focus on improving, for example, students' ability to understand scientific text structures rather than allowing him to shift the purposes for reading throughout the semester. What I gained in unexpected findings about the varied purposes for close reading in a chemistry classroom, I lost in the missed opportunity to trace a tightly woven instructional thread over time. With a longer time frame, say a year rather than a semester, I may have been able to reconcile both flexibility and precision by following up some of the findings from the initial A/B tests to create further interventions of study. Finally, as the sole researcher on this project, I was unable to triangulate my coding analyses with another person or persons, and while I followed a rigorous coding process, I acknowledge that the coding and analyses were informed by my theoretical perspective, experience in the classroom, and immersion in the research on close reading in adolescent classrooms.

Implications of this study for future research

The A/B testing approach used in this study yielded insights into understudied areas of close reading instruction in science, but the aims of this study were modest and the sample size small. Similar tests might be done with larger sample sizes across more diverse populations so that researchers may gain better understandings of how, when, and under what conditions close reading instruction is beneficial to students in science classrooms. In addition to the questions explored by this study, other research questions merit consideration:

- Does a focus on close reading of images or print text (or some combination) better help students develop metadiscursive awareness of the purpose of scientific texts?
- Does free or guided annotation (or some combination) help students better engage in an online discussion about a scientific text?
- Does collaborative or independent close reading better help students include ideas from close reading activities into scientific compositions?

Other researchers may also consider conducting case studies of close reading instruction in other disciplines, such as English literature, history, or mathematics. Some insights about close reading instruction that emerged in this study may generalize to other disciplines, such as the benefit (or at least lack of harm) of allowing students to choose texts to read closely. However, when students choose historical texts, they may need to be aware of different issues in reliability than for scientific texts, such as the source's motivation to spin past events. And before students read a poem in English class, perhaps they may need to spend more time understanding the author's culture and position in history in order to write rich questions than students reading a text about organic chemistry might. More discipline-specific studies of close reading are needed to enrich our understanding of a 21st-century close reading paradigm.

Finally, future research may strive to answer the question "What should close reading in the science classroom look like in the digital age?" While Mr. Thompson used Google classroom to deliver instructional activities to his students, he tended to use the tool as an efficient way to keep track of student work, check students' understanding, and write feedback to students, activities which also could have been accomplished with traditional print texts. While digital technology was

used every day in Mr. Thompson's class, his curriculum – with a few notable exceptions discussed in chapter 3 – was light on the “ethos” of participatory culture that characterizes new, digital literacies. In classrooms characterized by this ethos, students share their knowledge about digital platforms and popular culture, write for authentic audiences, compose and remix media in multiple modes, seek out just-in-time resources from the web, and have opportunities to play, explore, and connect in digital spaces (Knobel & Lankshear, 2014). There is still much research to be done in discovering the best ways to integrate digital technology into science classrooms to support students' close readings of traditional scientific texts, but also to update the activities students are engaged in while using close reading strategies. For instance, future formative experiments in a science classroom may guide students to attend closely to a range of texts as they navigate open source science journals, compare the results of an experiment with students across the world, craft animations or graphics by remixing online media, or analyze and comment on a popular science blog post.

Conclusion

During one afternoon observation, students clustered tightly in groups, debating the pros and cons of nuclear energy, their reading notes splayed out on the tables in front of them. As they spoke, I glanced out the window to watch curls of smoke drift from refineries over oil storage tanks dotting the hills, painted an earthen-red camouflage. The importance of students' skill to closely and critically read scientific documents was never more salient. Energy corporations like those that own these refineries affect the economy and health of students' community, and in order to be able to participate in town halls on energy policy, for example, young people need to be empowered to read and understand all sides of the issue. This study sought to add to our knowledge of effective instructional strategies that give students the ability to closely read complex scientific documents. To that end, I believe it does problematize Common-Core-era views about the role of background knowledge elicitation before reading and should reassure teachers that giving students supported opportunities to choose scientific texts to read does not have to affect the rigor or accuracy of those readings. The claims of this study must be modest due to its small sample size and pragmatic, flexible approach to data collection and analysis. However, formative experiments and collaborations between educators and researchers like Mr. Thompson and I can generate theories for future research to pursue, lend nuance to quantitative findings, and surface unexpected aspects of close reading processes and outcomes. If more scholars and teachers established such collaborations, we might be able to build a large community dedicated to practice-based research (see Hinchman & Appleman, 2017), which, in the long run could lead to new models of research-based practice.

Transition to Chapter 3: Closely Reading Digital Media In and Out of School: Synergies, Tensions, and Imaginings

Chapter 3 pursues a thread that runs through chapter 1: the role of digital media in designing a 21st-century close reading instructional paradigm. And while chapter 2 examines secondary close reading instruction from the perspective of the teacher and researcher, chapter 3 additionally seeks out student perspectives. The third article in this dissertation is an ethnographic case study of six high school students' everyday digital close reading practices and their teachers' digital close reading instruction. Cultural historical activity theory as a theoretical framework allowed me to view teachers and students as inhabiting interacting activity systems that had the potential for shared goals or conflict. Qualitative coding of survey, observation, and interview data surfaced key goals for students' digital close readings and teachers' digital close reading instruction. Students seemed to pursue digital close readings in the service of self-directed learning and social connection, while teachers seemed to pursue digital close reading instruction in the service of providing students with access to literacy skills and evaluating their academic progress. Comparing across students' and teachers' perspectives, tensions and synergies for digital close reading emerged. Teachers and students' goals synergistically aligned when teachers crafted curriculum that guided students to direct their own learning about topics that interested them. However, there were tensions between students' ease with close reading digital media at home and teachers' hesitation to allow these out-of-school uses of digital media into the classroom - a hesitation stemming from a conviction that classroom time should be spent teaching students college-oriented literacy skills. I conclude by recommending that teachers learn about students' everyday digital close reading practices through formal or informal interviews and surveys. I also provide a template for planning digital close reading instruction based on my findings in this study.

Chapter 3: Closely Reading Digital Media In and Out of School: Synergies, Tensions, and Imaginings

As I have argued in chapters 1 and 2 of this dissertation, the practice of “close reading” has made a comeback in schools. A relic of the New Criticism, an American school of poetic analysis, close reading was once confined to secondary and college English classrooms. Until recently, the influence of close reading was diminished, though not replaced, by other methods of textual analysis, such as critical literary or reader response approaches. But due to key shifts in the Common Core State Standards (CCSS) (National Governors Association for Best Practices and Council of Chief State School Officers, 2010) that call for teachers to engage students in “reading, writing, and speaking grounded in evidence from texts” (Common Core State Standards Initiative, n.d.), close reading is more prominent in K-12 education than ever. Calls for close reading instruction at all levels, in all disciplines, abound in the influential document titled Revised Publisher’s Criteria for the Common Core State Standards (RPC) (Coleman & Pimentel, 2012) and have been echoed by many non-profit and for-profit educational organizations.⁴

As David Pearson and I argue in a recent contribution to *Adolescent Literacies: A Handbook for Practice-Based Research* (Catterson & Pearson, 2017)⁵, not nearly enough is known about how to develop effective, engaging, and empowering close reading curriculum. One area for which we have very little research is the intersection between close reading pedagogy and digital media. As several scholars have noted (e.g. Chandler-Olcott, 2013; Drew, 2012) while digital technology is mentioned in the CCSS, little guidance is given as to its instructional uses. While it is possible to utilize the affordances of digital literacies in the service of Common Core instructional demands (Hutchison & Colwell, 2014), teachers would benefit from research that speaks to best practices in digital close reading instruction. Furthermore, researchers have suggested that students’ everyday out-of-school digital reading practices can and should inform instructional design (Alvermann, 2008; Moje, 2009).

The goal of this article, then, is to help develop recommendations for digital close reading instruction that is “socially embedded, interest-driven, and oriented toward educational, economic, or political opportunity” (p. 4), or that pursues what Ito et al. (2013) of the Digital Media and Learning Research Hub call “connected learning.” To accomplish this goal, I have observed and interviewed students and teachers to learn more about how they closely read digital media, and how they use digital media to support close readings. This chapter is an ethnographic case study of 6 students’ digital close reading practices out of school and their two teachers’ digital close reading instruction in school. As seen through the lens of cultural historical activity theory, students’ and teachers’ digital close reading practices and instruction at times aligned, and at time clashed. Out of these tensions and synergies, I imagine a digital close reading pedagogy that privileges students’ interests and expertise while also nurturing their academic literacies.

⁴ As evidence of close reading’s current relevance in education: A Google search of the terms “common core” and “close reading” yielded 551,000 results.

⁵ See the first chapter of this dissertation.

Defining Close Reading

An simple definition of close reading that can accommodate many perspectives on literacy instruction is “reading with special attention” to a text (Lentricchia & DuBois, 2003).⁶ In practice, those who closely read texts will follow a similar pattern (adapted from Fisher & Frey, 2014):

1. Select a text worthy of special attention, according to some predetermined criteria (e.g. difficulty, representative of a genre or literary device, pure enjoyment)
2. Read and reread the text.
3. Annotate the text in some way; ask and answer “text-dependent” questions.
4. Discuss the text with others and incorporate textual evidence into discussion.
5. Compose new texts in response to the first text.

Teachers enacting close reading pedagogies may select digital texts as the unit of analysis (close reading *of* digital media) or may use digital tools to enhance students’ learning as they read closely (close reading *with* digital media). I also argue in this paper that students, in pursuit of learning and social connection, regularly perform everyday close readings of (and with) digital media.

Defining Digital Media

Broadly, digital media is “rendered in pixels on screens rather than by impressions on paper, by means of digital code rather than material analogue means” (Knobel & Lankshear, 2014, p. 98). In the context of this study, I focus on six categories of digital media: on-demand media, communications technologies, social platforms, search tools, collaborative reading and writing tools, and video games. These categories are not mutually distinct – on-demand media might be posted on a social platform, for example, or a social platform may have built-in communications technologies. Nor are they exhaustive of the multitude of digital media technologies in existence. However, teachers and students in this study did seem to have conceptually different uses for digital media in these categories. Additionally, digital literacies researchers often refer to these types of digital media (e.g. Lankshear & Knobel, 2011; Leu, Kinzer, Coiro, Castek, & Henry, 2013), though not with this terminology. Table 9 provides a description and examples of each category of digital media.

Close Reading of Digital Media

I define close reading *of* digital media as special attention to a digital text for the purpose of analyzing that text to some end (e.g. critique the craft of the text). Falling under this type of close reading might be a student’s deconstruction of a celebrity’s Facebook profile or a teenager’s repeated viewings of a horror movie on YouTube in anticipation of discussing the movie with friends. For example, to develop a New Media Literacies curriculum, teachers used the internet to collect a variety of representations of Moby Dick (e.g. book, film, songs) and led students through close reading activities to synthesize across them (Kelley, Jenkins, Clinton, & McWilliams, 2013). Another teacher, Allan Webb, accessed digital archives to find sixteen different translations of *The Odyssey*, then guided students to closely read across them for differences in style (Webb, 2007). The (limited) literature on close reading of digital media focuses on traditional forms of texts that have been digitized for easier access. In an edited volume titled *Close Reading New Media: Analyzing Electronic Literature* (Looy & Baetens, 2003) humanities scholars argue for a reconceptualization of the reader’s

⁶ For a comprehensive treatment of the history and pedagogy of close reading in adolescent literacy, see Catterson & Pearson (2017) (the first paper in this dissertation).

role in the close analysis of digital hypertext, which may take many different forms depending on the reader's interests. I observed teachers and students in this study engage in close readings of multiple types of digital media - traditional texts (e.g. articles accessed online), multimodal texts (e.g. video, songs, or a combination of media), and hypertexts (e.g. interactive websites).

Table 9

Descriptions and Examples of Six Categories of Digital Media

<u>Digital media category</u>	<u>Description</u>	<u>Examples</u>
On-demand media	Free or subscription-based media available in multiple modes (e.g. audio, visual, text-based) in a variety of genres.	YouTube Netflix News websites
Communications technologies	Enables users to convey messages from person to person or in small groups.	Gmail Texting Kik
Social platforms	Enables users (often on a large scale, over distance) to interact with each other, exchange content, and collaboratively create new content. ^a	Instagram Snapchat Twitter
Search tools	Enables users to find information on the web with the help of sophisticated search algorithms.	Google Bing Duck Duck Go
Collaborative reading and writing tools	Enables users to collaborate on compositions, or to comment on and discuss content.	Google Docs RapGenius Diigo
Video games	Enables users (independently or collaboratively) to manipulate characters, situations, or puzzles on a screen to reach a goal.	Minecraft Borderlands Journey

Note: ^aDrawn from a memo on digital platforms written by J. Higgs for the upcoming book *Spread and Scale of Learning in the Digital Age* (Coburn, Catterson, Higgs, & Morel, in prep).

Close Reading with Digital Media

I define close reading *with* digital media as the utilization of digital media tools to support close readings of digital or non-digital texts. A young author may use a literary website's discover tool to find a short story to deconstruct before writing her own story. An emergent bilingual might use her Kindle app to define words as she is rereading a passage in a class text that she does not quite understand (Dalton & Proctor, 2007). A teacher might show students how to use a digital annotation app to share observations about a science website, as documented by Castek and Beach (2013). A teacher might also set up a Google form to collect and compare students' responses to

text. Or as an example of the kind of interaction that happens frequently in online participatory culture (Jenkins, 2006), worldwide fans of a Korean drama might take to internet forums to pick apart the characters' motivations even as they imagine new identities for themselves (Kim & Omerbašić, 2017). As many of these examples demonstrate, close reading *with* digital media may co-occur with close reading *of* digital media, although you could envision a close reading of a traditional print text enacted with the aid of digital media. In this study, I observed students (with and without the guidance of teachers) engaging in close readings *with* various forms of digital media that increased or changed their ability to discover, analyze text, share textual responses, and/or interact with others.

Theoretical Framework

This is a study of students' out-of-school close readings of and with digital media. But it is also a study of the differences (and similarities) between these self-directed close readings out of school and teacher-directed close readings in school. I thus borrowed as a theoretical lens Engeström's (2001, 2015) expanded vision of cultural historical activity theory (Leont'ev, 1978, 1981; Vygotsky, 1978; 1986), which helped me describe students' and teachers' goals for digital close reading practices and instruction, and tensions and synergies between teachers' and students' approaches to close reading and digital media.

In his meditations on the nature of human consciousness and learning, Vygotsky (1986) proposed that any person's drive toward action was mediated by a tool or sign. These tools and signs may be physical, as is a walking stick used to climb a mountain, or immaterial, as are memories of conversations with loved ones that motivate us to finish a project (Wertsch, 2007). In Engeström's (2001, 2015) reconceptualization of cultural-historical mediation, mediation takes place in interacting activity systems (e.g. of teachers and students), which have the potential to move toward shared goals, or to clash with one another. Engeström's activity systems are comprised of groups of actors with goals, whose actions toward those goals are mediated by tools and signs, their interactions with communities, professional or cultural rules of behavior, and divisions of labor. I consider teachers and students in this study to each inhabit an activity system. The activity of focus for students I call "digital close reading," which comprises students' close readings of and with digital media out of school. The activity of focus for teachers I call "digital close reading instruction," which comprises teachers' efforts to guide students in close readings of and with digital media in the classroom. For each activity, students and teachers pursue digital close reading practices or instruction in the service of some goal. Along the way, their decision-making is mediated by tools and signs (e.g. digital media, beliefs about digital media, identities), community (e.g. colleagues, family, friends, online affinity groups), rules (e.g. norms of behavior in school, limitations of digital tools), and divisions of labor (e.g. teacher's role as class leader). Figure 4 illustrates the framework for interaction between teachers' and students' activity systems, and the mediational forces at play.

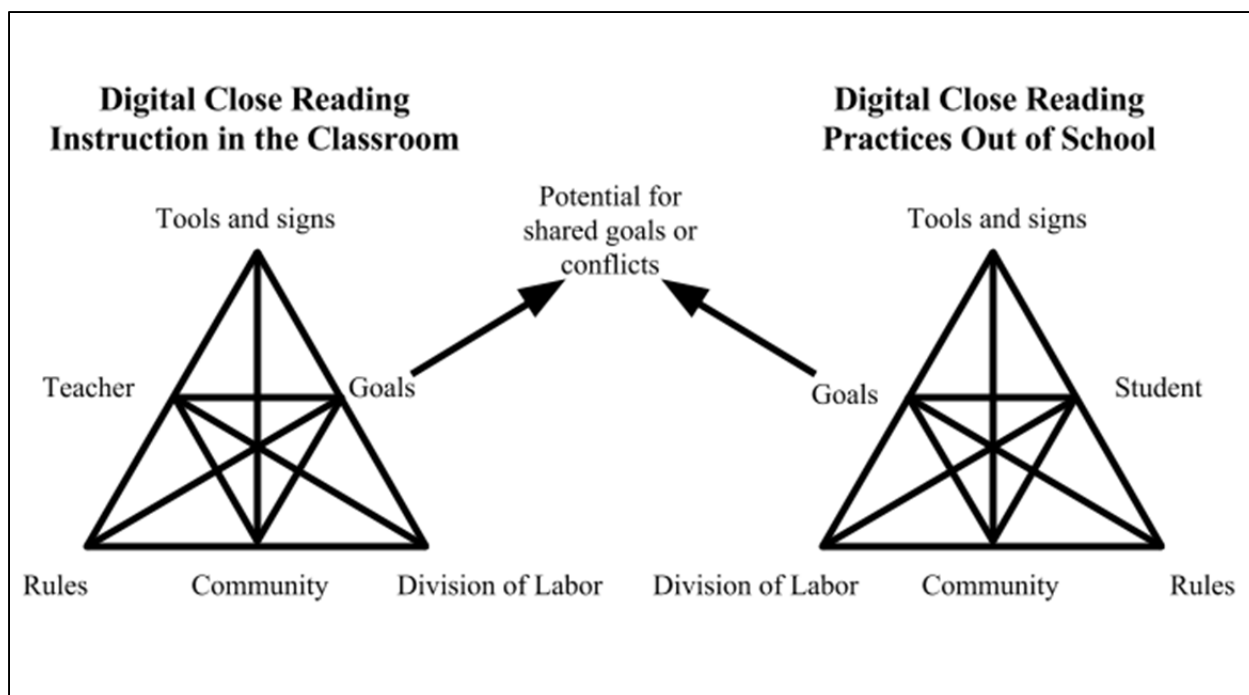


Figure 4. A diagram of teachers' and students' interacting activity systems. Adapted from Engeström (2001). The dark lines represent possible paths of mediation; for example, a teacher's action toward the goal of digital close reading instruction may be mediated by interactions with his or her community of students and colleagues. The arrows represent the interaction between teachers and students, which creates the potential for shared goals or conflict.

Donning the lens of students' and teachers' interacting cultural-historical activity systems allows me to explore several important questions about close reading *of* and *with* digital media. How do students use digital media to mediate their close reading? What are their goals when they pursue digital close readings? To what extent do motivated professionals with access to classroom technology mediate their close reading instruction with digital tools, and how do their goals and practices differ from students' goals and practices? Rarely do instructional designers listen to student voices – can those who are designing 21st-century close reading curricula learn from those who were born in the 21st century? What are the problems and possibilities for teachers who are trying to develop digital close reading pedagogies?

Methods

Site Selection

This ethnographic case study of students' and teachers' digital close reading practices and instruction is situated in a larger study of close reading in a high school in northern California, Bright Futures Academy (BFA).⁷ I selected Bright Futures Academy, a high-performing charter school, in part because of the administration's commitment to technological innovation in instruction. BFA's charter management organization had provisioned all students in their network with Google Chromebooks and contracted with Google Classroom to give students and teachers access to

⁷ All names of schools, teachers, and students are pseudonyms.

advanced tools in the Google productivity suite. The administration also had a system in place to help teachers build out, test, and develop their technological innovations – they pushed beta designs to a technical director who would improve upon the design and roll out to other teachers. BFA and its sister schools also acted as testing labs for a nonprofit educational technology company committed to crafting effective uses for digital media in the classroom. In short, the school had removed technological barriers to digital close reading instruction, so it provided an ideal setting to observe how teachers played the hand they were dealt.

Data Collection

I observed and interviewed two teachers at BFA: Diane, a 9th grade English teacher, and Robert, a mixed-grade chemistry teacher (observation and teacher interview protocols found in appendices J & K). Robert and I also co-planned and tested close reading instructional frames with his students⁸. Additionally, I surveyed 64 participating students in Diane and Robert’s classes about their digital and print reading habits, motivation, and dispositions at the beginning and end of the semester (surveys found in appendix L), and I interviewed and more closely observed 6 case study students (3 in each teacher’s class; student interview protocols found in appendix M). For this article, I focus on the interview (1 interview per student) and survey data of the case study students, interviews with the two teachers (3 interviews per teacher), and classroom observations (13 observations in Diane’s class, 14 in Robert’s class).

Data Analysis

To analyze the observational and interview data collected during this ethnographic case study (Yin, 2009), I conducted multiple rounds of open-ended coding (Bogdan & Biklen, 2007) using the qualitative data analysis program RQDA. I first coded observations and interviews using descriptive codes; for instance, I noted students’ reasons for closely reading digital media out of school and teachers’ beliefs about the place of digital media in close reading instruction. I then categorized these codes under more interpretive, theory-building pattern codes (Miles & Huberman, 1994). Inspired by the constant comparative analysis method of grounded theory approaches to qualitative research (Glaser & Strauss, 1967), I wrote analytic memos and coded data throughout the study, rereading and recoding when new understandings came to light. My data collection was influenced by this ongoing analysis, as I selected case study students based on interviews with teachers, survey results, and observations, and shifted my observational focus and semi-structured interview protocols (Patton, 1980) according to emerging theories.

Participants

Teachers. I selected these two educators because each was identified by school administrators as highly effective teachers of their disciplines and much beloved by students – by observing their classrooms and interviewing them, I hoped to grasp how motivated professionals with integrity navigated the resources and constraints of their environment to craft digital close reading instruction.

Diane. Diane, a ninth-grade English teacher, had been teaching at Bright Futures Academy for two years at the time of this study, and had been a special education teacher for three years before that. She identified as a black woman. Diane attended Columbia University as an

⁸ Findings from this collaboration are described in detail in the second paper of this dissertation.

undergraduate and had received an education policy master's degree. She had decided to become a teacher after witnessing her cousins' struggles in Detroit Public Schools and educational inequity for students of color when working in college recruitment and admissions. As of writing this study, Diane had become an academic dean at BFA, and had no plans to leave the education field.

During our interactions, Diane gushed enthusiasm about course readings, instructional strategies, and students. Her handouts, PowerPoints, and assignments were organized and clear, and her classroom walls were filled with neat and colorful motivational posters, student work, vocabulary, and procedural reminders. One large poster read "How have my culture and history influenced my identity?" During class, Diane used a firm but kind hand to steer students through a tight schedule of reading, writing, and discussion activities. She told lavish and funny stories relevant to class texts, like the time a college classmate fell into a tray of spaghetti in front of the whole cafeteria. Diane bantered easily with students, and students smiled and laughed often in her class. When Adam, one of the case study students, had a premature question about an assignment, she exclaimed wryly, "Patience, young grasshopper!" Students used their Chromebooks in Diane's classroom frequently, spending the most time on Google Classroom, but also occasionally visiting EDpuzzle⁹, ExitTicket¹⁰, YouTube, and NoRedInk.¹¹

Robert. At the time of this study, Robert had been teaching chemistry at BFA for four years. He identified as a white male. He had received his BS in Biochemistry from the University of Washington and held a master's degree in Urban Education. Robert said that he became a teacher in part because he "loved being a conduit for students to discover their passions, develop the skills to pursue them and be prepared to succeed in whatever they choose to do in life." At the time of writing, Robert had left BFA to move to the Pacific Northwest, and was teaching a physics class there.

Since the school building was brand new, Robert taught in a fully equipped science classroom; cabinets containing chemistry and safety equipment lined the walls, and students sat in high-backed stools around tall tables, surrounded by motivational and sports-themed posters. Like Diane and many teachers at BFA, Robert began his class every day with a warm greeting and a handshake with each student. Where Diane's sense of humor was dry and witty, Robert's was goofy. When introducing one chemistry "exploration," he joked that Dora the Explorer¹² had a little brother named Dorito, and that he didn't know if he'd be Nacho Cheese or Cool Ranch flavored (his students laughed and groaned). Students frequently smiled and laughed in Robert's classroom, and worked with diligence and energy at the variety of hands-on chemistry labs he organized for them. In addition to labs, Robert designed learning activities that incorporated science reading and writing, sometimes with my help. He was committed to providing students with strategies to tackle difficult scientific texts; in one of my first observations, for example, he performed a think aloud of a chemistry textbook's organization for students and talked about his own difficulties reading

⁹ A video platform that allows teachers to add questions before, after, and during videos.

¹⁰ An app that allows teachers to deliver digital formative and summative assessments to students, and that analyzes student performance data and displays it in a user-friendly way for teachers and students.

¹¹ A web app that generates grammar practice questions for students with content tailored to their interests, and offers students individualized feedback on their performance.

¹² A children's program character; Robert's students all seemed very familiar with this reference.

textbooks during college. The collection of digital media tools Robert used during the study was similar to the collection that Diane used. He most often used Google Classroom, but also used ExitTicket, EDPuzzle, YouTube, and Goobric¹³.

Students. I drew on my observations of the class, student survey data, and conversations with teachers to select six students who might represent the range of classroom participation, academic performance, and out-of-school uses of digital media in the two study classes. Table 10 below summarizes where each student compares to his or her classmates in the aforementioned categories, his or her age, ethnicity, and sex, and which teacher they had at the time of the study.

Table 10

Case Study Students Summary Table

<u>Student</u>	<u>Teacher</u>	<u>Age, Ethnicity, and Sex</u>	<u>Classroom Participation</u>	<u>Academic Performance</u>	<u>Use of digital media at home</u>
Natasha	Diane	14, Latina, female	Avg.	Above Avg.	Quotev, Wattpad, Instagram, Snapchat
Adam	Diane	14, African-American, male	Above Avg.	Above Avg.	Borderlands, Javascript, Lua, Corona SDK
Tanya	Diane	14, African-American, female	Above Avg.	Avg.	Snapchat, Tumblr, Kik, Instagram
Elsa	Robert	15, Latina, female	Below Avg.	Avg.	Instagram, Snapchat, YouTube
Mireya	Robert	17, Latina, female	Above Avg.	Above Avg.	Tumblr, Snapchat
Lena	Robert	15, Latina, female	Below Avg.	Below Avg.	Instagram, Snapchat, YouTube

Notes. Degrees of participation and performance are in comparison to the rest of the class, and are based on the researchers' observations and conversations with teachers.

Natasha. Natasha worked quietly and diligently in Diane's class, participating sometimes in whole-class discussion, but often keeping to herself unless she was working in a small-group setting, in which she often lead her table's textual inquiry. Natasha reported that she read novels and poetry at home in her free time, and that she used to spend a lot of time on a community-driven free literary website called Wattpad¹⁴. Natasha wrote and published one adventure story on Wattpad, about two acquaintances with a tense relationship who head into an isolated forest to search for mutual friends who have crashed their hot air balloon. She also spent a lot of time coding her "About Me" page on Quotev, another social reading and writing site. When I interviewed her,

¹³ A Google Chrome extension that allows teachers to automatically add rubrics to Google Drive documents, and assess student work.

¹⁴ Wattpad users can upload stories tagged in different genres and topics (e.g. #timetravel, #superheroes, #comingofage), and other users can read, comment, and vote on the stories.

Natasha had been reading a tutorial posted by another Quotev user titled “Q for dummies” to learn HTML to jazz up the visual and interactive aspects of her profile page.

Adam. Adam’s hand shot up often in Diane’s class, both to offer contributions to discussion and to ask Diane questions about class assignments. In contrast with most of the students in the study, Adam reported reading a wide variety of print texts at home: novels, cookbooks, how-tos, letters, comics, magazines, and nonfiction texts. He also reported spending more than five hours a week playing Minecraft and Borderlands with friends from other schools, and was learning the programming language Lua in order to write his own video game, an “endless runner” called “Skater Pig.” Adam positioned himself (and was positioned by Diane) as the class technology expert. In one observation, Diane tapped Adam to help a student fix a setting on his Chromebook – the images on the screen had turned sideways, which Adam rectified.

Tanya. Like Adam, Tanya was a high participator in Diane’s class, but she had trouble staying on top of class assignments at times due to her frequent absences. She was gregarious, friendly, and seemed to get along well with any group of students during class. Tanya spent some time reading print texts at home (magazines, letters, how-tos, and comics), but spent five or more hours per week each on social platforms, texting, and writing emails to her teachers and family. She used Kik, a free messaging app, to stay in touch with distant friends, and kept up with friends, family, and some celebrity accounts through Instagram. Tanya also used her Snapchat account socially, but in addition to its social uses she sought out the app’s discover feature to connect her to nation- and worldwide “stories,” for example, different states’ Fourth of July celebrations.

Elsa. Elsa was quiet and reserved in Robert’s class. Her makeup and clothes were always chosen with care, and I often picked her out during observations by noting her stylish bag. Elsa’s first language was Spanish; she learned English at age four. She was on the school’s volleyball team, and offered in her survey that she felt like she could teach volleyball to other students. According to her survey, she never read any kind of print text at home outside of what was required for her classes, though she spent more than three hours a week on Instagram, YouTube, Kik, and Snapchat. Primarily, she visited YouTube to listen to music and to watch makeup and hair tutorials, and hoped one day to have honed her skill enough to post her own tutorials. She had also made and posted YouTube videos of her dancing to music with friends and family.

Lena. Like Elsa, Lena learned English as a second language, at age four. Although Lena participated in group activities, she never offered contributions to whole class discussions in Robert’s class. In our interviews, she came across as shy and reserved, though her voice became louder and steadier when she talked about one of her passions, makeup. Unlike the rest of the case study students, Lena worked outside of school more than five hours a week. She reported never reading any kind of print text at home, but spent more than five hours a week on social platforms like Instagram and Snapchat, and texting her friends. She also watched movies that had been posted on YouTube often. She related to me, for example, the plot of a movie in which the protagonist kills “bad people” to prevent them from harming others.

Mireya. Mireya first learned English at age 3; like Lena and Elsa, Spanish was her first language. Mireya often lead her team’s lab group work, and sometimes participated in whole-class discussions. She reported reading novels at home a few hours a week in her free time, and her

favorite author was *The Fault in Our Stars*' John Green. A self-described “fangirl” of the band One Direction, Mireya spent more than five hours a week on the social blogging platform Tumblr. She often reblogged things that other users had posted that she found “cute, funny, or interesting.” Unique to the case study students was Mireya’s strategy of seeking out academically-themed Tumblrs (e.g. AP History and AP Chemistry) to help her with her schoolwork.

Findings

The Student Perspective: Closely Reading Digital Media Out of School

Some researchers have concluded that students of color and low socioeconomic status are more likely than affluent white students to consume digital media uncritically, without composing new texts or engaging in self-directed learning using the internet (Warschauer & Matuchniak, 2010). It would be hard to deny that the daughter of a Silicon Valley programmer and a machinist’s daughter wouldn’t have different levels of access to expertise and opportunity when learning to read and write digital texts. However, the students in this study –students of color from a low-income community – all proved to have rich reading and composing practices that perhaps would not have surfaced in a quantitative survey. This study brings to light several examples of teenagers who purposefully selected, read and reread, crafted responses to, asked questions about, and shared digital texts with others – all of the stages of close reading I have described.

I argue, in fact, that each of the six case study students engaged in close readings of digital media. Lena and Elsa, for example, watched and rewatched makeup and hair tutorials on YouTube. Tanya reread the comments sections of Instagram and SnapChat, and revisited SnapChat posts about the Day of the Dead to learn how to create a sugar skull design on her face with makeup. Natasha went back and forth from a digital coding tutorial to designing her Quotev profile in HTML. Adam picked apart tutorials for a programming language, Lua. Mireya revisited her own Tumblr posts. Some students also closely read with digital media. Natasha, for instance, used the Wattpad digital annotation platform to discuss user-posted texts with others. Adam played *Borderlands* with friends over Skype, over which he discussed the situations posed by the game and deliberated about tactics.

I identify and discuss here two key drivers of case study student’s close readings of and with digital media outside of school, which I will sometimes refer to as “digital close reading”: a desire to learn content and skills relevant to their career aspirations, and a wish to connect with friends, family, and online communities.

Digital close reading in pursuit of self-directed learning. For many case study students, close reading activity occurred when digital media mediated his or her pursuit of self-directed learning. Students often wanted to learn skills in the service of career aspirations. Tanya, Elsa, and Lena all stated in their survey that they wanted to be cosmetologists, and in interviews, each discussed how they closely read digital media in order to learn makeup skills. Elsa, for example, discussed browsing YouTube to find new beauty techniques:

If it’s really interesting to me, and I’m like, “Oh, I have to do this thing, it’s perfect.” Then I’ll like I’ll watch the video, like, a couple times, like twice or something.

In this example, Elsa selected the video based on her interest in makeup and desire to learn a new skill, then watched and rewatched the video so that she could reproduce the technique. Elsa's own version of the makeup technique I argue counts as a new text, a composition painted on her face and the face of her friends and family, who acted sometimes as her models. Elsa also expressed her desire to make her own tutorial videos to share on YouTube:

I wanna start making tutorials. But when I get more, like, better, like better enough to teach somebody else...I'll feel ready when I see, like, oh, I could do somebody's makeup, like, good? 'Cause I've been practicing doing, like, my sister's or my friends' makeup. And once — to the point where they think that I could do it, like, as a side job or something like doing, like, really good makeup.

Elsa's close reading activity, mediated by YouTube makeup tutorials, is in the ultimate service of making money off of doing makeup. When she has watched, rewatched, and discussed these videos with friends and family, and crafted her own versions of these beauty techniques to her satisfaction, she will be ready to contribute her own resource to YouTube's multimodal on-demand media platform, perhaps the first entry in her cosmetology portfolio.

Elsa, Lena, and Tanya's close readings of digital media were directed toward becoming beauticians; Natasha and Adam's close readings of digital media were in the service of becoming computer programmers. Natasha listed "web developer" as her future aspiration, and Adam listed "video game designer." When I interviewed him, Adam was designing a video game for mobile platforms in his free time:

I'm making this game called Skater Pig. You're a pig who learned how to skateboard on its two legs, and running away from farmers that try to change you into bacon.

Elsa's example of closely reading YouTube videos is more analogous to the types of close reading that many teachers may already understand - digital media takes the place of print texts, practicing techniques with friends and family take the place of classroom discussion, and makeup applications or new tutorials take the place of writing about texts. Adam, however, performed a style of close reading perhaps more at home in the digital realm than in the realm of traditional print texts; he blazed his own trail through multiple internet texts in pursuit of developing Skater Pig, reading with special attention to find the "just-in-time" information he needed to make progress (Hagel, Brown, & Davison, 2010). In our interview, Adam described how he progressed through multiple resources, digital and social, as he learned how to develop Skater Pig:

Well, I started using this program called Stencyl¹⁵...It's like Scratch¹⁶, you can export a game to, like, different platforms and like monetize. It's really cool. But then I realized I [didn't really like using] block code. It was kind of weird to understand. I started learning some

¹⁵ A free online platform that allows users to make digital games by snapping together graphic blocks of code ("Stencyl: Make iPhone, iPad, Android, Windows, Mac, Flash and HTML5 Games without code," n.d.)

¹⁶ A "free programming language and online community where you can create your own interactive stories, games, and animations" ("Scratch - Imagine, Program, Share," n.d.)

Javascript¹⁷, and that was, like, pretty easy to learn, but it was hard to make games with it, to export to different platforms. So I'm trying to learn a little Lua¹⁸. And I'm using that to, like, program games using this thing called Corona SDK¹⁹. It's this really cool and free program that offers monetizing for people who want to put their games on the market. And it was used to create this game called Bubble Ball, and that's how I found out about it. The kid that made it made two million dollars off of it...it was a free game, and it got a lot of good reviews. I'm trying to figure out art and music right now [for Skater Pig]. My mom, she graduated in art history, so she helps me with some pixel art. And, my friend helped me find some non-copyrighted music online. So I can use music for my game.

Adam first discovered the programming platform Corona SDK when reading an article about the monetary success of “kid”-developed Bubble Ball; he explained that he frequented financial and entertainment news sites in his surveys and interviews. He then pursued resources on learning how to use Corona SDK and how to write in Lua, a compatible programming language. Realizing that his game needed art and music, he turned to his social network. His friends and family mediated his close reading activity by directing him to new digital media resources, which would influence the design of his game. In pursuit of his goal of making money off of Skater Pig and ultimately becoming a video game designer, Adam selected a variety of digital media resources to read, read and reread them with special attention to how they might help him design his game, discussed his readings with friends and family, and will ultimately craft a new text in the form of Skater Pig.

Digital close reading in the pursuit of social connection. Many case study students also pursued close readings of and with digital media in pursuit of social connection – in order to understand others or bond with others over shared interests. These “others” included students’ friends, family, and online “affinity groups” (Gee, 2010). Elsa related in her survey and interview that she had recreated music videos with her family and friends and posted them on YouTube when she was in elementary school. Natasha began reading stories on Wattpad after a friend introduced her to the site, and that same friend encouraged her to write an adventure story to post. Tanya related that she often had to read and reread Snapchat and Instagram comments to make sure that she knew what her friends meant to communicate:

Like, um, it'll be something I don't understand or something that I didn't see right and I'll be scrolling and I'll catch half of it, but then I go back to make sure I read what I read to make sure it's not something else. Like for some people, they don't spell words, and so I see one word and think of another one, so I got to reread it, and like for some people, instead of spelling 'you' Y-O-U, they'll spell it

¹⁷ A “lightweight interpreted or JIT-compiled programming language with first-class functions” (“JavaScript,” n.d.).

¹⁸ A “powerful, efficient, lightweight, embeddable scripting language” (“Lua: about,” n.d.)

¹⁹ A “cross-platform framework that empowers developers to create 2D games and apps for mobile, TV, and desktop” (“Why Choose Corona SDK?,” 2016)

‘u’ with a letter u, or they’ll spell it Y-H-U or Y-U-U or something like that. And so I’ll have to go back and I read it, like, okay, I’ll make sure that I seen what I seen...So if I see something, I gotta go, I gotta scroll all the way down to ‘All Stories’ and click that person’s story again and watch carefully to make sure I’m seeing what I’m seeing.

In order to communicate appropriately in the discourse of these social platforms, Tanya often had to closely read unfamiliar language that her friends used. Tanya expressed that staying connected to loved ones was very important to her. She had changed schools, leaving close friends behind. Because of this, she checked her phone’s notifications constantly, to “see if anything new did happen.” Close reading, as this example demonstrates, was one way to be certain that she maintained membership in the discourse community of her friends.

Students also engaged in close reading activity to connect to online communities, “affinity groups” with shared interests (Gee, 2010). Mireya was a self-described “fangirl” of the band One Direction and John Green’s *The Fault in Our Stars* (Green, 2014), and read, reacted to, and reposted quotes and images relating to her fandoms on her Tumblr. In our interview, she said that people who looked at her Tumblr would “get like a general sense of, like, who I am and what I like.” Through her posts, Mireya established herself as a member of these fan communities. Mireya twice mentioned reading and reposting others’ reactions to current events or new content releases related to her fandoms:

When Zayn left the band of One Direction, like that was a huge thing, just like everyone had like different reactions to it. [Being a fangirl] I guess [borders] on like being obsessed with it, like it’s the majority of what you like, and like what you talk about on a daily basis.

With the goal of self-identification One Direction and *The Fault in Our Stars* fandoms, Mireya selected Tumblrs to follow, “obsessively” read others’ reactions, created new texts every time she reposted something to her Tumblr, and later reread these posts:

I just like scroll through like what I see, and if I like, if I like something interesting, like if a new movie got out, or if there’s like a trailer, I’ll look it up and see people’s reactions to it. I feel like I’ll read it, and if it seems interesting, then I’ll like, maybe like it and then repost it or, like it, and then later I’ll see it.

Though the content and process of Tanya and Mireya’s close readings are different than what you would be likely to see in a Common Core curricular exemplar, I argue that these are examples of close reading nonetheless. In pursuit of social connection, these adolescents read and reread digital media with “special attention,” discussed what they read with peers, and composed new texts in response to their readings.

As these examples illustrate, all of the case study students engaged in close reading activity driven by authentic purposes – to learn skills and content tailored to their interests and career aspirations, or to form or maintain social connections. When close reading happens in the service of

student-driven goals, as in these examples, the process appears so natural that it is almost possible to miss the real effort exerted. Close reading, as a pedagogical method, has been criticized for its tedium (Snow & O'Connor, 2013). But these examples of student-driven close reading of digital media show that close reading can be *interesting*, as well as a vehicle for learning, when students are excited by the purpose for reading.

The Teacher Perspective: Digital Close Reading Instruction in School

The previous section describes students' self-driven, out-of-school close reading activity using digital media. In this section, I will describe how teachers engaged students in close readings of and with digital media in the classroom, activity I refer to as "digital close reading instruction."

Diane and Robert led students in close readings *of* and *with* digital media. In an example of close reading instruction *of* digital media, Diane substituted videos for print texts, challenging students to analyze them as they would an article or literary work. Robert asked students to find and closely read websites pertaining to a lesson on several occasions. Both teachers also guided students to access digital media at strategic points in classroom lessons to support close reading; in these cases, students closely read digital or print texts *with* digital media acting as a tool or scaffold. For example, Diane created an EdPuzzle video to teach students how to closely read each other's work in writing circles. Robert introduced several close reading lessons with videos related to the content in the readings. Students in Diane's class also recorded their responses to close readings of articles, videos, and literary works on Google Docs, an example of close reading with collaborative reading and writing tools. Robert planned internet research activities in which students used Google to find information about a topic or arguments for or against a plan of action, an example of close reading with search tools.

I argue that Diane and Robert seemed to design digital close reading instruction in pursuit of two main goals: access and evaluation. They incorporated digital media when they thought it might help students access content or skills relevant to close reading, and/or when they thought it might help them evaluate students' progress toward close reading goals and hold them accountable for reaching those goals.

Digital close reading instruction in pursuit of access. When designing her digital close reading instruction, Diane and Robert sometimes chose videos as a way to introduce or reinforce concepts that students would encounter in their close readings. They intended, it seemed, for these videos to engage students in the material and build their schema for new terms, granting them better access to texts during close reading exercises.

Early on in the semester, Diane introduced students to close reading as "first and second draft reading," terminology inspired by Kelly Gallagher's curricular resource *Deeper Reading* (2004). She told students that whereas "first draft reading is when you are just reading to get the main idea...second draft reading is when you're trying to figure out all of the details so you're not confused." During a lesson on codeswitching, Diane asked students to do a first and second draft reading of an article about codeswitching. Then she played a video from the comic duo Keegan-Michael Key and Jordan Peele, "Obama's Anger Translator" (Comedy Central, 2012). In the video, then-President Barack Obama (played by Jordan Peele) addresses the nation in a measured tone, but then introduces his "Anger Translator," (played by Keegan-Michael Key) who repeats everything

Obama says in emphatic African American English. After reading the article and watching the video, students discussed the rationale for codeswitching in school and at home. Robert also relied on videos to introduce or complement new material before close reading activities. In one lesson, Robert introduced a lab safety reading activity with a video of a scientist who does everything wrong in the lab, cutting his foot on glass, tripping over a backpack, and spilling alcohol all over himself. Afterwards, students conducted a jigsaw reading of lab safety features in groups. In another lesson, students closely read the periodic table for organizational patterns after watching a music video about the elements. In my observations, students watched the videos teachers introduced with interest, and elements from the videos resurfaced in discussion. Digital videos seemed to be used by Diane and Robert as an access point to engage different learners and help them understand the material before, after, and during close reading instruction.

Diane also sometimes chose videos as part of a set of digital and print texts that she asked students to read across as evidentiary sources. In these instances, students closely read digital videos to improve a reading skill. For Diane, it was important for students to be able to evaluate the evidence presented by videos and not just to accept it at face value, or in other words, to develop a critical media literacy (Leu et al., 2013). She described a lesson in which students read three texts about the importance of going to college, one of them a video from the College Board's website:

It's kind of about, like, identifying relevancy in your evidence, which means they have to have multiple sources that they've read. So they will, at that time, have watched a video they're watching today called "Five Ways Ed Pays" from the College Board, which is kind of, like, propaganda basically because it gives all these things, like, "going to college makes you not obese," and you're like, um, (laughs) "Okay." They don't say any data in their -- they don't say any sources in their video. So today, they'll figure it out. "This is a cool video, but I don't really -- I'm not convinced because you didn't tell me where this came from." Tomorrow, they'll read this article I showed you: "Education Pays." And there's one more article that they read today, an excerpt from a New York Times article called, "Is College Worth It?," and it's basically saying 'yes,' even though you might, at a certain point, feel like it's not.

In this lesson, Diane provided students with a graphic organizer to fill in as they watched the College Board video. Under the main claim "College is worth it," she had listed subclaims with the headings "greater wealth," "more security," "better security," "close family," and "stronger community." Students watched the video three times and recorded evidence for each subclaim from the video in their organizers. Diane then asked students whether they were convinced. Most were, but a few students noted that the video didn't cite sources for their claims. When Diane asked students again if the video was convincing, far fewer raised their hands. At the end of this digital close reading lesson, it seemed that students had increased their access to critical media literacy skills, as Diane had intended.

Digital close reading instruction in pursuit of evaluation. Students in Diane and Robert’s classes turned in most of their work in Google Docs, a collaborative writing application. Google Docs allowed Diane and Robert to evaluate students’ work, give them extensive feedback on their reading responses, and hold them accountable for class reading and writing assignments.

During her argumentation unit on the value of college, Diane’s students recorded evidence for and against attending college in evidence logs on Google Docs. In the logs, students recorded quotes from the text (what the text “says”), paraphrased the quote (what the text “means”), and explained the significance of the quote, (why the text “matters”). When introducing the evidence logs, Diane explained the grading rubric, and gave examples of log entries that would not receive a high grade. Later in the semester, Diane had students work together in class to evaluate the strength of the evidence in their evidence logs before writing an argument for or against the worth of a college education. In the meantime, she had used Google Docs’ comment function to provide students with feedback on their evidence logs. Robert also used Google Docs to collect and evaluate student work, and used digital comments to write extensive feedback on students’ lab reports (which I would argue are students’ written responses to their close readings of experimental evidence). Robert said that Google Docs made grading more efficient for him and was helpful for students since they could receive real-time feedback from teachers and peers:

It’s really, really helpful to, for teachers to be able to see it all. I don’t have to carry any lab notebooks around, like, grade hard copies. They have the data constantly. They can constantly get feedback from me, from -- they can do peer revisions, where, like, you share your document with me, I’ll give you feedback. And then you share it with this person, they’ll give you feedback. So I mean, there’s just so many things you can do on it. You can insert grades on it...It’s wonderful.

Diane also used Google Docs to capture and evaluate students’ written arguments in a group debate on whether or not people should be able to use “the n-word” in certain contexts. She divided the class into two groups for and against the use of the word. Students then spent a week closely reading articles on each side of the issue and gathering evidence for an in-class debate over Google Docs:

They had this online debate, so their group was facing the opposite side’s group, and they would type in, like, “We think the n-word should be used because ‘blah blah blah.’” And then they had to, like, collaborate with their team: “What are we going to say, how can we refute their argument?” And then, “Yes, but ‘blah blah blah.’” And it became this conversation, but all the documents -- they could talk in a group, but what they were writing in a document was what I was gonna be able to...as a transcript, be able to capture. There’s basically a lot of small debates, which raised accountability because then you and your group have to decide what to say.

In this lesson, Diane used Google Docs to facilitate students’ discussion about the use of the n-word – after the online debate, she reported that students had a “really interesting conversation”

about the topic offline. Her interview responses suggest that she also chose Google Docs because it gave her the ability to capture student writing in real-time so that she could evaluate it more easily and adjust her instruction as needed. She also believed that this format kept students accountable to produce their thinking, since the other side was waiting for a response to their claims to appear on the screen.

As I have argued above, Diane and Robert appeared to design digital close reading instruction to give students access to new content and skills and to evaluate students' work. The choices they made in pursuit of these goals were mediated by the perceptions they held of their role as a teacher. They believed that it was their job to make sure students had the knowledge and skill to produce high-quality close readings of texts, the accountability structures that encouraged them to do the work, and the feedback to get better at close reading over time. The teachers' choices about how and when to use digital media in close reading instruction were also mediated by their colleagues' uses of digital media and the technological provisions the school had made for teachers. Diane and Robert had similar patterns of digital close reading instruction, and they each gave examples of how they had learned instructional uses of digital media from colleagues. Schoolwide provisions of technology also seemed to matter – Diane mentioned, for example, that she didn't use the writing skill site NoRedInk as much as she might otherwise because the district had not purchased the premium version for teachers. These teachers' digital close reading instruction was shaped by the rules and roles of a professional context, and thus pursued different aims, in a different way, than students' out-of-school digital close readings.

In the next section, I read across students' and teachers' perspectives on digital close reading. I point to possible synergies and tensions between students' out-of-school digital close readings and teachers' approaches to digital close reading instruction.

Reading across Student and Teacher Approaches to Digital Close Reading

In classrooms, teachers' and students' activity systems interact with each other to produce the work of instruction and learning. As I observed in this study, students came to class carrying with them rich digital close reading practices, which they had fine-tuned at home in the pursuit of self-directed learning and social connection. At the same time, teachers had developed their own approach to digital close reading instruction that privileged student access and evaluation. Sometimes, teachers' and students' goals and practices for digital close reading aligned synergistically, and as a result, students were happy to engage in rigorous learning experiences. One such synergy was Robert and Diane's use of authentic, relevant questions, which enabled students to direct their own close readings of and with digital media. Other times, however, teachers' goals for students made teachers hesitant to leverage the types of digital close readings students pursued in their free time. One such tension was Diane's concern that students' digital close readings of social media would supersede academic ways of reading in the classroom, and that as a result, students would not acquire the reading, writing, and speaking skills that they needed to overcome racial and socioeconomic barriers.

Synergies between student and teacher approaches to digital close reading. Diane and Robert each created opportunities for students to engage in close readings of and with digital media in the pursuit of self-directed learning. The teachers initiated student-directed learning by writing

authentic questions that were relevant to students' lives. Robert, for example, wrote an energy unit that culminated in a Socratic seminar discussion of the question: "Should we use nuclear energy?" To prepare for this Socratic seminar, students conducted online research about the pros and cons of nuclear energy. They generated research questions, selected informational websites, and recorded evidence for and against nuclear power in a graphic organizer. Elsa reported that while she found textbook reading in Robert's class "boring" and "real hard," she liked reading for the nuclear energy project:

I mean, I found the articles just today — they're, like, interesting. Like...they actually...gave me something to think about, like oh really, should we really use nuclear power? Or fossil fuels? Like, that was actually interesting, reading it. And especially since we're going to have a Socratic so, like, we had to read it. To, like, defend our... like whatever we believe in.

Lena also mentioned the nuclear energy unit as a way that she felt Robert had supported her reading:

The nuclear plants were pretty interesting. Like it's not something that'll just bore us. [It's interesting] 'cause it's like a real world thing? Something that happens around us, not just, like, something made up.

Because they were interested in learning about nuclear power, students in Robert's class were engaged when they searched for articles that answered their questions about nuclear energy, and when they closely read the articles to gather evidence to defend their positions. When I observed the Socratic seminar, I noted that students defended their positions loudly and eagerly, referring often to the evidence they had recorded on their graphic organizers. Robert attributed the success of the Socratic in part to student's self-directed close readings of articles online.

So a lot of kids in the Socratic were like, "according to the US Department of Energy." It was like, "I didn't give you anything from the Department of Energy"...So they had found other texts, but a lot of it was through, yeah, all online research. It's never been, like, here's a choice of five articles, like, read one that sounds interesting to you. It was way more open ended than that I think. Like everything's at your fingertips because you have Chromebook and the internet...I think that's way more authentic for a kid for the energy thing: what do you want to know about nuclear power? Now you need to find it, I'm not just going to, here's the article, what do you get out of it?

Diane also organized the digital debate about the n-word around an authentic question relevant to students' lives. As a result, she felt that students were more motivated to find and read information online and to engage in the discussion during class. She even contrasted the n-word debate with the argumentative unit about the value of college:

There's definitely a lot to talk about. They do a lot of research on it, they have this little online debate, they really get into it, and it's an interesting topic because they use it all the time, probably without even realizing it, so there's something to talk about, but -- "why is college valuable?" "Cause my mom said it is." There's not a lot to talk about, yeah.

These examples of digital close reading instruction demonstrate authentic opportunities for students to engage in self-directed learning related to their interests. As Robert said, digital media placed information right at student's "fingertips," just as in the examples of students' out-of-school close readings I have described. In school, student's close readings of that information were further mediated by teacher's guidance, other students' opinions, and collaborative reading and writing tools. As such, a "synergy" is achieved between the goals of teachers and students when their approaches to digital close reading instruction and out-of-school digital close reading align – the combined activity of the two groups is greater than the sum of its parts. In the pursuit of self-directed learning, classroom close readings of and with digital media can interest students, and they can also help them acquire academic skills and dispositions.

Tensions between student and teacher approaches to digital close reading. In addition to synergies, there seemed to be tensions between teachers' goals for digital close reading instruction and students' goals for out-of-school digital close reading. Diane and Robert's digital close reading instruction was tailored to give students access to college-ready reading and writing skills, and to evaluate those skills. Sometimes, they expressed concern that the social connection students sought through digital media might conflict with those goals. Diane expressed in interviews hesitation to incorporate students' out-of-school digital reading practices in her instruction because she worried that she would be "doing them a disservice" by not preparing them for reading, writing, and speaking in college:

I mean I think the hardest thing is like, the reality is that our kids need to learn how to codeswitch in order to be successful in America. Unfortunately, they don't yet understand that if they go to a college campus acting or speaking or texting or typing the way that they currently do that they will earn no respect, as a result of their racial and ethnic background, where they come from, and their socioeconomic status. They don't know that yet.

Though she acknowledged that using social media as an instructional tool would be engaging for students, Diane asserted that she would have to teach students how to switch between personas and choose language appropriate to the audience and situation. From my perspective, this did not seem to be an insurmountable challenge posed to integrating students' out-of-school digital close readings; Diane had already taken a step toward giving students codeswitching tools with a lesson at the beginning of the year. In fact, Tanya brought this lesson up in our interview, unprompted, when discussing how she used her technological skills in school:

Like when you go to school, you use a certain, I can't remember what it's called, where you... "code switching", that's what it was. And you

do a certain, it's a certain you that you don't, well not per se don't, but it's a certain you that when you're at school, and then you turn around and then you code switch to a different you when you're with friends, and you turn around totally code switch when you're with your friends than with your family. And it also goes for messaging, like, if I was to email [Diane, her teacher] the way I email my friends, she'd be looking like "I don't understand, not a word what you just said." And that's because I type different and I spell things different, and I word what I need to word different.

Tanya had internalized Diane's message that students must learn new "ways with words" (Heath, 1983) to communicate with teachers in school settings, in and out of the digital realm. Classroom conversations about the language, form, and purpose of different kinds of digital media might help students move fluidly between the discourses of their academic and social worlds, and might help teachers feel more confident marring the lines between those worlds when designing digital close reading instruction.

Imagining Digital Close Reading Instruction

In this article I viewed empirical data about students' out-of-school digital close reading and teachers' digital close reading instruction through the lens of cultural historical activity theory. I wanted to describe the nature of students' digital reading practices at home, and whether or not these practices could be construed as close reading; I argue that they can. I also wanted to understand what digital close reading instruction looked like in the classrooms of motivated and effective educators with adequate access to digital technology. Finally, by reading across the data, I wanted to cast light on the tensions and synergies that emerged when students' and teachers' digital close reading activity interacted in the classroom.

Ultimately, I found that students seemed to pursue digital close readings at home in pursuit of self-directed learning and social connection. Teachers seemed to design digital close reading instruction with the goal of giving students access to academic content and skills and evaluating those skills. And while teachers and students' goals aligned synergistically in the form of digital close reading instruction that encouraged student-directed learning, there was tension between teachers' desire to use digital media to engage students and their belief that students' digital close reading practices were not academically rigorous enough to prepare them for college. I believe that this study and others like it can help us answer the question: Can teachers design digital close reading instruction so that "a young person is able to pursue a personal interest or passion with the support of friends and caring adults, and is in turn able to link this learning and interest to academic achievement, career success or civic engagement"? (Ito et al., 2013, p. 4). To close this article, I offer two recommendations for digital close reading instruction: learn about students' digital habits at home and their ideas for leveraging these habits in the classroom, and craft plans to guide students in close readings of and with digital media.

Learn from Students' Out-of-School Digital Close Readings

Teachers may be able to improve their digital close reading instruction by learning about students' out-of-school digital reading practices and by repositioning them as digital experts.

Teachers may ask students, for example:

- What types of digital texts do you read at home?
- When do you reread or revisit these texts? Why?
- Do you ever take any type of notes when you read digital texts? For what reason?
- With whom do you discuss these texts?
- What types of digital texts do you write or compose?

Further examples of information teachers may consider collecting can be found in appendices L and M. Appendix L contains this study's survey questions pertaining to digital reading habits, and appendix M contains the interview protocols I used to ascertain the nature of students' out-of-school digital close reading practices. Of course, I acknowledge that most classroom teachers don't have the time to sit down to an interview with students. But these questions could perhaps also help teachers collect information informally, in the hallway and lunchroom conversations that are so common between educators and their students.

In addition to learning about students' out-of-school digital reading habits, teachers may be able to reposition their students as technological experts and bring to life students' ideas for digital close reading instruction. Engeström (2001) suggests that when activity systems collide with one another, as when students offer to teachers new and perhaps uncomfortable strategies for digital close reading instruction, these conflicts and contradictions can expand learning and lead to innovation. Case study students had ideas for such innovations. Adam wanted the class to buy tablets and to share an e-reader account, so that they could all share books. Natasha said that as a teacher, she wouldn't assign students readings, but would let them choose what they wanted to read from a user-produced site like Quotev. Tanya thought that teachers could learn about new reading programs or other learning opportunities by following educational organizations on social media. Mireya suggested that her chemistry class could use Tumblr to develop a record of their shared interests in scientific discoveries:

Tumblr, is like easy to like keep track of different like links 'cause like you can make pages so that there could be like a page for, like, different resources, or kinda like different news articles coming out... Like, [my teacher could] try to find cool assignment things, like new discoveries, or like new things that we're gonna make, like the bullet thing, the really fast train? Like, I guess, like, different people could, like, message [our teacher] through it and be like, "Hey, like, 'I heard about this, like, new, like, animal that they discovered, and what do you know about it?' And he could, like, answer the question with, like, articles and like, like his own, like, reactions to like [this new discovery thing].

In Mireya's vision, self-directed learning meets academic mentorship. While students would fill the Tumblr page in her example with science news they found in their free time, they would look

to Robert, their teacher, to guide their reading of these articles. Mireya's innovation represents connected learning at the crux of student interest and academic rigor. If teachers want to find that sweet spot when designing digital close reading instruction, they may consider seeking out students' expertise and ideas.

Craft Plans to Guide Students' In-School Digital Close Readings

After learning about students' out-of-school digital reading habits and expertise, teachers might also benefit from planning intentional ways to incorporate close readings of and with digital media into their curriculum. With the right support, teachers might find it possible to plan digital close reading instruction that taps into students' desire for self-directed learning and social connection, while also ensuring that students have access to academic learning. Figure 5 is an example of one such support that teachers might use, in the form of a digital close reading instructional planning guide. I developed this planning guide by drawing on this study's findings, which suggest that students might be more engaged in digital close reading instruction when authentic questions incite self-directed learning. I also incorporated questions that address the five stages of close reading and the six types of digital media I have outlined. This guide is designed to help teachers identify real purposes for close reading, embed close attention to digital and print texts within a program of strong literacy instruction overall, and guide them to select appropriate technological tools to support close reading instruction.

A blank version of the planning guide can be found in appendix N. My hope is that planning guides like this one might help teachers to bridge divides between students' out-of-school practices and their own goals for instruction, and create a digital close reading pedagogy at the intersection of interest and academic learning.

Conclusion

As this study suggests, there are pathways for teachers to learn about and incorporate students' everyday digital close reading practices into instruction. This is not to minimize the real challenges that teachers face even when they are excited to use digital media in the classroom – both teachers and students in this study felt that unfiltered, unfettered digital media use can be distracting and inappropriate for a school context. And teachers should be cautious, too, not to appropriate students' social uses of digital media without consulting them, as they might feel (as Lena did) that the realms should be kept separate. Despite these caveats, the opportunities for digital close reading instruction are exciting. The nature of digital literacies is *deictic*; the types of digital texts available to read, and the tools available to help us read them, are rapidly and constantly changing (Leu et al., 2013). Perhaps the best way for educators to reflect these changes in their digital close reading instruction is to tap into the fresh wave of knowledge they have access to every year, the students who enter class with phones in pockets and digital close reading practices at the ready.

Digital Close Reading Instructional Planning Guide for Teachers

Essential question: e.g. How can someone tell the difference between real news and fake news?		
Purpose for reading: e.g. To improve students' ability to choose reliable news sources, to interest students in civic engagement, to help students learn about current events relevant to their lives		
How will you make the purpose for reading relevant and clear for students? e.g. Through a demonstration of how easy it is to be fooled by a fake news article.		
What texts will you use in this unit?	Digital e.g. Facebook news posted to students' social media	Print
Who will select these texts?	<input type="checkbox"/> Teacher	<input type="checkbox"/> Student
If students are selecting these texts, what guidance might they need? e.g. A student-led mini-lesson on how to use Facebook's search tools.		Digital media used: <input type="checkbox"/> Search tools <input type="checkbox"/> Collaborative reading and writing tools <input type="checkbox"/> Video games <input type="checkbox"/> On-demand media <input type="checkbox"/> Social platforms <input type="checkbox"/> Communications technologies
How will you guide students to repeatedly read these texts? e.g. Students will first skim 4 potential real/fake news sources on Facebook, then will reread each carefully and sort them into real/fake categories.		Digital media used: <input type="checkbox"/> Search tools <input type="checkbox"/> Collaborative reading and writing tools <input type="checkbox"/> Video games <input type="checkbox"/> On-demand media <input type="checkbox"/> Social platforms <input type="checkbox"/> Communications technologies
How will you guide students to annotate, ask, and/or answer questions about these texts? e.g. Students will use the Genius web tool to identify and question the websites' sources, claims, and evidence.		Digital media used: <input type="checkbox"/> Search tools <input type="checkbox"/> Collaborative reading and writing tools <input type="checkbox"/> Video games <input type="checkbox"/> On-demand media <input type="checkbox"/> Social platforms <input type="checkbox"/> Communications technologies
How will you guide students to discuss texts with others? e.g. Students will tweet their articles with the hashtags #realnews[schoolname] and #fakenews[schoolname], and will have a twitter chat about how to tell the difference between real and fake news.		Digital media used: <input type="checkbox"/> Search tools <input type="checkbox"/> Collaborative reading and writing tools <input type="checkbox"/> Video games <input type="checkbox"/> On-demand media <input type="checkbox"/> Social platforms <input type="checkbox"/> Communications technologies
How will you guide students to write or compose new projects in response to these texts? e.g. Students will write both a real and fake news article about one of their interests, and will post each to a class Facebook page.		Digital media used: <input type="checkbox"/> Search tools <input type="checkbox"/> Collaborative reading and writing tools <input type="checkbox"/> Video games <input type="checkbox"/> On-demand media <input type="checkbox"/> Social platforms <input type="checkbox"/> Communications technologies

Figure 5. A template for planning digital close reading instruction. The gray content is an example of what a teacher might write when developing their lessons.

Chapter 4: Conclusion

In chapter 1, I summarized the history of close reading, critiqued Common-Core-era close reading paradigms, and proposed principles of a 21st-century close reading paradigm based on a review of the research.²⁰ In chapter 2, I tested some of those principles in a formative experiment of close reading instruction in a high school chemistry classroom. In chapter 3, I explored students' out-of-school digital close reading practices and teachers' digital close reading instruction, with the aim of discovering synergies and tensions between them. Each of the first three chapters in the dissertation has in common an interest in close reading instruction. All three, in different ways, aim to help researchers and educators answer the question: What close reading instructional practices will prepare students for the 21st century, engage them along the way, and empower them to affect their world? As such, I conclude this dissertation by discussing three cross-cutting themes that relate to the design or execution of close reading instruction: funds of knowledge, interest- and goal-driven learning, and diverse purposes for reading. Within each theme, I also discuss the role of digital media, since I see the affordances, challenges, and uses of digital media as a current that runs throughout close reading instruction rather than a separate category. I close this chapter and the dissertation with directions for future research and lingering questions about the nature of close reading.

Reading across the Chapters: Cross-Cutting Themes in Close Reading Instruction **Funds of Knowledge**

The first three chapters in this dissertation suggest that when teachers are guiding students to closely read texts, they should leverage their “funds of knowledge” (Moll, Amanti, Neff, & Gonzalez, 1992). I use the related term “background knowledge” in chapter 1, as a research-based principle of close reading instruction: “Learn about students’ cultural backgrounds, areas of expertise, and existing literacy practices, and adjust close reading instruction to leverage and build students’ content and discursive knowledge.” In that chapter, I discuss the research base supporting background knowledge activation for close reading instruction and review close reading instructional approaches that leverage background knowledge, such as cultural modeling, and build new background knowledge. I use the term funds of knowledge now because I believe it better encapsulates both background knowledge of content (chapter 2) and knowledge stemming from students’ home cultures or practices (chapter 3). The term “funds” also frames knowledge as a resource, something that can be drawn upon when learning new skills or content.

In Moll and colleagues’ original research, teachers learned about students’ household knowledge as a way to improve their instruction. Chapter 3 comes closest in spirit to the funds of knowledge research tradition, since I interviewed students to learn about their digital close reading practices at home. Though I did not intervene by passing this information to teachers, as Moll and colleagues did, I was able to document moments when these funds of knowledge were put to good use in the classroom, and thus likely increased student learning. One such moment was when Robert organized his nuclear energy project, which involved closely reading scientific articles about nuclear energy online, around a debate about its safety. As he mentioned in an interview, many students had visited the hospital when a nearby oil refinery exploded, and could draw on that experience when

²⁰ With P. David Pearson, co-author.

finding and reading articles pro and contra nuclear energy. In addition to their out-of-school experiences, I noticed students drawing on their knowledge of digital media, as when students used technologies like Prezi to present their final verdict on the value of college. Ultimately, I conclude in chapter 3 that teachers should learn about students' existing digital close reading practices so that they can design digital close reading instruction that is up-to-date with current technologies and that meets students where they are before leading them somewhere new.

Chapter 2 also provides evidence that students' funds of knowledge can be a helpful resource for close reading instruction in a science classroom. In this chapter, Mr. Thompson and I co-planned an A/B test of background knowledge activation's effect on the number and types of questions students wrote about a scientific article. Students who had their background knowledge activated before reading, by writing down what they already knew about the topic and what they still wanted to know about the topic, wrote just as many questions as students who wrote questions after each paragraph of the text while reading. The Before Reading group also wrote a higher proportion of "argument-generating" questions than the While Reading group, who wrote a higher proportion of "fact-generating" questions. These findings suggest that background knowledge activation prior to closely reading a science text will not harm students' ability to engage with the text in a meaningful way; in fact, these students seemed to approach the text from a broader sociopolitical standpoint than the While Reading group. These conclusions challenge Common-Core-era close reading recommendations that charge teachers to do away with background knowledge building before reading. Instructional approaches like the knowledge integration framework (Linn & Eylon, 2011) might provide further guidance for science teachers who wish to build on students' existing scientific knowledge while closely reading new texts.

Interest- and Goal-Driven Learning

Another theme that cuts across the three chapters is interest- and goal-driven learning. These chapters and studies suggest that students may be more engaged and work harder when they are closely reading about something that relates to their interests or goals. In chapter 1, one principle of close reading instruction that we recommend is authentic reading and writing: "Present students with authentic opportunities to use close reading strategies that mirror the types of reading that happens in the real world, and to draw from these close readings to compose authentic texts." This principle suggests that students read closely to *do things* with text, not just for the sake of practicing close reading or the general "knowledge building" goal stated in the Common Core State Standards. Because of space limitations, we also cut another aspect of authenticity from the published version of this paper, a decision that I regret in retrospect: "a student's perception that a school task connects to his/her life" (Behizadeh, 2014, p. 28). Chapter 1 sets the stage for the findings of the empirical works in chapters 2 and 3, which present further evidence that close reading in secondary classrooms should be embedded in interest- and goal-driven learning.

The most salient example of close reading in the service of interest- or goal-driven learning in chapter 2 is shown in the results of phase 3. In this phase of the study, I randomly assigned students to two groups: the "Teacher Choice" group closely read a text about the sun assigned to them by the teacher, while the "Student Choice" group closely read a text about the sun that they had chosen from the internet. While there were no motivational differences in the two groups in this

small sample, students in the Student Choice group were able to locate reliable websites and find information about the sun. While this finding does not allow us to say definitively that student choice was better than teacher choice of texts, it at least suggests that allowing students to choose texts was not harmful to their learning. Indeed, it diversified the texts that they read and allowed them to seek out information tailored to the authentic questions they had about the topic.

Chapter 3 presents further evidence that teachers should consider close reading instruction that pursues interest- or goal-driven learning. Based on interviews and observations of 6 case study students, I conclude that a) they each had everyday close reading practices of and with digital media, and b) these close readings were in the pursuit of self-directed learning and social connection. These students read, reread, discussed, and produced new texts in response to digital texts related to their interests and career goals – all of the stages of close reading that typically happen in classroom instruction. Online, students closely read about makeup, hair, world events, video games, coding, favorite bands, and teen romance. The most powerful moments of instruction that I encountered also enabled students to direct their own learning. Diane, for example, designed an online debate about whether or not the “n-word” should be used in certain contexts. Students researched arguments on either side of the issue using close reading strategies, finding claims, evidence, and reasoning. This lesson was interest-driven, as the topic was relevant to student’s lives, and it was goal-driven, as students knew they would enter a debate with their classmates about the issue. Diane noted that while the topic itself engaged students, they complained when she assigned them a side. Students were, perhaps, striving for the ability to shape their own thoughts around such a contentious issue. However, Diane’s goal of getting students to perspective-take was admirable, and I found this lesson a good example of close reading in the service of interest- and goal-driven learning while balancing the demands of academic rigor.

Diverse Purposes for Reading

In Chapter 1, we critique the limited vision of the Common Core close reading paradigm, which assumes that there is only one appropriate goal for close reading, knowledge building. As an illustration of the possibilities for close reading purposes, the empirical chapters in this dissertation surfaced several diverse goals for adolescent close reading and close reading instruction.

In chapter 2, Mr. Thompson directed the goals for close reading away from comprehension, or the “knowledge-building” that the Common Core State Standards recommends. Instead, he wanted students to closely read the texts to write inquiry questions that might lead them to engage with the content in the rest of the unit or to conduct their own research. This changed the order of texts in the curricular sequence – students read texts at the very beginning of the unit, before the chemistry content was introduced. It also changed the types of “text-dependent” questions he selected, as questioning took precedence over summarizing, synthesizing, or analyzing. Mr. Thompson’s purpose for close reading instruction, inquiry, surfaced as an “unexpected finding” in the study, a hallmark of formative experiments. As a result of Mr. Thompson’s diverse purpose for close reading instruction, I was able to track the effect of background knowledge activation on inquiry question writing, a goal that I had not held at the outset of the study.

Chapter 3 highlights students’ diverse purposes for closely reading digital media at home. Students often read, I have discussed, to learn about a topic of interest. In these cases, like Adam’s

just-in-time close readings to create and monetize a video game, I suppose one could argue that students are reading for “knowledge building” as the CCSS and the RPC recommend. But they are also closely reading to apply that knowledge, to act on it, whether for monetary gain, as in Adam’s case, or for identity displays, like Tanya’s sugar skull makeup. Students also closely read digital media in pursuit of social connection, another diverse purpose for reading that the CCSS misses entirely. In order to maintain membership in communities, students had to be sure that they understood the discourses they were reading on their social platforms. As an example of close reading in pursuit of social connection, Tanya reread unconventional spellings to be sure she knew what her friends were communicating before she responded. Based on these findings and the findings in chapter 2, I believe that teachers should think about many possible purposes for close reading before planning instruction, so that close reading becomes a tool to an end rather than an end in itself.

Future Research

I here recommend three new directions for future close reading research: disciplinary differences in secondary close reading instruction, connections between close reading, discussion, and writing/composing, and outcomes of Common-Core-era close reading curriculum.

Disciplinary Differences in Secondary Close Reading Instruction

I worked with an English and chemistry teacher for this dissertation study, partly because I hoped to gain understanding about the differences between the two disciplines in close reading purposes, practice, and demands. In the end, however, I did not analyze my data through this lens (perhaps for a future paper). Future studies are needed to zero in on best practices for close reading instruction in English, science, mathematics, history, computer science, and others. On a macro-scale, these studies might take the form of national surveys that ask teachers in each discipline to describe their close reading practice. On a micro-scale, studies might be in-depth interviews and observations of teacher practice in each discipline, akin to the expert interviews conducted by Shanahan, Shanahan, and Misischia (2011). These studies might explore questions like:

- What purposes for close reading are appropriate for this discipline?
- What counts as “text evidence” in this discipline?
- What demands for close reading are specific to this discipline?
- What close reading strategies work best for texts in this discipline?

Connections between Close Reading, Discussion, and Writing/Composing

This dissertation also speaks to the need for studies that follow the thread of close reading from student’s first encounter with a text through to discussion and any writing or composition they produce in response to the text. I could have, for example, collected all of students’ annotations of texts, recorded all discussions about that text, and collected all work written or composed in response to the text. Then I could have traced students’ development of ideas from the reading all the way through their writing, and how text evidence reemerged in discussion or composition. This is one naturalistic approach to studies that looked at close reading/discussion/writing connections; another approach might be to look at reading/discussion/writing connections as an outcome variable in a large-scale close reading intervention study. Some questions researchers might explore about this topic are:

- Under what conditions do students bring evidence from close readings of text into discussions and writing?
- What are the best ways to ensure that text evidence read and recorded during close reading activities reappears in discussion and more distal writing projects?

Outcomes of Common Core Era Close Reading Instruction

The papers and studies in this dissertation all hold in common a skeptical view of the Common Core close reading paradigm’s benefit for adolescent readers. But research is needed as to the effects of Common Core close reading curriculum to understand how it will actually affect learners. Many resources are now widespread in schools, and large scale efficacy studies might examine their impact. Qualitative studies are also needed to document the idiosyncratic strategies teachers might adopt when deploying these curricula, and whether or not a good teacher “adds” or “subtracts” from Common Core era close reading instruction to better meet his or her students’ needs. An important step to a 21st-century close reading paradigm is a thorough examination of the affordances and flaws of enactment of the Common Core era close reading paradigm in real secondary classrooms.

The Nature of Close Reading

In the months after the publication of chapter 1 in *Adolescent Literacies: A Handbook of Practice-Based Research*, I have had the opportunity to hear feedback from graduate students in an adolescent literacy seminar and the members of the dissertation committee. One question that resurfaced time and again was: What is *not* close reading? Readers felt that many of the recommendations in this chapter applied to literacy instruction as a whole, and that at times, it was difficult to distinguish what was special about close reading. This is an avenue of inquiry that I have struggled with myself, and continue to grapple with as my views on close reading evolve through reading and research. When does reading end and close reading begin? What are the conceptual boundaries of close reading?

One way to answer this question is to clarify definitions. In chapter 1, we define close reading as “special attention to text” and purposefully keep the definition broad, to allow teachers for more options when designing close reading instruction. In chapter 3, I felt that it might be helpful for readers to have a sense of what the close reading process looked like, and provided these steps (adapted from Fisher & Frey, 2014):

1. Select a text worthy of special attention, according to some predetermined criteria (e.g. difficulty, representative of a genre or literary device, pure enjoyment)
2. Read and reread the text.
3. Annotate the text in some way; ask and answer “text-dependent” questions.
4. Discuss the text with others and incorporate textual evidence into discussion.
5. Compose new texts in response to the first text.

In this process, “special attention” takes the form of revisiting texts, annotating texts, interrogating texts through questioning, discussing texts, and incorporating textual evidence into discussion and future writings. Many close reading curriculum designers and scholars would say, I think, that reference back to textual evidence is a key piece of close reading. Perhaps if conversation and writing leaves the text behind to explore tangents without circling back to the text as an evidentiary

source, students have left the realm of close reading behind. However, after writing chapter 3, I don't believe that this is necessarily true. Even though some of the students in chapter 3 did not explicitly refer to textual evidence when, say, designing a video game, I still believe that they had turned a "special attention" to digital media with the goal of learning new skills, constructing new identities, or producing new compositions. Close reading in these cases took the form of visiting, revisiting, referring back to texts, and discussing texts with others. Close reading was students' launching point for new ways of looking at the world, and the process of close reading had allowed them to feel confident using the text as a thread in new stories, new textiles.

If we accept this as true, that reading can still be close reading even if students don't refer explicitly back to textual evidence, then we are still left wondering what does *not* count as close reading. I propose that the boundaries of close reading relate to a reader's purpose for reading – does he or she have a compelling reason to turn a quizzical, merry, inspired, or critical eye back to a text? If the answer is yes, then close reading is possible, and can occur in a range of situations. I have, for example, read and reread L.M. Montgomery's *The Blue Castle* perhaps 25 times over the past 20 years. Each time, I choose which sections to revisit, and my purpose for reading is to immerse myself in the lush wilds of 1920s Canadian lake country or to reflect on changing views of femininity over the past century. This, I argue, is close reading, even though I'm not writing any formal essays about this book or keeping a log of quotes that reveal the protagonists' feminist stance. On the other hand, I don't consider it close reading when I watch an episode of *Veep* and giggle with my husband for half an hour – my purpose for reading in the latter case is transient enjoyment, and I have no reason to watch, re-watch, or dissect the show any further.

The students in my study implicitly understood that there was a purpose-driven threshold for close reading. When asked about close reading, Mireya said she did it sometimes, but only when she felt like she needed to closely read to understand something:

Like, from my senior thesis class, like the reading there has been like really challenging. And [close reading is] something that's been like really helpful and just something that like I've now like done in all my other classes. Like, I guess it's like all the English teachers that have been telling me to do it, but sometimes you don't do it because sometimes you don't feel like you need it at that point, it's like something I guess that like once reading gets harder and more complicated that you kind of have to do.

In this case, Mireya closely read the texts from her senior thesis class because they were difficult. She had to slow down and break apart the texts in order to understand them. Her teachers had given her tools to closely read challenging texts and she finally reached a point where she felt that she needed those tools. This brings this dissertation to a final pedagogical recommendation related to the nature of close reading: Teachers should make sure that students have a drive to closely read texts. These drives, or purposes for reading, can vary as I have argued. But I believe that students must have some sense of the underlying rationale for paying special attention to texts, whether it is to understand a complex argument, relate the text to their own identity, or to learn a new skill relevant to their career goals. Without that urge to closely read, students may be able to go through the close

reading motions – annotate, reread, locate and write text evidence – but when left to their own devices, they will revert to easier routes because, as Mireya says, they “don’t feel like [they] need it at that point.” Teachers may develop students’ metadiscursive awareness of when close reading is needed through simulations of real-life problems. I can imagine a lesson at the secondary level where teachers provide students with a task, such as figuring out how to take public transportation to a festival, and then ask them which parts of maps, posters, and other texts they would have to closely read to accomplish this task. When, why, and how to closely read texts should become an ongoing, spiraling theme in secondary curriculum, rather than a stand-alone series of lessons or worksheet-based protocol.

Perhaps, as one of my committee members suggested, the term “close reading” is too fraught with the historical baggage of the New Criticism, and efforts to reform close reading pedagogy would be better received if we used a fresh term. One candidate could be thoughtful reading, to indicate the cognitive work that happens when students carefully read texts. Or maybe even better, intentional reading, to capture the purpose-driven quality of the close readings that I have described in this dissertation. Whatever we decide to call it, my vision and hope for adolescent close reading instruction is that students enter college and career empowered to visit and revisit and wield texts as they would a well-worn tool, for a variety of purposes, to shape their futures and the future of their world.

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Chapter 4: Conclusion

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Appendix A: Phase 1 Pre-Survey

Answer these questions about yourself and your reading habits as honestly as possible. You will not be graded on your responses, and no other students will be able to see what you answer.

* Required

Demographics

1. Write your first name. *

.....

2. Write your last name. *

.....

3. What class period do you have [REDACTED]? *

Mark only one oval.

- First period
- Second period
- Third period
- Fourth period
- Fifth period
- Sixth period

4. How old are you? *

.....

5. Gender? *

Mark only one oval.

- Male
- Female
- Other

6. Is English the first language you learned? *

Mark only one oval.

- Yes
- No

7. **Are you planning to participate in the UC Berkeley study with Ms. Catterson?**

Mark only one oval.

- Yes
- I'm not sure; /my parents have questions
- No

8. **If you answered "No" to the last question, what is the first language you learned?**

If you answered "Yes" leave this blank.

9. **At what age did you learn English?**

If English is your first language, leave this blank.

10. **How comfortable do you feel reading in English? ***

Mark only one oval.

	1	2	3	4	5	
Not at all comfortable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very comfortable

11. **Do you read in a language other than English? ***

Mark only one oval.

- Yes
- No

12. **If "Yes," what language?**

If "No," leave blank.

13. **How many hours do you spend each week on each activity outside of school hours?***
If you're not sure just click your best guess.
 Mark only one oval per row.

	I don't do this outside of school hours.	0-2 hours per week	3-4 hours per week	5+ hours per week
Work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Take care of brothers and sisters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sports/fitness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Household chores	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Community or church activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After school clubs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hang out with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spend time alone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spend time with family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Reading Motivation

14. **My friends think I am _____.***
 Mark only one oval.

- a very good reader
- a good reader
- an OK reader
- a poor reader

15. **Reading a book is something I like to do _____.***
 Mark only one oval.

- never
- not very often
- sometimes
- often

16. **I read _____.***
 Mark only one oval.

- not as well as my friends
- about the same as my friends
- a little better than my friends
- a lot better than my friends

17. **My best friends think reading is _____.** *

Mark only one oval.

- really fun
- fun
- OK to do
- not fun at all

18. **When I come to a word I don't know, I can _____.** *

Mark only one oval.

- almost always figure it out
- sometimes figure it out
- almost never figure it out
- never figure it out

19. **I tell my friends about good books I read.** *

Mark only one oval.

- I never do this
- I almost never do this
- I do this some of the time
- I do this a lot

20. **When I am reading by myself, I understand _____.** *

Mark only one oval.

- almost everything I read
- some of what I read
- almost none of what I read
- none of what I read

21. **People who read a lot are _____.** *

Mark only one oval.

- very interesting
- interesting
- not very interesting
- boring

22. I am _____.*

Mark only one oval.

- a poor reader
- an OK reader
- a good reader
- a very good reader

23. I think libraries are _____.*

Mark only one oval.

- a really great place to spend time
- a great place to spend time
- a boring place to spend time
- a really boring place to spend time

24. I worry about what other kids will think of my reading _____.*

Mark only one oval.

- a lot
- sometimes
- almost never
- never

25. Knowing how to read well is _____.*

Mark only one oval.

- not very important
- sort of important
- important
- very important

26. When my teacher asks me a question about what I have read, I _____.*

Mark only one oval.

- can never think of an answer
- almost never think of an answer
- sometimes think of an answer
- always think of an answer

27. I think spending time reading is _____.*

Mark only one oval.

- really boring
- boring
- great
- really great

28. Reading is _____.*

Mark only one oval.

- very easy for me
- kind of easy for me
- kind of hard for me
- very hard for me

29. When I have free time, I spend _____.*

Mark only one oval.

- none of my time reading
- very little time reading
- some of my time reading
- a lot of my time reading

30. When I am in a group talking about what we are reading, I _____.*

Mark only one oval.

- hate to talk about my ideas
- don't like to talk about my ideas
- like to talk about my ideas
- love to talk about my ideas

31. When my teacher reads books out loud, I think it is _____.*

Mark only one oval.

- really great
- great
- boring
- really boring

32. **When I read out loud, I am a** ~~Not at all~~ ~~Not~~ ^{*} ~~comfortable~~ ~~comfortable~~ Neutral Somewhat comfortable Very comfortable
Mark only one oval.

- poor reader
- OK reader
- good reader
- very good reader

33. **When someone gives me a book for a present, _____.** ^{*}
Mark only one oval.

- I am very happy
- I am happy
- I am unhappy
- I am very unhappy

Reading Habits

34. **How comfortable do you feel reading/viewing and understanding these types of scientific texts?** ^{*}
Mark only one oval per row

	Not at all comfortable	Not comfortable	Neutral	Somewhat comfortable	Very comfortable
A chemistry textbook	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A scientific graph	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A scientific table/chart	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A scientific animation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An image explaining a scientific concept	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A magazine article about a scientific issue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A website about scientific issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A video about a scientific concept	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An article in a science journal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

35. Estimate how many hours per week you spend AT HOME reading or viewing each type of printed text listed here, NOT for school assignments. *

If you're not sure, click your best guess.

Mark only one oval per row.

	I don't ever read this type of text at home.	0-2 hours per week.	3-4 hours per week.	5+ hours per week
Novels (fiction)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informational books (nonfiction)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poetry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Magazines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religious texts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cookbooks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Newspapers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Letters, notes, or cards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How-to guides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comic books	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

36. If there are other types of printed texts (not on the phone, tv, or computer) that you read at home in your free time, list them here.

If not, leave this blank.

.....

37. Estimate how many hours per week you spend AT HOME reading or viewing each type of digital text listed here on the phone, tv, or computer, NOT for school assignments. *

If you're not sure, click your best guess.

Mark only one oval per row.

	I don't ever read this type of text at home.	0-2 hours per week.	3-4 hours per week.	5+ hours per week
Social media (like Facebook or Instagram)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Text messages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emails	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Youtube videos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
News websites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Entertainment websites (like BuzzFeed)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Blogs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Video games	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informational websites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online discussion forums	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online shopping	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

38. **If there are other types of texts you read on the phone, tv, or computer at home in your free time, list them here.**

If not, leave this blank.

39. **Of the many types of texts listed in the last four questions, what are your 3 favorites to read at home in your free time? ***

Check three boxes.

Check all that apply.

- Video games
- Online shopping
- Entertainment websites
- Informational books
- Cookbooks
- News websites
- Novels
- How-to guides
- Blogs
- Informational websites
- Social media
- Youtube videos
- Emails
- Poetry
- Text messages
- Online discussion forums
- Religious texts
- Comic books
- Magazines
- Letters, notes, or cards
- Newspapers
- Other: _____

40. Which of the types of texts in this list do you WRITE or CREATE in your free time?

Check all that apply.
Check all that apply.

- Youtube videos
- News websites
- Video games
- How-to guides
- Emails
- Online discussion forums
- Novels
- Text messages
- Magazines
- Newspapers
- Informational websites
- Poetry
- Cookbooks
- Blogs
- Social media
- Comic books
- Informational books
- Religious texts
- Letters, notes, or cards
- Entertainment websites
- Other: _____

41. What are your favorite books? *

You can list as many as you want, or say "none."

42. **Who are your favorite authors? ***

You can list as many as you want, or say "none."

43. **What are your favorite websites to visit? ***

You can list as many as you want, or say "none."

44. **What social media sites do you use?**

Check all that apply
Check all that apply.

- Facebook
- Twitter
- Instagram
- Snapchat
- Pinterest
- Tumblr
- Goodreads
- Other:

Technological Access

45. **Do you own a smart phone? ***

Mark only one oval.

- Yes
- No
- I can borrow one.
- I share one.

46. **Do you have reliable access to the internet at home? ***

Mark only one oval.

- Yes
- No
- Sometimes

47. **Does your smart phone have a data plan so you can access the internet in and out of your home? ***

Mark only one oval.

- Yes
- No
- Sometimes
- I don't have a smartphone.

48. **Can you send and receive unlimited texts with your phone plan? ***

Mark only one oval.

- Yes
- I have to pay for each text message
- I text using a free or cheap app (like WhatsApp or Facebook Messenger).
- My plan limits the number of texts I can send
- I don't have a phone or can't text.

Knowledge and Interests

49. **What are some topics that you know a lot about? ***

Examples of topics: fitness, cars, beauty, horses, robots, chemistry, knitting. Think of other topics you know a lot about and list as many as you want.

.....

.....

.....

.....

50. **If you had to make a video teaching someone how to do something, what would you teach? ***

.....

.....

.....

51. What careers or occupations have you considered doing in the future? *

52. What do you like to do for fun in your free time? *

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Appendix B: Phase 4 Post-Survey

End of Semester Reading Survey

Answer these questions about yourself and your reading habits as honestly as possible. You will not be graded on your responses, and no other students will be able to see what you answer.

Demographics

Description (optional)

Write your first name. *

Short answer text

Write your last name. *

Short answer text

What class period do you have  *

1. First
2. Third
3. Fourth
4. Sixth

Reading Motivation

Answer the following questions as honestly as possible.

My friends think I am _____.*

- a very good reader
- a good reader
- an OK reader
- a poor reader

Reading a book is something I like to do _____.*

- never
- not very often
- sometimes
- often

I read _____.*

- not as well as my friends
- about the same as my friends
- a little better than my friends
- a lot better than my friends

-
- really fun
 - fun
 - OK to do
 - not fun at all

When I come to a word I don't know, I can _____.*

- almost always figure it out
- sometimes figure it out
- almost never figure it out
- never figure it out

I tell my friends about good books I read.*

- I never do this
- I almost never do this
- I do this some of the time
- I do this a lot

When I am reading by myself, I understand _____.*

- almost everything I read
- some of what I read
- almost none of what I read
- none of what I read

-
- very interesting
 - interesting
 - not very interesting
 - boring

I am _____.*

- a poor reader
- an OK reader
- a good reader
- a very good reader

I think libraries are _____.*

- a really great place to spend time
- a great place to spend time
- a boring place to spend time
- a really boring place to spend time

I worry about what other kids will think of my reading _____.*

- a lot
- sometimes
- almost never
- never

not very important

sort of important

important

very important

When my teacher asks me a question about what I have read, I _____.*

can never think of an answer

almost never think of an answer

sometimes think of an answer

always think of an answer

I think spending time reading is _____.*

really boring

boring

great

really great

Reading is _____.*

very easy for me

kind of easy for me

kind of hard for me

very hard for me

none of my time reading

very little time reading

some of my time reading

a lot of my time reading

When I am in a group talking about what we are reading, I _____.*

hate to talk about my ideas

don't like to talk about my ideas

like to talk about my ideas

love to talk about my ideas

When my teacher reads a text out loud, I think it is _____.*

really great

great

boring

really boring

When I read out loud, I am a _____.*

poor reader

OK reader

good reader

very good reader



Section 3 of 4



Reading Scientific Texts

Description (optional)

How comfortable do you feel reading/viewing and understanding these types of scientific texts? *

Row 1. A chemistry textbook

Row 2. A scientific graph

Row 3. A scientific table/chart

Row 4. A scientific animation

Row 5. An image explaining a scientific concept

Row 6. A magazine article about a scientific issue

Row 7. A website about scientific issues

Row 8. A video about a scientific concept

Row 9. An article in a science journal

Column 1. Not at all comfortable

Column 3. Neutral

Column 4. Somewhat comfortable

Column 5. Very comfortable

After section 3 **Continue to next section** ▼

Section 4 of 4



End of Semester Reflection

Thinking about your experiences this semester, answer the following questions to the best of your ability.

Describe how you have used your chromebooks in [redacted] class this semester.

Long answer text

What types of things have you read or viewed on the chromebooks in [redacted] class?

Long answer text

Have you learned how to do things on the chromebooks that you didn't know how to do before this class?

1. Yes

2. No

If yes, what have you learned to do on the chromebooks?

What would you like to do on the chromebooks that you haven't done so far in this class?

Long answer text

Has the way you approach reading scientific texts changed this semester?

1. Yes

2. No

If yes, how has your approach to reading scientific texts changed?

Long answer text

When you annotate a scientific text, what types of things do you write?

Long answer text

Describe the strategies you use to find information on a scientific topic on the internet.

Long answer text

How do you know that an internet text on a scientific topic is reliable?

Long answer text

Appendix C: Phase 1, 2, and 3 Planning Protocol

Planning Session Guide

What do you think went well with your reading instruction this week?
What improvements to your reading instruction would you like to make?
What challenges are your students facing regarding the close reading of texts?
Which of these challenges do you feel is most pressing?
Let's brainstorm several ways to address this challenge:

Which two ways do we think hold the most promise?

- a) What principles of close reading do these two ways support?
- b) What research question do they address?

How can we incorporate these two ways into your curriculum?

- a) Which texts should you use?
- b) What technology should you use?
- c) What instructional steps should you use?
- d) How can you make sure to support all students during the lesson?
- e) How does this fit in with your long-term plans and goals?

What should be added to this planning session guide for the next meeting?

Appendix D: Phase 1 Baseline Textbook Reading Measure

Atoms by Numbers

Use the text you just read and annotated to answer the following questions.

1. Write your first name.

2. Write your last name.

3. What period are you in?

Mark only one oval.

- First period
- Third period
- Fourth period
- Sixth period

4. 1. What does it mean for an atom to be neutral?

Paraphrase the text's explanation in your own words.

5. 2. Check the boxes of the subatomic particles that make up most of an atom's mass.

Check all that apply.

- Neutrons
- Protons
- Electrons

6. 3. Which subatomic particle can best help you figure out an atom's atomic number?

Mark only one oval.

- Proton
- Neutron
- Electron

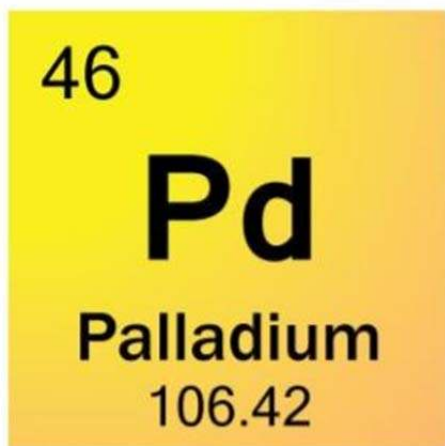
7. 4. What information could you use to figure out the number of neutrons in an atom?

Check all that apply.

Check all that apply.

- Number of protons and atomic mass.
- Number of electrons and atomic number.
- Number of protons and number of electrons.
- Atomic number and atomic mass.

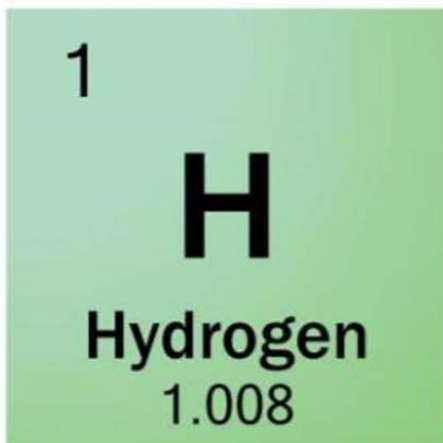
Palladium



8. 5. How many neutrons does the element Palladium have if the atom has a mass of 106 amu?

You can use the back of the text you annotated for calculations if needed.

Hydrogen



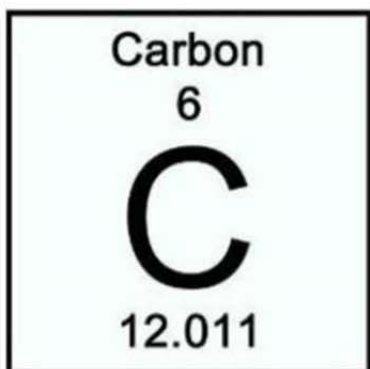
9. 6. How many neutrons does the element Hydrogen have if the atom has a mass of 1 amu?

You can use the back of the text you annotated for calculations if needed.

Atomic Models

7. Follow the steps in "The Periodic Table and Atomic Models" to draw a model of a Carbon atom if it has a mass of 12 amu. Do this on the back of the text you annotated. Be sure to label protons, electrons, and neutrons clearly.

Carbon



Appendix E: Phase 1 Rubric Grading Question 1

Rubric for Atoms by Numbers

1. What does it mean for an atom to be neutral?

4: Uses own words, effectively captures the denotation and connotation of the text, includes all key details and arguments, is clearly stated.

3: May rely on some ideas straight from text (not in own words), captures the denotation and connotation of the text, includes most key details and arguments, is mostly clearly stated.

2: Attempt made to paraphrase, may have some incorrect details, may leave out important details and arguments, may not be clearly stated.

1: Completely incorrect understanding of the text.

Appendix F: Phase 2 Instructions for Before Reading Group

Partner A

Before you read the article, answer these questions.

1. What do you already know about nuclear energy and nuclear disasters? Brainstorm as many details as you can.

2. What questions do you have about nuclear energy and nuclear disasters? Write as many questions as you can think of before you start reading.

Read the article once through to **understand** what you are reading. Annotate as you read.

Now, read the article again to **generate questions** about what you are reading. Write the questions in the margin of the text.

3. Now that you've read the article, return to your list of questions above. Are any still left unanswered by the article?

Choose at least one question that you wrote above that the article did not answer for you and write it down:

Choose three other questions that you developed while reading the article and write them here:

Once finished, complete the post-reading survey using this [link](#)

Appendix G: Phase 2 Instructions for While Reading Group

Partner B

Read the article once through to **understand** what you are reading. Annotate as you read.

Now, read the article again to **generate questions** about what you are reading.

1. After carefully reading the section of the text titled "Where is Chernobyl?," write a question that you have developed.
2. After carefully reading the section of the text titled "What happened?," write a question that you have developed.
3. After carefully reading the section of the text titled "Radioactive fallout," write a question that you have developed.
4. After carefully reading the section of the text titled "Health effects," write a question that you have developed.
5. After carefully reading the section of the text titled "Environmental impact," write a question that you have developed.
6. After carefully reading the section of the text titled "Chernobyl today," write a question that you have developed.

Once finished, complete the post-reading survey using this [link](#)

Appendix H: Phase 3 Instructions for Teacher Choice Group

Yellow/Blue Pair:

1. Before you read, complete the chart below on your own ()

What do you already know about the sun?	What do you want to know about the sun?

2. Share something from each side of the chart with your partner. Write down one thing your partner knows and wants to know into your chart. (2 min)

3. Take 2 minutes to skim the article that [redacted] handed out, looking only at the title, diagrams, images, subheadings, and other organizing features. (2 min)

4. With your partner, choose a short section (two-three paragraphs) to read more closely. (4 min)

Which section did you choose and why?

5. Read your section once, quickly and independently, just to get the "gist" of the text's meaning. (4 min)

6. Read your section again. This time, read more closely. Annotate the text while you read. (10 min)

7. Talk to your partner about what you read. Write down your answers below (5 min)

What questions do you both still have?

What interesting facts about the sun did you learn?

8. Complete the post reading survey using this [link](#) (2 min)

Appendix I: Phase 3 Instructions for Student Choice Group

Pink/Purple Pair:

1. Before you read, complete the chart below on your own. (5 min)

What do you already know about the sun?	What do you want to know about the sun?

2. Share something from each side of the chart with your partner. Write down one thing your partner knows and wants to know into your chart. (2 min)

3. Think about what you want to know about the sun. With your partner, find a webpage that might help you answer this question. (6 min)

Which webpage did you choose and why? Copy/paste the URL below.

4. Take 2 minutes to skim the webpage, looking only at the title, diagrams, images, subheadings, and other organizing features. (2 min)

5. With your partner, choose a short section (two-three paragraphs) to read more closely. (2 min)

Which section did you choose and why?

6. Read your section once, quickly and independently, just to get the “gist” of the text’s meaning. (4 min)

7. Read your section again. This time, read more closely. As you read, see if the text answers your question from earlier. (10 min)

8. Talk to your partner about what you read. Write down your answers below (5 min)

Did you answer your original question? If yes, what is the answer? If no, why not?

What other questions do you have about the webpage?

What other interesting facts about the sun did you learn?

9. Complete the post reading survey using this [link](#) (2 min)

Appendix J: Observation Protocol

Observation Protocol

Teacher:

Date:

Period:

Time:

Researcher:

Lesson key words:

Field notes (typed-up running record of observations)

Reflection/Memo

Research Questions:

- 1) What psychological and material tools (content knowledge, cultural funds of knowledge, linguistic practices, and literacy practices) relevant to close reading in the 21st century are available to teachers, students, and researchers before curriculum design takes place?
- 2) During the close reading curriculum design and testing process, what major contradictions, tensions, or conflicts emerge between interacting activity systems (school, district, teachers, students, families, and researcher)? How do these contradictions, tensions, or conflicts affect close reading curriculum design, instruction, or student practice?
- 3) How does digital computing technology mediate students' close reading practices over the course of the design and testing process?
- 4) How do students' close reading practices change over the course of the design and testing process? How do these practices relate to adolescent reading and writing outcomes agreed upon by the teachers and researcher (e.g. standardized reading/writing measures, motivation to read and write, critical literacy acumen, metadiscursive knowledge, compositional skill, etc.)?

Five principles of close reading instruction:

- 1) Background knowledge
- 2) Authentic reading/writing
- 3) Metadiscursivity
- 4) Critical literacy
- 5) Dialogically organized discussion

Next steps:

Appendix K: Teacher Interview Protocol

Teacher Interview Protocol

Part I: General information about the class

1. Tell me about your class.
2. Tell me your overall goals for the class this semester.
3. In the past, what types of final assessments have you used? Interim? Diagnostic?
4. How are standards used in your class? Do you have other frameworks that shape your instruction? What are they?
5. Tell me about a typical group of students. What are they like?
6. How have students progressed toward your goals in the past? What challenges have you encountered? What are your strategies to support students through these challenges?

Part II: Questions about close reading

1. What does close reading mean to you?
2. What have you done in the past (if anything) to support close reading in your class?
3. (For science teacher) – What does science literacy mean to you?
4. What have you done in the past to support science literacy in your class?
5. What types of texts do you typically read in your class?
6. What types of texts do students typically read at home?

Part III: Questions about technology

1. How is technology being used in your course?
 - a. What technology is available to your school?
2. What does “online reading” mean to you?
3. Do your students read online in class? If yes, how so? If not, why not?
4. Do your students write online in class? If yes, how so? If not, why not?
5. Do your students read online at home? If yes, how so? If not, what is your understanding of why not?
6. Do your students write online at home? If yes, how so? If not, what is your understanding of why not?

Learning about Students' Digital Reading Practices

Answer these questions about yourself and your reading habits as honestly as possible. You will not be graded on your responses, and no other students will be able to see what you answer.

* Required

Demographics

1. Write your first name. *

2. Write your last name. *

3. How old are you? *

4. Gender? *

Mark only one oval.

- Male
 Female
 Other

5. Is English the first language you learned? *

Mark only one oval.

- Yes
 No

6. If you answered "No" to the last question, what is the first language you learned?

If you answered "Yes" leave this blank.

7. At what age did you learn English?

If English is your first language, leave this blank.

8. How comfortable do you feel reading in English? *

Mark only one oval.

	1	2	3	4	5	
Not at all comfortable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very comfortable

9. Do you read in a language other than English? *

Mark only one oval.

Yes

No

10. If "Yes," what language?

If "No," leave blank.

11. How many hours do you spend each week on each activity outside of school hours? *

If you're not sure just click your best guess.

Mark only one oval per row.

	I don't do this outside of school hours.	0-2 hours per week	3-4 hours per week	5+ hours per week
Work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Take care of brothers and sisters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sports/fitness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Household chores	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Community or church activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After school clubs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hang out with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spend time alone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spend time with family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. **Estimate how many hours per week you spend AT HOME reading or viewing each type of printed text listed here, NOT for school assignments. ***

If you're not sure, click your best guess.
 Mark only one oval per row.

	I don't ever read this type of text at home.	0-2 hours per week.	3-4 hours per week.	5+ hours per week
Novels (fiction)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informational books (nonfiction)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poetry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Magazines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religious texts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cookbooks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Newspapers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Letters, notes, or cards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How-to guides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comic books	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. **If there are other types of printed texts (not on the phone, tv, or computer) that you read at home in your free time, list them here.**

If not, leave this blank.

14. **Estimate how many hours per week you spend AT HOME reading or viewing each type of digital text listed here on the phone, tv, or computer, NOT for school assignments. ***

If you're not sure, click your best guess.
 Mark only one oval per row.

	I don't ever read this type of text at home.	0-2 hours per week.	3-4 hours per week.	5+ hours per week
Social media (like Facebook or Instagram)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Text messages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emails	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Youtube videos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
News websites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Entertainment websites (like BuzzFeed)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Blogs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Video games	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informational websites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online discussion forums	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online shopping	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. **If there are other types of texts you read on the phone, tv, or computer at home in your free time, list them here.**

If not, leave this blank.

16. **Of the many types of texts listed in the last four questions, what are your 3 favorites to read at home in your free time? ***

Check three boxes.

Check all that apply.

- Video games
- Online shopping
- Entertainment websites
- Informational books
- Cookbooks
- News websites
- Novels
- How-to guides
- Blogs
- Informational websites
- Social media
- Youtube videos
- Emails
- Poetry
- Text messages
- Online discussion forums
- Religious texts
- Comic books
- Magazines
- Letters, notes, or cards
- Newspapers
- Other: _____

17. Which of the types of texts in this list do you WRITE or CREATE in your free time?

Check all that apply.

Check all that apply.

- Youtube videos
- News websites
- Video games
- How-to guides
- Emails
- Online discussion forums
- Novels
- Text messages
- Magazines
- Newspapers
- Informational websites
- Poetry
- Cookbooks
- Blogs
- Social media
- Comic books
- Informational books
- Religious texts
- Letters, notes, or cards
- Entertainment websites
- Other: _____

18. What are your favorite books? *

You can list as many as you want, or say "none."

19. **Who are your favorite authors? ***

You can list as many as you want, or say "none."

20. **What are your favorite websites to visit? ***

You can list as many as you want, or say "none."

21. **What social media sites do you use?**

Check all that apply

Check all that apply.

- Facebook
- Twitter
- Instagram
- Snapchat
- Pinterest
- Tumblr
- Goodreads
- Other: _____

Technological Access

22. **Do you own a smart phone? ***

Mark only one oval.

- Yes
- No
- I can borrow one.
- I share one.

23. **Do you have reliable access to the internet at home? ***

Mark only one oval.

- Yes
- No
- Sometimes

24. **Does your smart phone have a data plan so you can access the internet in and out of your home? ***

Mark only one oval.

- Yes
- No
- Sometimes
- I don't have a smartphone.

25. **Can you send and receive unlimited texts with your phone plan? ***

Mark only one oval.

- Yes
- I have to pay for each text message
- I text using a free or cheap app (like WhatsApp or Facebook Messenger).
- My plan limits the number of texts I can send
- I don't have a phone or can't text.

Knowledge and Interests

26. **What are some topics that you know a lot about? ***

Examples of topics: fitness, cars, beauty, horses, robots, chemistry, knitting. Think of other topics you know a lot about and list as many as you want.

27. **If you had to make a video teaching someone how to do something, what would you teach? ***

28. **What careers or occupations have you considered doing in the future? ***

29. **What do you like to do for fun in your free time? ***

Appendix M: Student Interview Protocol

Focal Student Interview Protocol

Part I: Questions about reading, writing, and communicating with others

1. Tell me about the things you read when you're at home.
 - a. If student mentions the internet:
 - i. What do you read on the computer?
 - ii. Do you ever write anything on the internet?
 - iii. Do you ever communicate with others on the internet?
2. Tell me about the things you read when you're at school.
3. What do you like to do in your free time?
4. What does "close reading" mean to you?
 - a. Do you ever reread things on the internet? Why?
5. On a scale of 1-10, 10 being the best you ever feel, 1 being the worst you ever feel, how do you usually feel when reading/writing/communicating in this class? Can you tell me a little bit more about that?

Part II: Reflection about the lesson

1. Could you describe for me the class you participated in [say when] from your perspective? What happened?
2. What were the teacher's goals during this lesson today? [or reiterate previously stated goals] Do you think that you met those goals? Why or why not?
3. What were your goals during this lesson today? [or reiterate previously stated goals] Do you think that you met those goals? Why or why not?
4. What did you like about the lesson? What did you dislike?
5. What was challenging about the lesson? What was easy?
6. In what ways (if any) did you use technology today during class? In what ways (if any) did you use technology today outside of class?

Appendix N: Blank Digital Close Reading Instruction Planning Guide

Digital Close Reading Instructional Planning Guide for Teachers

Essential question:		
Purpose(s) for reading:		
How will you make the purpose for reading relevant and clear for students?		
	Digital	Print
What texts will you use in this unit?		
Who will select these texts?	<input type="checkbox"/> Teacher	<input type="checkbox"/> Student
If students are selecting these texts, what guidance might they need?	Digital media used:	
	<input type="checkbox"/> Search tools <input type="checkbox"/> Collaborative reading and writing tools <input type="checkbox"/> Video games	<input type="checkbox"/> On-demand media <input type="checkbox"/> Social platforms <input type="checkbox"/> Communications technologies
How will you guide students to repeatedly read these texts?	Digital media used:	
	<input type="checkbox"/> Search tools <input type="checkbox"/> Collaborative reading and writing tools <input type="checkbox"/> Video games	<input type="checkbox"/> On-demand media <input type="checkbox"/> Social platforms <input type="checkbox"/> Communications technologies
How will you guide students to annotate, ask, and/or answer questions about these texts?	Digital media used:	
	<input type="checkbox"/> Search tools <input type="checkbox"/> Collaborative reading and writing tools <input type="checkbox"/> Video games	<input type="checkbox"/> On-demand media <input type="checkbox"/> Social platforms <input type="checkbox"/> Communications technologies
How will you guide students to discuss texts with others?	Digital media used:	
	<input type="checkbox"/> Search tools <input type="checkbox"/> Collaborative reading and writing tools <input type="checkbox"/> Video games	<input type="checkbox"/> On-demand media <input type="checkbox"/> Social platforms <input type="checkbox"/> Communications technologies
How will you guide students to write or compose new projects in response to these texts?	Digital media used:	
	<input type="checkbox"/> Search tools <input type="checkbox"/> Collaborative reading and writing tools <input type="checkbox"/> Video games	<input type="checkbox"/> On-demand media <input type="checkbox"/> Social platforms <input type="checkbox"/> Communications technologies