CHAPTER 4

What Does Discussion Add to Reading for Conceptual Learning?

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Reading appears to be a solitary endeavor: a child under the covers with a flashlight, a student huddled in a cozy corner of the library, a scholar staring into a computer's pale glow. However, we argue that reading is, and should be, anything but solitary. As Mark Haddon (2004) wrote, "Reading is a conversation. All books talk, but a good book listens as well." In this chapter, we claim that reading is, ideally, a conversation, and that reading to learn concepts is especially dialogic, or an interaction between the reader and the text. As such, we urge educators to embed reading comprehension instruction in a social context, because doing so helps students learn the thinking skills needed to read effectively and to think through conceptual topics in a deep way. We further urge theorists to embrace this approach to ensure that innovations in social approaches to reading continue to flourish.

The idea that reading comprehension should be taught in a social context is not new, nor is it restricted to educational theorists. Teachers display a belief in this principle when they use the phrases "Let's struggle with the text," "You need to engage with the text," and "We should be challenging the text." This language reveals an intuitive understanding that the process of reading should be akin to a conversation between the reader and the author, and that the classroom is the proper place to begin that conversation. Teachers often make reading a social event by reading aloud to children, having children read to each other, and talking about texts.

However, it is not at all clear that teachers understand the critical distinction between talking as a way to understand a particular text and talking as a way to gain the skills of reading comprehension. As repeated research has demonstrated, teachers tend to dominate classroom discourse. Teachers mostly use a pattern of speaking in which they present a question, pick a student to respond, then evaluate that response, followed quickly by another question—a pattern called the IRE, which stands for initiation–response–evaluation (Cazden, 2001). This pattern of talk is well structured for certain tasks, such as reviewing the details of a story, or checking whether students have read the story. However, it requires mostly surface-level comprehension, and it does not model reading comprehension strategies. For this reason, it is unlikely to lead to better reading comprehension of new conceptual texts. Quality discussion, on the other hand, can improve reading comprehension skills that can then be applied to future texts.

A number of studies have shown that quality classroom discussion does indeed improve students' reading comprehension. In a meta-analysis of 42 empirical studies, Murphy, Wilkinson, Soter, Hennessey, and Alexander (2009) calculated the effect sizes of nine major approaches to classroom discussions on reading comprehension measures. The authors grouped these approaches by the stance they took toward the text. Approaches that took an *efferent* stance focused on gaining knowledge from the texts; these included questioning the author (Beck & McKeown, 2006), instructional conversations (Goldenberg, 1993), and shared inquiry (Great Books Foundation, 1987). Approaches that took an *aesthetic* stance focused on encouraging children to make a personal response to texts; these included literature circles (Short & Pierce, 1990), grand conversations (Eeds & Wells, 1989), and book club (Raphael & McMahon, 1994). Finally, the approaches that took a *critical–analytic* stance were focused on questioning the claims and issues raised by the text and included collaborative reasoning (Anderson, Chinn, Waggoner, & Nguyen, 1998), paideia seminar (Billings & Fitzgerald, 2002), and philosophy for children (Sharp, 1995). Results from the analysis indicate that efferent discussion approaches led to improved literal and inferential reading comprehension, whereas critical–analytic discussion approaches led to improved critical thinking, reasoning, and argumentation. There is also evidence that shared inquiry, questioning the author, and collaborative reasoning showed that the gains made in reading comprehension are transferable to new texts.

Why Do Discussions Lead to Improved Reading Comprehension?

The sociocultural perspective provides a plausible explanation for why discussions might lead to improved comprehension. The sociocultural perspective is most closely associated with the developmental psychologist Lev Vygotsky (1978), who wrote:

> Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals. (p. 57)

In Vygotsky's vision, the interlocutor with which we converse in the process of learning is the internalized voices of our parents, teachers, friends, and community. When we talk back to the text, we are responding to the internalized voice of the imagined author. Logically following from this vision, Vygotsky promoted children talking with other children, talking with parents and the teacher, and talking to themselves as a means of developing individual thinking (Au & Kawakami, 1983). Discussion helps us create an inner dialogue. As Morris and his colleagues (2018) suggest, discussion can give children the understanding of "the self as agent and others as audience" (p. 245).

Reznitskya and colleagues (2001) extended the idea of internalization by combining it with schema theory (Anderson & Pearson, 1984). A *schema* is a generalized type of knowledge. It is a flexible outline that allows people to more easily understand specific ideas. For example, everyone has ideas about how to make an argument, which is called an argument schema. A well-developed argument schema guides a person to make a claim and to provide convincing evidence. It can also help a person quickly understand and evaluate new arguments. Reznitskya and her colleagues proposed the *argument schema theory* to explain how people develop argument schemas as they talk with each other; they internalize the norms, expectations, and skills that constitute the ability to present or understand an argument.

To better understand the social nature of argument schema theory, let us compare this theory with some of the most influential models of reading comprehension today. These models are built on the metaphor of

the mind as a machine or computer. In this metaphor, individual pieces of knowledge are like light bulbs on a vast board, and each light bulb is connected to many other bulbs. Most of the time, any particular bulb is off, but when one bulb lights up, then the bulbs connected to it also light up. When we read, each word and phrase causes ideas to light up, which in turn causes many other ideas to light up. For example, when the word *wolf* is read, the mind may also be reminded of the words *dog, Little Red Riding Hood,* and *the dark forest.*

One example of such a theory specifically designed to account for conceptual reading is the knowledge revision components (KReC) framework recently proposed by Kendeou, Walsh, Smith, and O'Brien (2014). In the KReC framework, each piece of information that is read brings to mind all the other information associated with it. The theory suggests that these thoughts are brought to mind automatically, whether the reader wants this to happen or not. When the incoming information conflicts with existing information, the reader attempts to integrate both pieces of information and make a coherent understanding from them. The newly formed and coherent conception will coexist with the original conception in memory. Over time, if the reader keeps receiving information consistent with the new conception, it will be reinforced and become better rooted in the knowledge network. Eventually, the new conception will come to mind more readily, and the original one will fade away.

The KReC gives one plausible explanation regarding why reading so-called "refutational texts"—texts that present both scientific conceptions and common misconceptions—are more effective than traditional texts that only present the scientific understanding (Sinatra & Broughton, 2011; Tippett, 2010). However, theories such as KReC are designed from the perspective of one individual; they do not directly address other people. Furthermore, they envision the text as simply an inert source of information—not as a thing with which you can converse. Theories such as KReC suggest that fostering conceptual learning is primarily a matter of properly exposing students to more information. Readers are perceived as individual agents who independently construct accurate conceptual understanding from a text when presented with the right information.

Argument schema theory is different (Reznitskaya et al., 2001, 2009). The dialogical approach requires readers to go beyond their own understanding of the text. In theories based on the Vygotskian idea of internalization, readers change the way they read as a result of their interactions with other people. They are exposed to novel ideas from

other discussants that might elaborate or conflict with their own understanding. Through the dynamic reasoning process, they are stimulated to evaluate critically and refine their own thoughts regarding the text. The final comprehension outcome is stretched beyond textual meaning construction at the individual level. Yet there is a caveat: Not all types of discussion stretch thinking; therefore, it is important to examine the kind of discussion that can add to reading for conceptual learning.

What Kind of Discussion?

In our exploration of reading within the context of discussion, it is important to make a distinction between the many types of discussion that exist. Discussion is already a widely practiced activity in classrooms. However, there are various definitions regarding what constitutes a discussion.

One teacher might ask students a question such as "Why did Jack and Jill go up the hill?" These questions are intended to help reinforce the details of the story or to determine who has actually read the story. Students participating in these discussions learn to ask themselves factual questions as they read to monitor how well they are comprehending the story at the most basic level. These discussions are usually conducted in the familiar IRE format described earlier.

Another teacher might say, "This week we are reading a nonfiction text about erosion. Has anyone here been to the Grand Canyon? What did you see there?" These questions are intended to help students make personal connections with the text. Any answer to these questions is acceptable, because all answers help students to learn the skill of conversing with the text by responding with their own memories, thoughts, and feelings.

However, to learn concepts, neither of these types of discussion is ideal, because concepts are not simple facts or personal experiences. Concepts are complex and multifaceted. Concepts are embedded in larger belief systems. Concepts can be true in one way and not another. To understand concepts within a text is to engage with the text in an argumentative way. By *argumentative,* we do not mean combative, but rather the kind of discussion in which all participants seek to achieve a better understanding by proposing, analyzing, and challenging claims.

Let's take the concept of keystone species as an example. Here is a short text we wrote to explain this concept:

> "A keystone species is a critical species in an ecosystem. If the keystone species disappeared, an ecosystem would change dramatically. If other species disappeared there would be smaller changes. A keystone species is often a large predator, like a wolf, because these species regulate the population size of many other prey, scavenger, and competitor species. The reintroduction of wolves to Yellowstone National Park is a documented example of the keystone species concept. When wolves were reintroduced to Yellowstone, the populations of many species changed. The number of elk changed, because the wolves ate them. Wolves do not eat beavers, but the number of beavers also changed. Since the elk were hunted by wolves, the elk spent less time near water, which allowed willow trees to grow, which allowed beavers to survive winter, which led to more beavers being born in spring."

Even within this abbreviated explanation of the keystone species concept, there are several features intended to make the reader understand and believe the concept. Even the name supports understanding of the concept. The name *keystone* is an analogy to the keystone of an arch that allows all of the other stones to remain in place. To fully understand the concept, readers need to understand and evaluate this analogy.

Understanding the keystone concept also depends on relational and causal thinking. *Relational thinking* is the type of thinking that analyzes the connections, or relationships, between things. In the case of beavers, there is a complex relationship involving a cascade of effects. It is easy to understand direct connections, but it is more difficult to understand a long causal chain, like the one that describes the relationships between wolves, elk, willow trees, and beavers.

As the example of the keystone species concept illustrates, learning concepts from text requires a host of thinking skills. Sociocultural perspectives describe how people acquire these thinking skills by talking with other people.

The Collaborative Reasoning Approach to Classroom Discussion

We developed an approach to discussion called collaborative reasoning (CR), which can serve as a model for discussions designed to support the learning of those thinking skills needed for conceptual reading. CR

is an approach to peer collaboration in which students argue about a controversy (Anderson et al., 1998). The controversy is raised by a text students have read, then presented to them as a single big question. Students take positions on the big question and support their positions with evidence-based reasoning. They are expected to listen carefully to what others say and evaluate their colleagues' statements and evidence. They are also encouraged to challenge views different from their own with counterarguments.

Students control the flow of discussion, interacting with one another freely, without raising their hands. Teachers are present, but they play a supporting role and only provide scaffolding when needed. No hierarchy is imposed on the group, such as assigning a discussion moderator, although student leaders usually emerge spontaneously (Sun, Anderson, Perry, & Lin, 2017).

The CR discussion structure endorses a minimal role for teachers and a maximal role for students. This is beneficial for two reasons. First, minimal teacher input (e.g., ask for clarification, prompt for reasoning) is sufficient to keep the student discussions going (Jadallah et al., 2011) and still promote cognitive gains (e.g., Chi & Wiley, 2014; Reznitskaya et al., 2009). Second, peer communication can be more effective than teacher–student communication due to the correspondence in peers' speech (Noddings, 1985); that is, students can better understand each other's thoughts than those of adults, and can provide explanations accordingly (Vedder, 1985). For instance, student modeling throughout a discussion is more effective than teacher modeling in promoting relational thinking (Lin, Jadallah, et al., 2015). Teacher models of relational thinking may be too complicated for students to understand. In contrast, peer models are often much easier to comprehend and therefore more appropriate for use in the discussion.

How Do CR Discussions Help Children Understand and Evaluate Concepts in Texts?

Careful observation of CR discussions has shown that when a student uses a particularly useful stratagem, other students copy that same technique. For example, if one student challenges another student by saying, "Some people might say [counterargument]," it is likely that another student will use a similar phrase to accomplish the same goal, because this approach allows the speaker to challenge an argument in an indirect nonthreatening way. As time goes by, more and more students use these

successful stratagems with increasing frequency—a process Anderson et al. (2001) called *snowballing*. Stratagems are often introduced in the discussion by social leaders in the group, then picked up by other students (Lin, Anderson, et al., 2015). In addition to argument stratagems (Dong, Anderson, Kim, & Li, 2008), some of the many skills we have documented as snowballing include analogical thinking (Lin et al., 2012) and causal reasoning (Ma et al., 2017).

Using the Vygotskian vocabulary (Vygotsky, 1978), students' snowballing of argument moves is an indication of *partial internalization*—an early stage of learning in which students can accomplish a process in a social context but are not yet able to perform it on their own. Fully internalized argument moves will occur when the different roles performed by multiple people in the social context all occur in the student's own mind. It is like an internal dialogue between a student and the rest of the class. For instance, as a student is formulating an argument in his or her mind, he or she will also be aware of other disagreeing "voices" with potentially plausible evidence to counter his or her argument. To make her claim stand, the student will need to address those possible counterarguments.

We investigated whether the process of internalization had occurred by asking students to read a new story, *Pine Wood Derby*. It presented an ethical dilemma that involved weighing the relative importance of many competing ethical challenges, including cheating, keeping secrets, being kind to people less fortunate, and obeying authority (e.g., Reznitskaya et al., 2001). Participants then individually wrote essays explaining their opinions. Students who had previously participated in CR discussions used the text to generate more satisfactory arguments, counterarguments, and rebuttals than similar students who had not participated in CR discussions. This result has been replicated in several different educational settings, including online discussions, and in face-to-face discussions in large and small American cities, urban and rural areas of China, as well as Korean and Malaysian communities (Dong et al., 2008; Kim, Anderson, Miller, Jeong, & Swim, 2011; Kim, Anderson, Nguyen-Jahiel, & Archodidiou, 2007; Ma'rof, 2014; Morris et al., 2018; Reznitskaya et al., 2001).

The repeated finding that students can use ways of thinking they have acquired in their discussions in a new and different individual task is a demonstration of the Vygotskian idea of internalization (Vygotsky, 1978). The tools of reasoning begin as ways of communicating with others, to help each other clarify ideas, and to improve argumentation quality; they gradually become internalized for students to use freely. The once external voices have become one's own voice.

Multilink Causal Reasoning for Conceptual Learning

CR improves students' ability to engage in multilink causal reasoning (Ma et al., 2017). Reading about concepts often requires students to consider claims about a series of relationships. The effect of wolves on beavers, described earlier, is an example of a multilink causal chain. Table 4.1 presents another example of a causal chain. Students needed to decide whether a pack of wolves should be kept or eradicated because they are a potential threat to community safety. They then wrote an individual policy letter explaining their own opinion on the issue. CR students produced significantly longer causal chains than other students. Multilink causal reasoning pushes students to consider different aspects of the issue, including ecology (i.e., the imbalance between elks and plants) and economy (i.e., hunters and timber companies), then ponder the relationship among potential factors, as well as how they can influence one another. With this skill, students can better evaluate the relationships in a previously unread text.

Analogical Reasoning for Empathy

Analogical reasoning is an important form of higher-order cognition that can be developed through CR discussions (Dong et al., 2008; Lin et al., 2012). Through analogical reasoning, one can identify possibly important elements of a novel target domain (e.g., electrons), and the relationship among these elements (e.g., how electrons flow along a wire); this can occur through a comparison of the novel target domain (e.g., electrons) to a familiar source domain (e.g., water flowing in a ditch) (Gentner, 1983; Hummel & Holyoak, 1997).

Lin et al. (2012) found that when children first participated in CR discussions, they began to repeat or elaborate on analogies that were presented by previous speakers. Over time, students learned to generate new analogies and did so at an increasing rate. The construction of new analogies, such as those discussed earlier, suggests that students learned to analyze situations in terms of deeper relationships; in other words, they were able to perceive the situations from a new angle. Indeed, analogical reasoning is a vital skill, because it enables students to critically examine and compare the overall significant components and relational features in each information source, especially when they encounter information inconsistent with their prior knowledge. An example is the keystone

TABLE 4.1. An Example of a Multilink Causal Chain in Collaborative Discussion

KAYLA:	I think that wolves help:: [clears throat] I think that wolves help balance the um::like balance the food web and balance the food chain of how things go, because if there was too many elk then the number of producers would go down. If you know:: If it, too:: If there was too less elk, the number of producers will go up too bad. And I think that:: I know:: I wouldn't want to go outside, keep on cutting, cutting, cutting down trees, but that's:: does:: for the timber company to do, right? That's why I think:: That's why um the elk is eating the trees up and that the wolves are kill the elk. So the trees are growing more. That's why the wolf:: um the timber company is making more. And then:: But, second, I'm now thinking about the hunters, because the hunters aren't getting that much money, because the wolves are already killing all the food, and they can't take roadkill. I wouldn't eat roadkill.
JOHN:	Uh-uh. Yeah, like you said, if the elk get over popular [populated], they will eat all the grass and stuff. Then there will be other animals that eat grass, they won't have anything to eat. So they might starve you know.
MARCELO:	Yeah, and like we in my activity booklet, we made a pie chart, like on Jaylen's box, box B. Well, half:: Timber makes half the money, right? And if the wolves, if they kill the wolves, there is no more wolves in Winona, the elk population will go up and they'll eat most of the trees that the timber has to cut. Now think of this, if the timber has to shut down, we'll only have these three major businesses left to carry the city.
JOHN:	And timber makes most money.
MARCELO:	Yeah. Four million dollars a year. That's [1] half of the money. [1]
KAYLA:	[1] If that happened, [1] if that may happen, I think that the timber company wouldn't technically shut down, but have to cut down some of our trees that we actually use and stuff. And like [2] our apple trees and [2] stuff like that. 'Cause you know how we have them apple thingies when we go [3] [3] yeah, and stuff like that. And I think they'll end up cutting those down and then after they cut those down they have to cut:: they have to stop making houses, stop making tables and chairs, we have to sit on the floor.

Note. [1], [2], [3] indicate segments of interjected and overlapped speech. :: denotes sentence fragments.

described earlier, a specially shaped piece of stone, which holds the other pieces together so that the structure stays intact. In an ecosystem, the wolf is one of the keystone species, which means that major changes to the species has the potential to significantly alter the ecosystem. If someone claims that relocation of a wolf pack is beneficial to the ecosystem, students who understand the keystone analogy will immediately raise a red flag about this statement.

Analogical reasoning enables students to transfer social values from one setting to another. In the dialogue excerpted in Table 4.2, Bruce puts himself in the position of the wolves. Then, he draws an analogy between people living in their own houses and wolves living in their natural habitat. He claims that eradicating the wolves from their territory is just like

TABLE 4.2. Illustration of the Use of Analogy to Instill Empathy

BRUCE:	I would:: My main idea is I just wouldn't want to kill the wolves, 'cause if you are a wolf living in your own territory, not bother no elks, [Dan] Exactly. [Dan] you would not:: You wouldn't want to be messed with or getting chased down by hunters or cars or anything. You just want to live in your natural habitat, like what:: [Avril] Right [Avril] we lived in our:: we lived in our houses.
AVRIL:	It's like:: it's like:: it's like:: it's like:: it's like nature killing:: it's like:: it's like you're killing yourself, because you:: you don't want any:: you don't want any big animal killing you, right?
SALLY:	Or it's like saying:: You know how animals, they get killed, or we could get, like:: We could get shot, we can go to jail. It's the same thing like they get caged. Feels like we are getting in jail. [Bruce] Exactly. [Bruce] Or they are getting hunt, like we getting killed by someone else.
AVRIL:	Like:: like:: like if we kill them a:: another animal could kill us for killing someone, for killing an animal that they might rely on. So you know::
BRUCE:	Or:: And it's like if:: if you li*:: You're living in your house peacefully, not bother nobody, and some people just:: [Avril] And somebody:: somebody just come in and try to kill you, or whatever. [Avril] Yeah, and people just:: and people just come in without even knock on your door or telling you that they are coming. And they just broke in, right in your door [Avril] Right, just bust in the door. [Avril] And tell you to get out of your house. That's probably was what the wolves feel like. If they got killed:: so I wouldn't want to kill them, because we would feel the same:: feel the same way.

Note. [Name] [Name] indicates segment of overlapped or interjected speech. :: denotes sentence fragments.

someone breaking into someone's house to kill the people. Bruce's analogy is revoiced and elaborated by others in the discussion.

Seeing the relevance of social values in new and different situations is a source of empathy toward others, which is crucial for social understanding and prosocial behavior (Findlay, Girardi, & Coplan, 2006). Analogical reasoning is particularly observed when students discuss texts in social sciences and the humanities, such as history, political science, and ethnic studies that bear on public policy. Public policy always involves social values and is not necessarily straightforward or black and white. Analogical reasoning can enable transfer of social norms, and consequently, empathy, from one situation to another; thus, it can help students better understand different voices and consider the emotional implications of possible courses of action.

Metacognition for Conceptual Learning

CR appears to improve students' metacognition as well (Latawiec et al., 2016). *Metacognition* is the ability to reflect on and evaluate one's own thoughts; for example, did my claim make sense to my audience, did my evidence support my point? Based on such an evaluation, you can deliberately adjust your performance to achieve a goal (Winne & Azevedo, 2014). Metacognition is important in reading for conceptual learning, because it is often necessary for students to accommodate their existing concepts in light of new concepts. When reading is difficult or confusing because you have beliefs that conflict with what you are supposed to learn, reading slows down; to succeed, readers have to exercise control over what is ordinarily a largely automatic process (Dole, 2000). Rather than just accepting thoughts that bubble up, it may take some self-conscious work to come to a resolution.

Without skill and the disposition to reflect on what they are reading, students may fail to realize that there are discrepancies between their prior beliefs and the information in a text (Chi, 2008). Sustained engagement in the type of metacognition required to resolve conflicting ideas is difficult for individual readers (Thiede, Griffin, Wiley, & Reford, 2009), because it can create a heavy cognitive load. Juggling alternative interpretations requires readers to keep in mind more information than is normally needed for reading. A collaborative discussion can help students cope with a large amount of possibly conflicting information, enabling students to think critically and analytically about a conceptual text despite the obstacles (Dole & Sinatra, 1998).

Through the group process, peers' challenges, or requests for clarification, students become aware of inadequacies in their own ideas and are introduced to new possibilities. To play their part in a discussion, students must strive to make their contributions complete and cogent. Then, peers provide further feedback and students once again try to improve their ideas until all are satisfied. Continuous feedback from peers alleviates the cognitive demands of self-evaluation. Students learn to form their thoughts through a more reflective and critical lens.

Table 4.3 presents an excerpt from a discussion of *Amy's Goose* (Holmes, 1977) to illustrate how students endeavor to refine an argument

TABLE 4.3. Illustration of Argument Development in Response to Peer Feedback

AURETHA:	But the//
KEVIN:	Yeah, but the bar-, barn door's closed.
TIMOTHY:	// Yeah, but if they knock it down.
SYLVIA:	What kind of fox : could do that?
AURETHA:	: How, how could the fox knock out the door? [children giggle]
TIMOTHY:	Jump on it?
KEVIN:	: Yeah, right.
SYLVIA:	: No, he's not strong enough.
MARCEL:	I don't :: that's gonna?
AURETHA:	:: OK, jump down the door, knock out the door, if, the door's rusty, and wiggly.
TIMOTHY:	::: Yeah, but if it won't,
KEVIN:	::: And if it is very old, too.
TIMOTHY:	But people open the door, to get in there, the fox can sneak in, so while they're gone//
SYLVIA:	// Yeah, but they could see the fox sneak in.

Note. : denotes the first occurrence of overlapping speech. :: and ::: denote the second and third occurrences, respectively. The first // indicates where the speech is interrupted, whereas the adjacent // denotes the interjecting speech.

in response to peer feedback. In the excerpt, Auretha, Kevin, and Timothy argue that a fox could knock down a door to enter the barn. However, Sylvia is not convinced by their claim and continues to point out flaws in their argument. Because of Sylvia's immediate and continuous feedback, the other students were able to realize the inadequacies in their argument and further improve it. Such a collaborative context enables students to develop and exercise metacognition. Research has found that CR students are able to internalize this skill and employ it when writing an individual essay. In their essays, students entertain the pros and cons of multiple possibilities as if they were responding to an imaginary challenger (Reznitskaya et al., 2009).

Conclusion

To understand a conceptual text, readers need to reason actively with the ideas it contains, ideas that possibly conflict with readers' existing beliefs. The necessary reasoning skills can include drawing causal relationships, comparing similar concepts, synthesizing different sources of information, evaluating peers' and one's own conceptual understanding, and reconciling conflicting ideas. Such thinking is fostered in a dialogical context, such as CR, an open, student-managed approach to classroom discussion. CR has been shown to be effective in developing causal reasoning (Ma et al., 2017), analogical thinking (Lin et al., 2012), decision making (Zhang et al., 2016), stratagems for arguing (Anderson et al., 2001), and facility in metacognition (Latawiec et al., 2016). Students who participate in CR develop a more complete argument schema, including the knowledge that a sound argument incorporates evidence and considers both sides of the issue (Anderson et al., 2001; Reznitskaya et al., 2009).

Social interaction exposes students to novel reasoning skills. In collaborative discussion, socially and cognitively advanced peers serve as models of good thinking; the skills they display are picked up and internalized by other students. Later, students are able to use the thinking skills for individual tasks, such as essay writing. The discussion brings forth various perspectives as students help one another evaluate the cogency and comprehensiveness of ideas. Through collaboration, students can co-construct ideas about complex and difficult concepts; the co-construction process refines their conceptual understanding.

Besides the cognitive benefits, CR fosters positive social and affective dispositions foundational for conceptual learning. Student leadership

of discussions emerges and in turn improves learning outcomes (Li et al., 2007; Sun et al., 2017). CR facilitates engagement and positive feelings (e.g., enjoyment, curiosity, interest, excitement) toward thinking about difficult issues, especially in students who were previously less engaged in school. Positive feelings are associated with increased engagement, and both engagement and positive feelings are significantly related to learning outcomes (Sun et al., 2018). Increased engagement, interest, and curiosity promote the kind of deep reading of texts necessary for conceptual growth (Miller et al., 2014).

In summary, intellectually and socially stimulating dialogue, such as that in CR discussions, can elevate students' reading experience. In discussions, children encounter ideas that may not occur to an individual child. The need to communicate presses children to express ideas that they would leave vague or incomplete if they were working alone. In collaborative discussions, thinking skills emerge that support learning from conceptual texts. Collaborative discussions inspire the disposition to look at the other side, to spontaneously consider counterarguments invoked, we may suppose, by a little voice, distilled from the many voices of classmates and others with whom one has argued, that whispers, "Wait, what's wrong with that idea? What would someone who disagrees say?" Talking with peers about controversial issues is fun for children and socially fulfilling. Positive feelings and social stimulation fuel students' motivation to read texts deeply and further enhance learning outcomes. Supported by research evidence, CR is a viable discussion approach that can be integrated into reading instruction to optimize conceptual learning.

IMPLICATIONS FOR PROFESSIONAL LEARNING

- Student-centered discussions can extend concepts introduced in reading as students strive to explain themselves to their classmates and respond to criticisms.
- During discussions, students can learn academic vocabulary and begin to acquire higher-order thinking skills by observing peers.
- Students as early as grade 3 can collaboratively conduct an argumentative discussion. Minimal teacher support, such as prompts for evidence or clarification, is sufficient to maintain the discussion flow.

QUESTIONS FOR DISCUSSION

1. How would you formulate a big question for discussion?
2. What are the expectations and norms you intend for students to follow during discussions?
3. What is a suitable size for a discussion group? How would you decide which children to put in each group?

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