Article

SAGE Open
April-June 2016: 1–15

DOI: 10.1177/2158244016647994
sgo.sagepub.com
SAGE

Pre- and in-Service Teachers Reading and Discussing Informational Texts: Implications for Preparing Teachers to Meet the Common Core

Theresa A. Deeney[1]

Abstract

This study investigates U.S. elementary (kindergarten-Grade 6, ages 5-12) pre- and in-service teachers' discussions of informational texts to understand current practices and identify needs with respect to how teachers support students in building knowledge from complex informational text as specified in the grade-level expectations of the Common Core State Standards adopted in many U.S. states. Transcripts and reflections from 17 in-service and 31 pre-service teachers' informational text discussions were analyzed for teachers' focus on the text, background knowledge, and text/background knowledge. In addition, transcripts were analyzed for the types of text ideas teachers targeted (details/main ideas), the comprehension demands placed on students, how teachers used follow-up moves to encourage higher level thinking, and how teachers use transcripts of their discussions to analyze and critique their own practice. Findings suggest that both pre- and in-service teachers draw heavily on students' background knowledge and text details in their questioning; but differences exist in how pre- and in-service teachers use follow-up responses to promote knowledge building. Findings also suggest that both pre- and in-service teachers can use their transcripts to recognize areas of need, and offer themselves suggestions to better support students' understanding. Implications are offered for teacher education and professional development.

Keywords

teacher education, education, social sciences, literacy, curriculum, education theory and practice, informational text, reading comprehension, Common Core State Standards

For years in the United States, elementary classrooms (serving students age 6-12) have privileged narrative text (Duke, 2000). Now the Common Core State Standards (CCSS; National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010), setting forth what students should know and be able to do at the end of each grade in school, call for a balance of literary and informational text (non-fiction) in elementary classrooms. Although incorporating informational texts directly into content area instruction is recommended (Palincsar & Magnusson, 2000), instructional time in science and social studies have been negatively affected by demands of high-stakes testing (Fitchett & Heafner, 2010; Judson, 2013). Because of this, CCSS requirements of informational text reading may fall to selections in basal reading series or the addition of children's informational books into reading instruction. Given the traditional lack of informational texts in elementary classrooms (Duke, 2000; Jeong, Gaffney, & Choi, 2010), in-service teachers may not have extensive experience in using informational text, or in helping students understand informational texts. By extension, undergraduate pre-service teachers working in elementary classrooms may not gain exposure to informational text-based practices. Although there is some research investigating elementary teachers' use of informational texts (Heisey & Kucan, 2010; Varelas & Pappas, 2006), these are in classrooms where curriculum was designed deliberately to build students' conceptual knowledge through reading and discussion of multiple informational texts with or without combined hands-on experimentation, which may not reflect practices in many elementary classrooms. Therefore, to determine needs of pre- and in-service teachers with respect to informational text, it is important to understand how pre- and in-service teachers help students understand informational texts, and how discussions of informational text relate to the requirements of CCSS.

[1]University of Rhode Island, Kingston, USA

Corresponding Author:
Theresa A. Deeney, Associate Professor, School of Education, University of Rhode Island, 605 Chafee Hall, Kingston, RI 02881, USA.
Email: tdeeney@uri.edu

Informational Text

Use of the term *informational text* varies in research and practice. The Common Core Standards seem to use *informational text* to describe *non-fiction*, regardless of text form or structure. Within the Standards document, references are made to "texts in history/social studies, science, and technical subjects" and "literary non-fiction" (p. 5), and the accompanying text exemplars (CCSS, Appendix B) include titles from sciences and social studies, and structures from poetry to exposition.

The research literature does not portray a single definition of *informational text*. Some researchers described synonymy with non-fiction, but differentiated structures within informational text (Kletzien & Dreher, 2004; Kristo & Bamford, 2004). Duke (2000) defined informational text by function—texts that communicate "information about the natural or social world" (p. 205). Adding complexity, Pappas (2006) discussed that some texts exhibit "intertextuality"—that is, contain elements of fiction and non-fiction, narrative and non-narrative writing. Pappas (2006) termed these *hybrid* texts, whereas others referred to them as *narrative-informational* (Duke, 2000), *mixed* (Kletzien & Dreher, 2004), and *dual purpose* (Donovan & Smolkin, 2001) texts. A clear definition of informational text is important in interpreting findings of research (Maloch & Bomer, 2013) and understanding what is being asked for in the CCSS. In this study, as in the CCSS, I use *informational texts* to refer generally to *non-fiction*.

The focus of CCSS on informational text in elementary classrooms is supported by research. Studies have shown that through exposure to informational texts, students gained background knowledge on a variety of topics (Maloch, 2008; Wollman-Bonilla, 2000), knowledge of various structures, features, and language styles found in informational text (Duke & Kays, 1998; Pappas, 1991), scientific language (Varelas & Pappas, 2006), and improved reading and writing of informational texts (Purcell-Gates, McIntyre, & Freppon, 1995). Increased knowledge of content and structure was associated with increased reading achievement (Chall, Jacobs, & Baldwin, 1990; Guthrie, Van Meter, McCann, Anderson, & Alao, 1996) and achievement in content areas (Bernhardt, Destino, Kamil, & Rodriguez-Munoz, 1995). In addition, students' reading interest was piqued through interesting content topics (Wigfield, Guthrie, Tonks, & Perencevich, 2004).

Conceptual Framework

In this study, I draw on a cognitive perspective of comprehension, which describes comprehension as an active process where readers, with their knowledge and skills, attend to text information, consider what is important, and connect information with the goal of constructing a coherent mental representation of text ideas (Sweet & Snow, 2003; van den Broek & Kremer, 2000). I also draw on knowledge construction through Kintsch's (1988) construction–integration model, which posited that readers assemble phrase and sentence-level text propositions and integrate information within and across paragraphs to construct a textbase representation. Readers also integrate the textbase with prior knowledge to gain a coherent situation model—new knowledge upon which new learning can be built.

Within a construction–integration model, readers do not simply retrieve a text's key ideas and details; they integrate information across a text and fill in gaps in information. Although the reader actively constructs representations, the text plays a significant role. The number of propositions (ideas) within a text can affect comprehension (Kintsch, 1988). Informational texts are dense, containing more propositions, and requiring more work on the part of readers. Difficulty is also affected by the relationship of propositions to one another, and the cohesiveness of propositions—how clearly meaning relationships are specified (Graesser, McNamara, & Louwerse, 2003; Halliday & Hasan, 1976). A considerate text (Armbruster, 1984) signals relationships between propositions, assisting readers in constructing a coherent representation. However, typical texts are not completely coherent—that is, semantic relationships between propositions are not clearly dictated, placing burden on readers to draw inferences that bridge gaps. These inferences may be easier or more difficult to make, depending on a reader's prior knowledge (McNamara, 2001) and experience with texts types and structures. Informational texts often assume background knowledge, which can leave readers without necessary information to construct representations (O'Reilly & McNamara, 2007).

Although comprehension is a cognitive process where readers construct and integrate text information, learning also takes place in a social context through novices' scaffolded participation in socially constructed activities (Vygotsky, 1978; Wertsch, 1991). Therefore, I embed a cognitive perspective within a social learning perspective (Mercer & Howe, 2012; Purcell-Gates, 2012) to emphasize the interactions of text, reader, task, teacher, and context in comprehension (Snow, 2000). The cognitive challenges of informational text reading may be supported through teachers and students working collaboratively to assemble and integrate text propositions, fill in gaps in text information, and relate text to other knowledge and information (Chinn & Anderson, 1998). In a social learning view, teacher/student interactions can serve as a form of language scaffolding (Bruner, 1990), and in a cognitive view, they can support students in assembling and integrating text ideas (Applebee, Langer, Nystrand, & Gamoran, 2003; Heisey & Kucan, 2010).

Teacher-led text-based discussion has been shown to help students build knowledge from challenging texts (Beck & McKeown, 2006; Bransford, Brown, & Cocking, 2000; Murphy, Wilkinson, Soter, & Hennessey, 2009). In productive

discussions—discussions that related positively to comprehension—teachers asked authentic questions, questions that generated affective, inter-textual, and shared knowledge responses, and those that called for higher level thinking (analysis, generalization, hypothesizing; Soter et al., 2008; Varelas & Pappas, 2006; Wilkinson, Soter, & Murphy, 2010). Higher-order and open questions tended to generate more student talk (Beck, McKeown, Hamilton, & Kucan, 1997; Nystrand & Gamoran, 1991), which related to higher levels of comprehension (Taylor, Pearson, Peterson, & Rodriguez, 2003) than merely yes/no or fill-in-the-blank types of questions (Wolf, Crosson, & Resnick, 2005). The productiveness of discussion as a vehicle for knowledge building and comprehension instruction rested not only in the kinds of questions teachers asked initially but also on how teachers responded to students. In productive discussions, teachers followed up student responses to encourage elaboration, clarification, linking, and analysis (Soter et al., 2008), which were shown related to higher comprehension (Wolf et al., 2005).

Although the CCSS do not prescribe how teachers should engage students in discussion, they do delineate student expectations for thinking about text. The CCSS call for students to demonstrate "wide, deep, and thoughtful engagement" with text (p. 3), and "cogent reasoning and use of evidence" from text (p. 3). The Standards then do signal to teachers the kinds of questions and discussion needed to support student thinking. For example, the anchor standards for *key ideas and details* (CCRA.R.1-R.3) require that students identify main ideas, details, and connections between the two, draw inferences, cite textual evidence, and so on. To assure that students have met these, teachers need to ask students to provide main ideas, connect ideas, draw inferences, and the like. Similarly, supporting students' understanding of *craft and structure* (CCRA.R.4-R.6) suggests that teachers ask students to determine meaning of unfamiliar vocabulary, interpret text language, discuss text features, and contemplate point of view, while supporting students' *integration of knowledge and ideas* (CCRA.R.7-R.8) suggests teachers ask students to use graphic information from text to describe text ideas, analyze and critique authors' claims and supporting evidence, and discuss connections between sentences and paragraphs. Although the CCSS also do not dictate that teachers follow up on students' responses, supporting students in meeting the Standards and constructing knowledge necessitates probing students responses to understand their thinking, and prompting students to clarify thinking, explain, provide evidence of an assertion, and so on. In essence, the CCSS signal cognitive thought throughout the levels of Bloom's (1984) question taxonomy, from recognition and recall, to application and analysis, to synthesis and evaluation. However, expectations of thinking grow across grades. Whereas kindergartners (age 5) are expected to demonstrate lower level retrieval, fifth graders (age 10) are expected to analyze, synthesize, and evaluate.

Understanding the ways in which pre- and in-service teachers currently engage students in discussing informational text, and gaining teachers' analysis of their own discussion practices, may provide insight into their professional development needs with respect to helping students meet the CCSS for informational text. Thus, I undertook this study of discussions of informational text to ascertain the following:

1. What are elementary pre- and in-service teachers' initial foci when discussing informational text, and how do those foci correspond to the CCSS?
2. How do pre- and in-service teachers follow up on student responses to encourage explanation, textual evidence, and integration of ideas, as required in the CCSS?
3. Do pre- and in-service teachers demonstrate recurring patterns of talk in their discussions?
4. What do pre- and in-service teaches note as areas for improvement in their own questioning and responses during informational text discussions?

Method

Participants

Pre- and in-service elementary teachers enrolled in reading courses in a U.S. university participated in this study. Pre-service teachers (n = 40) were third-year undergraduate students enrolled in a reading comprehension course and weekly elementary-grade practicum during the first semester of their elementary teacher preparation program. In-service elementary teachers (n = 23), having 1 to 20 years of experience, were enrolled in a reading intervention course as the beginning of a master's program in reading. With Institutional Review Board approval, pre-service teachers in two classes and in-service teachers in three classes were invited and agreed to participate.

Data Collection

As part of their respective courses, I asked pre- and in-service teachers to audio record and transcribe their reading and discussion of a non-fiction/informational text with students in their classrooms. Because my intent was to understand current practices, I provided little instruction other than to discuss the text during reading, and to prepare discussion questions/ideas in advance. Teachers could have students read portions of the text silently or aloud to the group, or could read the text to students. Pre-service teachers participated in 6 weeks of the comprehension course (topics included theories of comprehension, factors that affect comprehension, the teaching cycle, and comprehension strategies) prior to conducting their discussion. In-service teachers conducted the discussion and submitted their materials prior to any course instruction in comprehension. Teachers' audio

recorded their entire discussion and transcribed a 15- to 20-min segment following a basic transcription protocol (text read, followed by script of teacher/student comments). They completed a reflection identifying questions and responses they felt supported students' understanding of text ideas, those they would revise, why and how they would revise, and their overall assessment of their own learning through the assignment. Teachers submitted the transcript, text, recording, and reflection.

Data Preparation

A graduate research assistant read all submitted texts to verify that they were non-fiction. Two pre-service (5%) and six in-service (25%) teachers submitted readings/discussions of fiction. These were dropped from further analysis. The graduate assistant listened to the remaining audios for quality. Seven pre-service audio recordings were not completely intelligible; therefore, they were also dropped, leaving 48 text discussions for analysis, 31 pre-service (Grades 1-6, approximately ages 6-12) and 17 in-service (kindergarten-Grade 6, ages 5-12). To understand these 48 texts, I outlined each text with respect to its details or micro level ideas, and how these build to larger main- or macro-level ideas.

The graduate research assistant reviewed all audio recordings with corresponding texts and transcripts, revising transcripts as necessary to ensure completeness and accuracy, and transcribing the remaining discussion. I then divided transcripts into discussion segments representing each instance in which teachers or students interrupted text reading to interject comments or questions and all talk up to the continuance of reading. I further divided discussion segments into topical units, including the initiating utterance and all talk related to the topic of that initial utterance. I coded teacher talk using the constant comparative method (Glaser & Strauss, 1967; Strauss & Corbin, 1990). To ensure reliability, at each coding level, a trained graduate research assistant and I worked together with three transcripts, creating, discussing, and defining codes. We then independently coded two transcripts, comparing and revising codes and definitions as necessary, and independently coded 20% of remaining data, reaching 87% agreement. After we worked to resolve any differences, I coded the remaining transcripts.

Data Analysis

To address Research Question 1 concerning the focus of teachers' initial talk, I coded teacher's initial questions and statements within each topical unit. I coded initial questions for (a) their *relationship to the text* (whether the questions addressed information from the text, text and background knowledge, or background knowledge), (b) the types of *text ideas* targeted by the question (macro ideas, micro ideas, graphics), and (c) the *comprehension demands* the question placed on the readers (Table 1). I coded teachers' initial statements or comments for (a) *text ideas* (macro ideas, micro ideas, graphics) and (b) purpose (Table 2). To address Research Question 2 concerning how teachers further scaffold students' understanding, I coded teachers' follow-ups to student responses (Table 3). Because it was important to understand whether teachers demonstrated recurring patterns, or stances, of interactions during discussions (Research Question 3), I created a matrix (Miles & Huberman, 1994) from the analysis of questions and follow-up responses (questions' relationships to text, ideas targeted, comprehension demands, and follow-up type), to compare patterns throughout each transcript, and to then compare patterns across transcripts. I considered teachers to have adopted a recurrent pattern or stance when more than half of the transcript's segments fit a particular pattern (Table 4).

Although I provided teachers guiding questions to reflect on their discussions (Research Question 4), teachers' submitted reflections did not contain all requested information, or were very general, making them difficult to interpret. Therefore, I restricted coding to those who provided a rationale for revising questions (25 pre-service, 10 in-service) and responses (26 pre-service, 9 in-service).

Results

Research Question 1: Relationship of teacher talk to text and student comprehension.

Teachers' Initial Moves

The majority of pre-service teachers' initial questions related to students' *background knowledge* (46%), while others related to the *text* (35%), and *text and background knowledge* (18%). Within background-only questions, pre-service teachers asked students to retrieve information related to text details or micro-level ideas (23%), including vocabulary definitions, or to relate to (11%) or evaluate text details (8%). Some background knowledge questions (4%) focused on retrieving information about the text's main, or macro-level, ideas. Within *text-based* questions, pre-service teachers focused on micro-level text ideas, and engaged students in retrieving text details (23%) and labeling or retrieving graphic information (5%). A smaller percentage of pre-service teacher's initial text-based questions called for students to summarize or interpret macro-level ideas (7%). The majority of *text/background knowledge* questions (8%) targeted text details, where teachers asked students to predict, infer, or interpret information. Approximately 10% of text/background knowledge questions focused on the text's macro-level ideas, where teachers asked students to infer, predict or apply information, including from graphics.

The majority of pre-service teachers' initial statements (89%) related to the text. Within these, pre-service teachers called students' attention to graphic information or used

Table 1. Pre- and In-Service Teachers' Initial Questions.

Question's relationship to text	Ideas targeted	Comprehension demands placed on reader	Example	Percent	
				Pre-service	In-service
Text-based				35	28
	Micro/text detail			29	18
		Retrieve text detail	*Mt Everest . . . is the highest peak on Earth . . .* Which mountain has highest peak in the world?	23	12
		Connect details w/ in text	So how is this similar to what the ancient Egyptians built?	0	3
	Micro-graphic	Label or describe picture or caption	What types of rocks do we see in this picture? (Rocks clearly labeled)	5	3
		Apply text to graphic	Which picture shows a composite flower? (text discussed, pictures unlabeled)		
	Macro/main	Summarize text	Can someone put this all together so far?	7	10
Text and background knowledge				18	24
	Micro idea			8	6
		Predict information	What kind of treasure do you think he buried?	4	4
		Infer information	Why do you think seeds were chosen from the healthiest plants to produce crops?	3	1
		Interpret, explain text meaning	So if they have "no visible ears," what does that mean?	1	1
	Macro idea			10	15
		Infer/predict	What do you think is going to happen? Any predictions?	3	13
		Interpret, explain text meaning	*Swollen by rainwater, the Amazon River and its many branches . . . overflow their dry-season banks.* What does that mean?	<1	<1
		Apply/extend text	[after reading text on recycling] How can you help recycle?	2	1
		Predict based on Graphic	What do you think this book is going to be about by looking at the picture on the front page?	4	<1
	Text structure	Retrieve feature	Why do you think the word *rangers* is bold and dark?	0	4
Background knowledge				46	49
	Micro			42	28
		Retrieve	What other animals hibernate? Does anyone know what *predatory* means?	23	22
		Relate personally	Has anyone ever been to the Museum of History?	11	5
		Evaluate/opinion	Would you want to go to a place called Death Valley?	8	<1
	Macro				
		Retrieve	We're going to read about global warming. What is global warming?	4	21

Note. Total percentages may not equal 100 due to rounding.

graphic information to explain a concept (42%). Secondarily, pre-service teachers' comments focused on micro-level text ideas, with teachers recapping text information for students (17%), or providing an opinion about the information (9%). Pre-service teachers' comments focused on macro-level ideas (16%) were used to recap information for students.

As with pre-service teachers, the majority of in-service teachers' initial questions related to *background knowledge* (49%), the *text* (28%), and *text and background knowledge* (25%). With *background knowledge* questions, in-service teachers focused on micro-level (28%) and macro-level (21%) ideas, the majority of both being retrieval of

Table 2. Pre- and In-Service Teachers' Initial Statements/Comments.

Ideas targeted	Purpose	Example	Percent	
			Pre-service	In-service
Micro-level			26	44
	Recap/annotate	So, this tree, the dragon's blood, has a lot of rainwater stored because it doesn't evaporate.	17	24
	Provide opinion	*People believed that fog was caused by a white bear that drank too much water and burst.* That's silly, huh?	9	20
Macro-Level			16	37
	Recap/annotate	*Renewable resources are ones that can be replaced. When we cut down trees, we can plant new ones.* Okay, so we have some natural resources that are nonrenewable and some that are renewable. Renewable ones are ones we can use again. Like the book says, when you cut down a tree, you can plant a new one, so that is a renewable resource.	16	32
	Provide opinion	Spiders seem sneaky to me, hiding and waiting for their prey.	0	5
Graphic			47	17
	Notice	Look at this picture. Do you see this girl? She's on the edge of a cliff.	42	10
	Annotate graphic	Okay, so see here. This turtle lays a bunch of eggs. These are the different sizes. It could be as big as this one or as little as this one.	5	7

knowledge related to text ideas, including vocabulary. With *text-based* questions, in-service teachers focused on the text's micro-level ideas (18%), asking students to retrieve details (12%), connect details (3%), or label/describe graphics (3%). They also focused on summarizing macro-level ideas (10%). *Text and background knowledge* questions were directed toward macro-level ideas (inference, prediction; 19%), micro-level ideas (6%), and text structure (4%).

In-service teachers' initial statements/comments focused on the text (98%), including micro ideas (44%), macro ideas (37%), and graphics (17%). Most in-service teacher initial comments recapped information (56%). In-service teachers also provided opinions about macro-level ideas (20%) and called attention to (10%) or annotated (5%) graphics.

In sum, pre- and in-service teachers showed similar foci with respect to the relationship of the questions to the text versus background knowledge. Their initial questions related mainly to students' background knowledge (46 and 49%, respectively), secondarily to the text (29 and 28%), and finally to text and background knowledge (18 and 24%). However, pre-service teachers focused largely on micro-level text ideas (79%), whereas in-service teachers focused equally on micro- (54%) and macro- (46%) ideas. With respect to comprehension demands, both pre- and in-service teachers' initial questions called for lower level comprehension (66 and 67%, respectively).

Follow-Ups to Student Responses

The majority (64%) of pre-service teachers' follow-ups to student responses (Table 3) followed a *question-answer-response* (Initiate-Respond-Evaluate [IRE]) pattern (Cazden, 1988). They evaluated student responses, collected additional responses, echoed (repeated) student responses, or asked questions to confirm the teacher understood the response. Pre-service teachers also followed up through instructive comments (20%), where they summarized or annotated the text read. Pre-service teachers did use some scaffolding moves (5%), where they asked students to retrieve the main idea or prior knowledge of vocabulary.

As with pre-service teachers, the majority (48%) of in-service teachers' follow-ups to student responses (Table 3) followed the *question-answer-response* (IRE) pattern. In-service teachers also followed up through instructive comments (25%), where they summarized or annotated the text read. They used scaffolding responses (23%) by asking students to expand (explain, justify, infer), build knowledge through subsequent questions, set a purpose for future reading, retrieve the main idea, define vocabulary, or turn to text. When in-service teachers' initial questions focused on the text at the macro-level, or main ideas, they typically followed up on student responses to help students build information. Some in-service teachers used scaffolding moves following text questions directed at the micro level. At these times, teachers used the detail as a starting point to build upward to the main idea.

In sum, although both pre- and in-service teachers engaged in question–answer (IRE) responses (64 and 48%, respectively), pre-service teachers used few scaffolding moves (5%), indicating less student engagement in the discussion. In-service teachers engaged in more scaffolding moves (23%), extending students' thinking about text.

Discussion Stances

Both pre-service (27 transcripts, 94%) and in-service (15 transcripts, 88%) teachers' discussions showed recurrent patterns of interactions, suggesting these teachers enacted specific text

Table 3. Pre- and In-Service Teachers' Follow-Ups to Student Responses.

Response type	Response label	Definition	Percent	
			Pre-service	In-service
Question–Answer		Teacher question, student response, teacher evaluation/follow-up (IRE/IRF)	64	48
	Evaluate	Accepts, rejects, corrects	42	16
	Confirm	Repeats student response with question intonation to confirm understanding	3	3
	Collect	Asks other to answer same question	9	13
	Echo	Repeats student response	11	16
Instruct		Teacher provides students information	20	25
	Revoice/recap	Repeats/revoices comment, recaps text	0	12
	Connect/add	Connect student comments or elaborate on student response	2	2
	Summarize	Summarize or annotate text	18	10
Scaffold		Queries to support knowledge building	5	23
	Expand	Probe, infer, explain	0	7
	Build	Additional retrieval questions to help summarize or clarify text segment	0	6
	Purpose	Set purpose for future reading	<1	2
	Main idea	Retrieve main idea or background	4	2
	Vocabulary	Question vocab in text segment	0	2
	Turn to text	Redirect to text, ask compare/contrast parts of text, cite evidence from text	0	2
	Graphic	Notice/label graphic to support idea	0	1
	Hint	Prompts to encourage different answer	0	<1
Tangent		Off topic of text	11	4
	Encourage background knowledge	Follows up on background knowledge	7	4
	Opinion	Ask opinion about tangential response	4	0

Note. IRE = initiate-respond-evaluate; IRF = initiate-respond-follow up.

discussion stances (Table 4). Pre-service teachers engaged in two different stances—what I termed a *text-focused* stance, where discussion was focused on text ideas and required knowledge of text ideas to answer, and what I termed an *assuming comprehension* stance, where discussion did not require knowledge of the text to answer, and where teachers may have assumed students already understood the text. In-service teachers engaged in a *text-focused* stance (Table 4).

In nearly half (45%) of the pre-service teachers' discussions, teachers talked with students about the text as if students had constructed meaning from it and could relate that meaning to further discussion. Throughout this *assuming comprehension* stance, pre-service teachers attempted to draw students into the discussion by relating the text to students' knowledge, lives, or interests (42%). One pre-service teacher also demonstrated an *assuming comprehension* stance through recurrent comments or questions that related aesthetically (Rosenblatt, 1978) to her own engagement with the text (e.g., "Oh, my gosh, they must be so hot in there"). Although teachers adopting an *assuming comprehension* stance seemed to understand the value of engagement and students' funds of knowledge, their follow-up responses did not help students build isolated details to create a textbase representation or connect knowledge and text to create a situation model. Their discussions tended to stem from text ideas, but did not require text knowledge to participate, which is counter to the text-focused nature of the CCSS. For example, when reading *Snake* (Chinery, 2003), an expository informational text which, in part, explains snakes' body parts and functions, a third-grade pre-service teacher asked students to relate these body parts to themselves asking, "Do we have a backbone?" "What would happen if we had no eyelids," "What do we use to smell," "Would we be able to move if we had no muscles," all of which can be answered without knowledge of the text, itself. Excerpt 1, from a third-grade pre-service teacher reading *Why Is Everyone Worried About Global Warming* (M. Anderson, 2008), further demonstrates this *assuming comprehension* stance.

Excerpt 1

> . . . Warmer temperatures over the entire globe have already caused surprising changes in polar ice, weather patterns, and the behavior of the oceans. One change leads to another, and, like falling dominoes, these changes affect the lives of many plants

Table 4. Pre- and In-Service Teachers' Stances Toward Discussion.

Stance	Subcategory	Description	Number of teachers (%)	
			Pre-service	In-service
Assumed comprehension		Discussion topic derives from text ideas, but text understanding not required to answer	14 (45%)	0
	Background knowledge	Queries students' personal experiences or background knowledge	13 (42%)	0
	Aesthetic discussion	Questions/comments on interesting information	1 (2%)	0
Text-focused		Questions/comments focused on text, require text to answer	23 (32%)	15 (88%)
	Initiate-respond-evaluate	IRE detail retrieval; successive IRE sequences not tied together	6 (19%)	3 (18%)
		Sequential series of repeating student response and asking for other response	3 (10%)	2 (12%)
	Text recap	Teacher explains text or refers to graphic to explain text	2 (6%)	3 (18%)
	Extend	Uses follow-up responses to extend ideas or piece text into coherent whole	2 (6%)	7 (41%)

Note. IRE = initiate-respond-evaluate.

and animals, including humans. Normally, Earth's climate changes slowly and predictably. Global warming, however, causes big changes to happen fast. This worries us because we can't always predict what will happen. (p. 6)

1. T: Does that worry you guys that you can't control the weather?
2. Ss: Yes
3. T: That you leave it all up to Mother Nature?
4. S1: But sometimes we could [control the weather] if we build a
5. machine that could help us get global warming away.
6. S2: Maybe we can go in the ocean and the whole world can swim in
7. circles like a whirl pool.
8. T: It's going on right now, because all of a sudden it [the weather]
9. went from really hot to really cold.

Global warming is most noticeable in the coldest places on earth. In the Arctic, spring comes earlier. Summer lasts longer. Winter is warmer. Water from melting glaciers flows into the ocean. In a place where the temperature in winter can go down to −60 degrees, normally a little warmth might sound like good news, but change this big has many effects. (p. 7)

9. T: −60 degrees! Wow! Can someone tell me if that's hot or cold.
10. S1: Cold. Me and [Student 2] were in his car and we were talking
11. about global warming and we found out an idea not for cars to
12. pollute and we want to figure out how to do that.

Excerpt 1 presents the main idea that warmer temperatures are creating changes that affect the earth and its ecosystems. The teacher draws from the last idea presented in the paragraph to pose a question that does not require the text (line 1). This opinion question generates implausible responses (lines 4 and 5, 6 and 7). After the next portion of text, whose main idea is climate effects being most noticeable in colder places, the teacher focuses on a detail insignificant to the main idea (line 9) and requiring background, rather than text knowledge. Thus, the connection to the main idea of melting ice caps due to global warming is not made. Throughout these segments, although students do refer to the text topic, global warming (lines 5 and 11), and do demonstrate some background knowledge about solutions to global warming (lines 11 and 12), it is difficult to determine what students understand about the text's main ideas.

Pre-service teachers (48%) also adopted *text-focused* discussion stances, where their questions or comments focused on the text, and required students to draw on text-based information or related background knowledge, which coincides with the expectations of the CCSS. I noted three text-focused stances: (a) *IRE*, (b) *text recap*, (c) *extend.* In an IRE stance, pre-service teachers (29%) asked students to retrieve a text detail or background knowledge about that detail, then accepted, evaluated, or acknowledged student responses. They then may have collected additional responses, repeated student responses, or asked additional, unrelated retrieval questions. Although text detail retrieval does coincide with the CCSS, it is at the lower end of the CCSS staircase of complexity (kindergarten/age 5 standard). Because such a large proportion of pre-service teachers' initial questions and IRE responses focused on text details, it is unclear in the discussions whether students built macro-level ideas or were

able to integrate ideas within the text, as addressed in the CCSS. Pre-services teachers (6%) also demonstrated a *text recap* stance, where they repeated, recapped, or translated text ideas for students, and an *extend* stance (6%), where they initially focused on micro- or macro-level text propositions, then used scaffolding follow-ups (Table 3) to extend the discussion and assist students in building ideas. Excerpt 2 demonstrates a third-grade pre-service teacher using an *extend* stance to assist students in understanding part of *All About Turtles* (Arnosky, 2000).

Excerpt 2

> The least predatory of all turtles are the tortoises. These shy, burrow-digging turtles feed almost exclusively on plants. (p. 9)

1. T: Now, does anyone know what the word *predatory* means?
2. S1: I know what the word *predator* means.
3. T: Ok, so if it's the least predatory, of all turtles . . .
4. S1: The uh, kind of uh, turtle that needs, uh, that needs . . .
5. T: Well it says here they feed almost exclusively on plants.
6. Do you know what that means?
7. S2: They don't eat meat.
8. S1: So predatory means they pretty much will never eat meat.
9. T: Right, so they are not a predator.
10. So they don't go out and try to find other animals to eat.
11. They just live by themselves. They're not scary.

This pre-service teacher astutely anticipates the confusion inherent in the construction, "least predatory," and attempts to scaffold understanding by asking students to tie background knowledge (*predator*, line 1) to text (*least predatory*, line 3) to interpret meaning. When students cannot make this connection (line 4), she redirects them to supportive text (line 5). However, when the resulting response (line 7) leads to confusion (line 8), she provides explanation (lines 9-11). Confusion may have stemmed from the teacher not probing the student's reported background knowledge of *predator* (line 2), and by confusing text (*least predatory, almost exclusively*). Ultimately, her explanation reinforces students' misconception that tortoises are not predatory and do not eat meat.

Like pre-service teachers, in-service teachers also demonstrated the text-focused stances of *IRE* (16%) and *text recap* (18%). However, the majority of in-service teachers (41%) demonstrated an *extend* text-focused stance, where they used scaffolding follow-ups (Table 3) to extend the discussion and assist students in building ideas. In this stance, in-service teachers sometimes used additional retrieval questions to assist students in piecing text details into a larger textbase representation, as in Excerpt 3, from a third-grade in-service teacher reading *Sun Stories* (Neder, 2008). Prior to the excerpt, the text described the sun's movement, and that the sun provides light, heat, and energy needed for life.

Excerpt 3

> S1: Long ago, people knew little/about the Sun./ Yet the Sun was important to them./It was a powerful source/of heat, light, and energy./Many ayn-kent, ayn . . . [T: Ancient] ancient people/ believed the Sun was/a powerful god./They honored the Sun in different ways. (p. 3)

1. T: Ok, so [Student 1] got hung up on one word. Do you remember
2. what the word was?
3. S2: It was *ancient*.
4. T: *Ancient*. Can everybody say that word?
5. S: Ancient.
6. T: Does anybody know what the word *ancient* means?
7. S2: Like old from way back.
8. T: Like old, old, old. Very, very old.
9. there? What was *ancient* telling us about?
10. S2: The ancient people.
11. T: From what we read, what did ancient people, or people who lived a
12. long time ago, think about the sun?
13. S3: They honored it.
14. T: They honored it. What's that mean to honor something?
15. S4: I think it's like celebrate.
16. T: It's kind of like celebrating. That's a great way to describe it.

In this example, the teacher first calls on students' background knowledge (*ancient*, line 6), then links that knowledge back to the text (line 9). This series of retrieval serves to scaffold one of the main points of the text, that the ancient people honored the sun: ancient-old (line 7), ancient-people (line 10), ancient people's feelings about the sun (line 13), celebrating the sun (line 15), thereby helping students build a series of isolated details into a more coherent whole.

In other *extend* instances, in-service teachers used scaffolding moves to help students provide additional information, clarify thinking, or support thinking with evidence, as in Excerpt 4 from a third-grade in-service teacher reading from *Water* (Full Options Science Series, 2003).

Excerpt 4

> Water is always changing from one state to another. When you wipe a chalkboard, liquid water left behind escapes into the air, becoming water vapor. The same thing happens to water splashed onto a counter. Left alone, it soon disappears. We call this change from a liquid to gas evaporation . . . Evaporation dries your clothes after you come out of the rain. (p. 15)

1. T: So let's stop for a moment there. Um, what have we learned so
2. far from what we read?
3. S4: When you get out of the rain your clothes dry off.
4. T: And what is that called?

5. Ss: Evaporation
6. T: Why does it happen? From what we read, why does that happen?
7. S2: It evaporates
8. T: Why, why does it evaporate? What do you think from what we just read?
9. Ss: (No response)
10. T: So [S1] talked about earlier [pre-reading] how he says the sun dries
11. it, then he said well if it is not the sun then it's the warmth, right?
12. S1: [non-audible response, assumed "yes"]
13. T: So what did we specifically find out about, we know it is called
14. Evaporation that process? What does it say from what we read?
15. S2: I think it says gas
16. T: Show me. Show me. Do you see where it [the text] says it?
17. S2: yeah
18. T: Will you read it aloud to us so we can all . . .
19. S2: [reads] We call this change from a liquid to a gas evaporation.
20. T: So what is happening to our clothes after they get wet and then
21. They dry? What is happening to the water?
22. S: [no response]
23. T: You just told us.
24. S2: It vanishes then into air . . . a gas
25. T: It turns into a gas. Agree? Disagree? What do you guys think?
26. Ss: Agree
27. T: So what we just found out, is that the process that [Student 1] was
28. Talking about how our clothes dry from the warmth, that's called
29. evaporation . . . and it actually . . . the water changes from that wet state
30. to a gas state a vapor state okay?

Here, the teacher begins with a text-based question asking students to summarize the text (line 1). When a student retells the last sentence, she prompts him to retrieve the label for the concept (line 4). Once a student does so, the teacher probes for an explanation of the process (line 6). The lack of response (lines 7 and 9), even when she turns students to the text, signals that students have only surface understanding. She continues to assist students by connecting students' initial summary of the text (lines 10 and 11) to other text ideas (lines 14, 16, and 18).

Teachers adopting an *extend* stance were often successful in helping students build textbase representations, as noted in student responses. However, at times teachers explained the text to students, or abandoned the discussion segment prior to students demonstrating understanding, perhaps because they did not notice students' confusion, or could not quickly regroup. This seems to be the case in Excerpts 5A and 5B from a third-grade in-service teacher reading *Peculiar Plants* (White, 2003):

Excerpt 5A

> . . . Like land plants, seaweeds photosynthesize, or make their own food using sunlight. And like land plants, seaweeds have to adapt to their environment. They have to adapt to a dark habitat where there is no soil (p. 10).

1. T: Based on what we read, what types of adaptations do you think
2. underwater plants have?
3. S3: Maybe plants, seaweeds, stick to rocks. They attach to rocks
4. because maybe they get some of the minerals out of the rocks.
5. T: So they can get their nutrients.
6. Any other adaptations they might have?
7. S1: They might get oxygen from the rocks.
8. T: Oxygen from rocks.
9. What about the other nutrients they need? Or things like light?
10. S2: Well, they said in the book they don't need light
11. because it was kind of dark.
12. T: Right it is dark there.
13. How could they get light if it's dark? It did say their habitat is dark.
14. S5: This isn't really related to the book but I think they might have an
15. adaptation so they don't need as much sunlight. Because my mom
16. also has a friend. She does a little bit of diving. She brought back a
17. couple of pictures and she studies plants underwater.
18. T: So you are thinking they just don't need as much light?
19. S5: Yeah
20. T: Well, let's read about underwater plants.

In this discussion segment, the teacher initially asked students to predict based on text information (line 1). When a student displays that he misunderstood the text (line 10), the teacher confirms the accurate portion of the student's response (line 12) and probes for predictions about how plants might get light (line 13). When students continue to display misunderstanding, thinking seaweed does not need much light (line 15), the teacher ensures she understands their thinking (line 18) and suggests they read further (line 20), perhaps to confirm.

Excerpt 5B

> Because seaweeds don't have roots, they can't get nutrients from the ocean's sandy bottom. Instead, they take in nutrients from the seawater. Because sunlight doesn't reach far below the surface of the water, seaweeds that live in deep water have to grow tall to reach the light they need from above . . . (p. 11).

1. T: Think about what we just read. What do you think the author wants
2. us to know about underwater plants?
3. S3: I think he really wants us to know that plants that live underwater
4. need to grow tall to get sunlight but they don't need as much.

Here, Student 3 continues to demonstrate confusion (line 4, "but they don't need as much [light]"). However, the teacher does not return to the idea of whether seaweed needs light

Teachers' Reflections on Their Practice

Pre-service teachers' reflections showed that they were able to provide advice to themselves about their own discussions. They discussed revising questions that called for background knowledge or experience without tying that to text (60%), and where they asked retrieval versus higher level questions (12%). In addition, pre-service teachers discussed asking tangential questions (28%), asking for background knowledge about topics for which they did not possess adequate knowledge themselves, leading to inaccuracies (16%), and asking about details without connecting those to main ideas (8%). Pre-service teachers' question revisions, for the most part, moved toward students engaging more with text ideas. For example, earlier I pointed out a teacher reading about snakes and asking students, "What would happen if we had no eyelids." In her reflection, the teacher revised this question to have students retrieve information from the text, *Why is having a third eyelid useful for an animal like a alligator?*

With respect to revising follow-up responses, pre-service teachers identified instances where they did not help students connect text details to main ideas (8%), and commented on providing explanation to students, suggesting that they should have provided more explanation (19%). Pre-service teachers noted instances where they promoted tangential responses or disconnected discussion (12%), responses that were unclear (12%), or where they promoted or provided inaccurate information (15%).

In-service teachers' reflections also showed that they were able to provide advice to themselves about their own discussions. Like pre-services teachers, they discussed revising questions that called for background knowledge or experience without tying that to text (30%), and where they asked retrieval versus higher level questions (40%). Unlike pre-service teachers, in-service teachers discussed revising piggy-backed questions (multiple questions in one turn; 20%), and questions that were unfocused/not related to their goals for the text (10%). With respect to revising follow-up responses, in-service teachers also commented on providing instruction to students. However, in contrast to pre-service teachers, in-service teachers (22%) suggested that they should have provided less information—that they should have come up with ways for students to build the representations themselves. Like pre-service teachers, in-service teachers also noted instances where they promoted tangential responses or disconnected discussion (23%), responses that were unclear (33%), or where they promoted or provided inaccurate information (22%). For example, the teacher from Excerpt 5 identified her role in students' confusion (5B, line 4), commenting,

> I did not respond at all here, and the student had a misconception! The student understood that underwater plants grow tall to get sunlight, but then added that underwater plants don't need as much sunlight. . . I really should have turned back to the text here. "Did the text ever say that underwater plants don't need as much sunlight? Let's go back and reread that part."

Discussion

I undertook this study of U.S. elementary-grade (ages 5-12) pre- and in-service teachers' text-based readings/discussions of informational/non-fiction text to understand current practices with respect to supporting students in meeting the grade-level expectations for informational text provided within the CCSS. The Standards focus heavily on the text, building a staircase of complexity from retrieval of details to identifying main ideas, referring to details when explaining text, citing textual evidence, and drawing inferences. In addition, the Standards call for students to interpret text language and author stance or intent, connect information within a text and across other texts, and evaluate information. Because the Standards imply the kinds of questions that have been shown to support lower-, and higher level comprehension demands as posed by research and theory on questioning (e.g., Bloom, 1984; Graesser & Person, 1994), understanding how teachers support students reading informational text may interest those who do not subscribe to the CCSS. Several key findings of this study will help inform my practice as a teacher educator, and may assist others as they work with teachers around informational text.

First, approximately half of pre-service teachers' initial questions focused on the text. The other half focused on students' prior knowledge, opinion, and relations. In addition, nearly half of the pre-service teachers in this study displayed a recurrent pattern of focusing on students' background knowledge and experience. Given that questioning background knowledge or opinions generated more oral language from students than text-based questions, it is possible that pre-service teachers focused on encouraging talk among

their students, suggesting that they have some understanding of social learning and value student engagement (Davis, 2006; Parker & Hurry, 2007; Roth & Garnier, 2006). It also implies they are aware of the importance of background knowledge in comprehension (R. C. Anderson & Pearson, 1984), and of their role in scaffolding knowledge activation. However, pre-service teachers did not yet approach background knowledge with the goal of connecting that back to the text to fill in gaps and promote deeper engagement with text ideas (Kintsch, 1988). These kinds of questions also did not require reading or engaging with the text ideas to answer, indicating that pre-service teachers may assume students understand the text and can discuss it. That students' could talk about background knowledge may reinforce teachers' assumptions about student understanding.

Connecting background knowledge to text and having students rely on text for explanation are critical practices with informational text reading. Students tend to maintain prior knowledge, even when confronted with text evidence that refutes it; misconceptions of informational concepts, particularly science concepts, have been shown highly resistant to change (Dole & Sinatra, 1998; Dole & Smith, 1989). Although refutational texts—text that present a misconception, discuss how it is incorrect, and explain the scientifically correct concept—assisted students in the process of conceptual change (Posner, Strike, Hewson, & Gurtzog, 1982), textbooks have been shown to contain little refutatational text (Guzzetti, Snyder, & Glass, 1992), nor has refutational text structure been found often in children's informational books (Tippett, 2010). Therefore, it is important to bring students back to the text so that they can see where their background is consistent with the text, and where it is in contrast to the information presented within a text.

Second, in this study, both pre- and in-service teachers interpreted ideas for students, using approximately one-third of their discussion talk explaining or annotating the text. Teachers' explanations did not seem focused on modeling comprehension, which would support students' repertoire of comprehension strategies (Parker & Hurry, 2007). Teacher explanation may have occurred simply because teachers perceived concepts as difficult (Palmer & Stewart, 2003), or that they were unaware of alternate pedagogy (Parker & Hurry, 2007). However, teacher explanation does not allow students to grapple with complicated text ideas. In-service teachers' analysis of their discussions indicated teachers realized the need to help students build representations for themselves, whereas pre-service, who proposed providing more explanation for students, were less aware of the need for, or their role in, scaffolding knowledge building.

Third, pre- and in-service teachers in this study focused on more basic retrieval of text details. Although the CCSS do require students to ask and answer questions about key ideas and details within the text, these types of questions are at the lower end (primary grades, ages 5-8) of the staircase of complexity of the Standards. By Grade 3 (age 8), the standards call for students to explain and cite textual evidence. More generally, building a textbase representation necessitates pulling together text ideas, both when the relationships between the ideas are clearly specified and when readers need to make those connections (Kintsch, 1988). A focus on text details without attention to the larger macro-level ideas may lead to students having difficulty pulling information together into a coherent whole. Although pre-service teachers did not often follow up on retrieval questions to extend thinking, in-service teachers were more likely to use retrieval questions as a springboard to questions calling for explanation, connection, or inference, perhaps suggesting more awareness of the need to support students' higher level comprehension.

Fourth, the Standards call for students to *determine* the meaning of vocabulary, signaling that students should derive meaning from context. In this study, pre- and in-service teachers did pose questions about content-rich vocabulary, suggesting they realize the critical role vocabulary plays in informational text comprehension (Chall et al., 1990). However, they often queried vocabulary unsupported by the text, essentially targeting students' background knowledge. In addition, pre-service teachers had difficulty scaffolding students' understanding of complex text language.

Reflections on their own discussions showed that both pre- and in-service teachers could identify areas for improvement, specifically recognizing that students should be more engaged with text ideas. That they could notice and name (Johnston, 2004) their needs suggests promise for using this kind of reflection in improving practice. However, as Parker and Hurry (2007) found, teachers' discussions initially reflected a "lack of awareness of any advantage in making the children more active in the comprehension process" (p. 311). They also reflect that teachers may not be aware initially of text issues that challenge students, and their own role in supporting knowledge building. In a recent study (Deeney & Coiro, 2015), my colleague and I found that pre-service teachers initially encountered difficulty recognizing instances where texts presented gaps in information that needed to be filled in by the reader, although the teachers themselves had filled in the gaps. These support an interpretation that one issue facing teachers in helping students build representations from text is that teachers may have more tacit rather than explicit knowledge (Parker & Hurry, 2007).

Limitations and Directions for Future Research

This study, based on a sample of 31 pre-service and 17 in-service teachers engaging in one discussion with students, cannot represent these teachers' habitual practices or the practices of other pre- and in-service teachers. This study was also not designed to investigate teachers' understanding of the role of talk in supporting students' understanding of complex text ideas. In the future, it is important to understand teachers' goals for text-based discussions, not only the

content knowledge they seek to build but how they perceive their role in supporting students' understanding. In addition, although this study offers insight into these teachers' informational text discussion practices, it cannot suggest how teachers benefit from instruction or professional development in reading/discussing informational text, or whether retrospectively reflecting on their practice influences subsequent discussions. In the future, it is important to determine how any analysis of current practices influences planning and enactment of future practices.

Implications for Practice

Helping students meet the informational text demands of the CCSS, and general knowledge building through informational text, requires that teachers possess adequate content knowledge, understand how readers construct knowledge, and can make real-time decisions that adapt to student needs (Boyd, 2012). Practicum and student-teaching experiences provide pre-service teachers opportunities to confront these complexities, and in-service teachers live with these complexities daily. Yet, Ball and Forzani (2009) noted that, "assuming that most people can learn these difficult [instructional] practices while trying to teach real students, or through observing and talking with more experienced teachers, is unrealistic" (p. 503). The university classroom and in-service teacher professional development must be spaces where teachers can learn these practices—spaces that are "practice-focused" (Ball & Forzani, 2009), specifying what teachers need to learn to do, and unpacking that for learning.

This notion of "unpacking" teaching is supported by Grossman and colleagues (2009) who proposed a framework for teaching complex practices that includes representing, decomposing, and providing successive approximations of practice. In the case of text-based discussions, this would include providing teachers a representation of what successful informational text discussions look and sound like, perhaps through observations or videos of expert practice. Once teachers have a feel for the overall practice, they would be engaged in analyzing the steps to planning and enacting such a discussion. Lastly, teachers would be provided opportunities to plan with an expert, have a more experienced other observe and debrief with them, or otherwise, "try out" the practice and receive feedback.

Kucan and Palincsar (2013) applied the Grossman et al. framework to informational text reading and discussion, providing a helpful resource for literacy education courses and professional development. In my own practice, I have focused initially on representation and decomposition of informational text-based discussions, creating video-recordings of expert informational text-based discussions, and accompanying sample plans for those discussions. Using these in monthly in-service teacher professional development sessions has allowed teachers to identify goals for the discussions, successes in supporting comprehension, and areas of need, as well as learn to develop questions that encourage student engagement. As a result, in-service teachers have become more purposeful in planning for informational text-based discussions (Deeney, 2014). I have also identified decomposition as a target for both pre- and in-service teachers in the university setting. In addition to better understanding the practice, decomposing serves to make implicit knowledge more explicit. Because teachers in this study and others (Kucan, 2007) can decompose transcripts of their discussions to offer themselves suggestions for improvement, using teachers' own work in teacher education courses and professional development holds promise as a way to help teachers learn to deconstruct the text and their own role in supporting students' understanding of informational text.

However, because in this study, teachers asked about vocabulary unsupported by the text, and had trouble scaffolding students' understanding of complex language, they would benefit from learning to decompose the text itself to explicitly understand it challenges. My colleague and I have embedded informational text analysis into our coursework, particularly focusing on text features that provide support or challenge to comprehension, including genre, graphics, typographical features, cohesive ties, and so on, as well as how text details build to main idea(s), where inferences are required, and how complex language is supported or unsupported. Results of our analysis (Deeney & Coiro, 2015) show that pre-service teachers grow in their ability to analyze the text, particularly with respect to text issues that challenge students. Recognizing where difficulty lies within a text is the first step to planning how to help students navigate its complexities—such as when to provide explanation, and when/how to help students build explanations for themselves.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research and/or authorship of this article.

References

Anderson, M. (2008). Why is everyone worried about global warming? *Ask*, *7*(4), 6-13.

Anderson, R. C., & Pearson, P. D. (1984). A schema-theoretic view of basic processes in reading comprehension. In P. D. Pearson (Ed.), *Handbook of reading research* (pp. 255-291). New York, NY: Longman.

Applebee, A. N., Langer, J. A., Nystrand, M., & Gamoran, A. (2003). Discussion-based approaches to developing understanding: Classroom instruction and student performance in middle and high school English. *American Educational Research Journal*, *40*, 685-730.

Armbruster, B. B. (1984). The problem of "inconsiderate texts." In G. G. Duffy, L. R. Roehler, & J. Mason (Eds.), *Theoretical issues in reading comprehension* (pp. 202-217). New York, NY: Longman.

Arnosky, J. (2000). *All about turtles*. New York, NY: Scholastic.

Ball, D. L., & Forzani, F. M. (2009). The work of teaching and the challenge for teacher education. *Journal of Teacher Education*, *60*, 497-511.

Beck, I., & McKeown, M. (2006). *Improving comprehension with Questioning the Author: A fresh and expanded view of a powerful approach*. New York, NY: Scholastic.

Beck, I., McKeown, M., Hamilton, R., & Kucan, L. (1997). *Questioning the author*. Newark, DE: International Reading Association.

Bernhardt, E., Destino, T., Kamil, M., & Rodriguez-Munoz, M. (1995). Assessing science knowledge in an English/Spanish bilingual elementary school. *Cognosos*, *4*, 4-6.

Bloom, B. (1984). *Taxonomy of educational objectives book 1: Cognitive domain* (2nd ed.). New York, NY: Addison Wesley.

Boyd, M. (2012). Planning and realigning a lesson in response to student contributions. *The Elementary School Journal*, *113*, 25-51.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (2000). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.

Bruner, J. (1990). *Acts of meaning*. Cambridge, MA: Harvard University Press.

Cazden, C. B. (1988). *Classroom discourse: The language of teaching and learning*. Portsmouth, NH: Heinemann.

Chall, J., Jacobs, V., & Baldwin, L. (1990). *The reading crisis: Why poor children fall behind*. Cambridge, MA: Harvard University Press.

Chinery, M. (2003). *Snake*. Mahwah, NJ: Troll Communications.

Chinn, C. A., & Anderson, R. C. (1998). The structure of discussions that promote reasoning. *Teachers College Record*, *100*, 315-368.

Davis, M. H. (2006). *Effects of text markers and familiarity on component structures of text-based representations*. College Park: University of Maryland.

Deeney, T. (2014, January). *Preparing teachers and students to meet key shifts in the Common Core State Standards*. IGNITE Presentation, 6th Annual Academic Summit, University of Rhode Island, Kingston, RI.

Deeney, T., & Coiro, J. (2015, December). *Pre-service teachers' analysis of informational text*. Paper presented at the 63rd Annual Meeting of the Literacy Research Association, San Diego, CA.

Dole, J., & Sinatra, G. (1998). Reconceptualizing change in the cognitive construction of knowledge. *Educational Psychologist*, *33*, 109-128.

Dole, J., & Smith, E. (1989). Prior knowledge and learning from science text: An instructional study. In J. Zutell & S. McCormick (Eds.), *Thirty-eighth yearbook of the National Reading Conference* (pp. 345-352). Chicago, IL: National Reading Conference.

Donovan, C. A., & Smolkin, L. B. (2001). Genre and other factors influencing teachers' book selections for science instruction. *Reading Research Quarterly*, *36*, 412-440.

Duke, N. K. (2000). 3.6 minutes per day: The scarcity of informational texts in first grade. *Reading Research Quarterly*, *35*, 202-224.

Duke, N. K., & Kays, J. (1998). "Can I say 'once upon a time'?" Kindergarten children developing knowledge of information book language. *Early Childhood Research Quarterly*, *13*, 295-318.

Fitchett, P., & Heafner, T. (2010). A national perspective on the effects of high-stakes testing and standardization on elementary social studies marginalization. *Theory & Research in Social Studies*, *38*, 114-130.

Full Options Science Series. (2003). *Water*. Nashua, NH: Delta Education.

Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago, IL: Aldine Publishing.

Graesser, A. C., McNamara, D. S., & Louwerse, M. M. (2003). What do readers need to learn in order to process coherence relations in narrative and expository text? In A. P. Sweet & C. E. Snow (Eds.), *Rethinking reading comprehension* (pp. 82-98). New York, NY: Guilford Press.

Graesser, A. C., & Person, N. K. (1994). Question asking during tutoring. *American Educational Research Journal*, *31*, 104-137.

Grossman, P., Compton, C., Igra, D., Ronfeldt, M., Shahan, E., & Williamson, P. W. (2009). Teaching practice: A cross-professional perspective. *Teachers College Record*, *111*, 2055-2100.

Guthrie, J. T., Van Meter, P., McCann, A., Anderson, E., & Alao, S. (1996). *Does concept-oriented reading instruction increase motivation, strategies, and conceptual learning?* (Reading Research Report No. 66). Athens: National Reading Research Center, University of Georgia. (ERIC Document Reproduction Service No. ED 400523).

Guzzetti, B., Snyder, T., & Glass, G. (1992). Promoting conceptual change in science: Can texts be used effectively? *Journal of Reading*, *35*, 642-649.

Halliday, M. A. K., & Hasan, R. (1976). *Cohesion in English*. London, England: Longman.

Heisey, N., & Kucan, L. (2010). Introducing science concepts to primary students through read-alouds: Interactions and multiple texts make the difference. *The Reading Teacher*, *63*, 666-676.

Jeong, J., Gaffney, J., & Choi, J. (2010). Availability and use of informational texts in second-, third-, and fourth-grade classrooms. *Research in the Teaching of English*, *44*, 435-456.

Johnston, P. (2004). *Choice words*. New York, NY: Stenhouse.

Judson, E. (2013). The relationship between time allocated for science in elementary schools and state accountability. *Science Education*, *97*, 621-636.

Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction integration model. *Psychological Review*, *95*, 163-182.

Kletzien, S. B., & Dreher, M. J. (2004). *Informational text in K-3 classrooms: Helping children read and write*. Newark, DE: International Reading Association.

Kristo, J., & Bamford, R. (2004). *Nonfiction in focus*. New York, NY: Scholastic.

Kucan, L. (2007). Insights from teachers who analyzed transcripts of their own classroom discussions. *The Reading Teacher*, *61*, 228-236.

Kucan, L., & Palincsar, A. S. (2013). *Comprehension instruction through text-based discussion*. Newark, DE: International Reading Association.

Maloch, B. (2008). Beyond exposure: The uses of informational texts in a second grade classroom. *Research in the Teaching of English*, *42*, 315-362.

Maloch, B., & Bomer, R. (2013). Informational texts and the Common Core Standards: What are we talking about, anyway? *Language Arts*, *90*, 205-213.

McNamara, D. S. (2001). Reading both high and low coherence texts: Effects of text sequence and prior knowledge. *Canadian Journal of Experimental Psychology*, *55*, 51-62.

Mercer, N., & Howe, C. (2012). Explaining the dialogic processes of teaching and learning. *Learning, Culture and Social Interaction*, *1*, 12-21.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: SAGE.

Murphy, P., Wilkinson, I., Soter, A., & Hennessey, M. (2009). Examining the effects of classroom discussion on students' comprehension of text: A meta-analysis. *Journal of Educational Psychology*, *101*, 740-764.

National Governors Association Center for Best Practices and Council of Chief State School Officers. (2010). *Common Core State Standards for English language arts and literacy in history/social studies, science, and technical subjects*. Washington, DC: Author.

Neder, B. E. (2008). *Sun stories*. New York, NY: Macmillan/McGraw-Hill.

Nystrand, M., & Gamoran, A. (1991). Instructional discourse, student engagement, and literature achievement. *Research in the Teaching of English*, *25*, 261-290.

O'Reilly, T., & McNamara, D. S. (2007). The impact of science knowledge, reading skill, and reading strategy knowledge on more traditional "high-stakes" measures of high school students' science achievement. *American Educational Research Journal*, *44*, 161-196.

Palincsar, A., & Magnusson, S. (2000). *The interplay of first-hand and text-based investigations in science education*. Ann Arbor, MI: Center for the Improvement of Early Reading Achievement.

Palmer, R. G., & Stewart, R. A. (2003). Nonfiction trade book use in primary grades. *The Reading Teacher*, *57*, 38-48.

Pappas, C. C. (1991). Fostering full access to literacy by including information books. *Language Arts*, *68*, 449-462.

Pappas, C. C. (2006). The information book genre: Its role in integrated science and literacy practice. *Reading Research Quarterly*, *41*, 226-250.

Parker, M., & Hurry, J. (2007). Teachers' use of questioning and modeling comprehension skills in primary classrooms. *Educational Review*, *59*, 299-314.

Posner, G., Strike, K., Hewson, P., & Gertzog, W. (1982). Accommodation of a scientific conception: Toward a theory of conceptual change. *Science Education*, *66*, 211-227.

Purcell-Gates, V. (2012). Epistemological tensions in reading research and a vision for the future. *Reading Research Quarterly*, *47*, 465-471.

Purcell-Gates, V., McIntyre, E., & Freppon, P. A. (1995). Learning written storybook language in school: A comparison of low-SES children in skills-based and whole language classrooms. *American Educational Research Journal*, *32*, 659-685.

Rosenblatt, L. (1978). *The reader, the text, the poem: The transactional theory of the literary work*. Carbondale: Southern Illinois University Press.

Roth, K., & Garnier, H. (2006). What science teaching looks like: An international perspective. *Science in the Spotlight*, *34*(4), 16-23.

Snow, C. E. (2000). On the limits of reframing: Rereading the National Academy of Sciences report on reading. *Journal of Literacy Research*, *32*, 113-120.

Soter, A., Wilkinson, I. A., Murphy, K., Rudge, L., Reninger, K., & Edwards, M. (2008). What the discourse tells us: Talk and indicators of high-level comprehension. *International Journal of Educational Research*, *47*, 372-391.

Strauss, A., & Corbin, J. (1990). *The basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: SAGE.

Sweet, A. P., & Snow, C. E. (2003). *Rethinking reading comprehension*. New York, NY: Guilford Press.

Taylor, B. M., Pearson, P. D., Peterson, D. S., & Rodriguez, M. C. (2003). Reading growth in high-poverty classrooms: The influence of teacher practices that encourage cognitive engagement in literacy learning. *Elementary School Journal*, *104*, 3-28.

Tippett, C. (2010). Refutation text in science education: A review of two decades of research. *International Journal of Science and Mathematics Education*, *8*, 951-970.

van den Broek, P., & Kremer, K. (2000). The mind in action: What it means to comprehend during reading. In B. Taylor, M. F. Graves, & P. van den broek (Eds.), *Reading for meaning: Fostering comprehension in middle grades* (pp. 1-31). New York, NY: Teachers College Press.

Varelas, M., & Pappas, C. (2006). Intertextuality in read-alouds of integrated science-literacy units in urban primary classrooms: Opportunities for the development of thought and language. *Cognition and Instruction*, *24*, 211-259.

Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Wertsch, J. (1991). *Voices of the mind: A sociocultural approach to mediated action*. Cambridge, MA: Harvard University Press.

White, N. (2003). *Peculiar plants*. Marlborough, MA: Sundance Newbridge.

Wigfield, A., Guthrie, J. T., Tonks, S., & Perencevich, K. C. (2004). Children's motivation for reading: Domain specificity and instructional influences. *Journal of Educational Research*, *97*, 299-309.

Wilkinson, I. A. G., Soter, A. O., & Murphy, P. K. (2010). Developing a model of quality talk about literary text. In M. G. McKeown & L. Kucan (Eds.), *Bringing reading research to life* (pp. 142-169). New York, NY: Guilford Press.

Wolf, M. K., Crosson, A. C., & Resnick, L. B. (2005). Classroom talk for rigorous reading comprehension instruction. *Reading Psychology*, *26*, 27-53.

Wollman-Bonilla, J. (2000). Teaching science writing to first graders: Genre learning and recontextualization. *Research in the Teaching of English*, *35*, 35-65.

Author Biography

Theresa A. Deeney is professor of literacy education in the School of Education at the University of Rhode Island, USA. Her research focuses on pre- and in-service teacher education in literacy, and assessment and instructional practices for students who struggle.