Issue 8 Spring 2017

CORE Academic Quarterly

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CORE Leadership Corner

The Internal Coherence Framework: Creating the Conditions for Continuous Improvement in Schools

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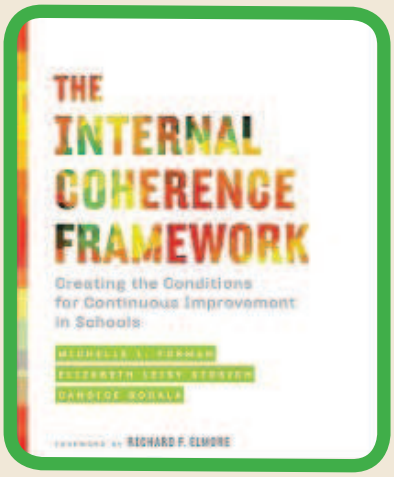
The Internal Coherence Framework: Creating the Conditions for Continuous Improvement in Schools by Michelle L. Forman, Elizabeth Leisy Stosich, and Candice Bocala (2017) establishes a set of guidelines and procedures (clinical practices) for school leadership teams to create a systems approach to professional learning. The framework provides the impetus for teachers to work collectively to improve a school's achievement. The authors argue the following:



> "When teachers work in isolation or rely on their individual teaching style, students experience inconsistent teaching as they move from classroom to classroom, and they encounter a spectrum of practices that range from ineffective to effective . . . Unless the learning activities of the faculty in a given school are coordinated, the overall result is unlikely to constitute a coherent instructional approach." (p. 2)

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The Internal Coherence Framework (cont.)

The framework has three central elements:

FRAMEWORK ELEMENTS

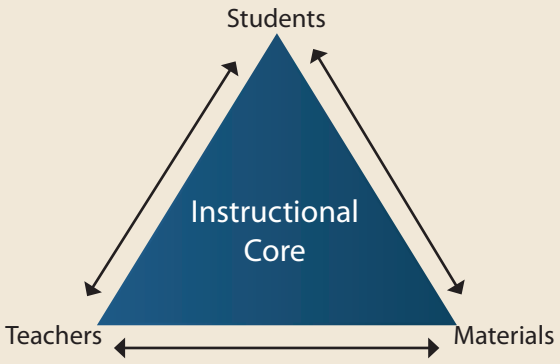
1. **Leadership practices** that promote leadership for learning, psychological safety, and meaningful professional development
2. **Organizational processes** that involve teacher collaboration around instructional improvement strategies and the development of shared understanding of effective practice and team processes
3. **Teacher efficacy beliefs** that result in teachers recognizing that they can affect student outcomes, which in turn results in more positive student achievement

Additionally, four core principles guide the internal coherence approach to school and system improvement:

CORE PRINCIPLES

1. Internal coherence should be built around the instructional core.
2. Improvement is a challenge of learning, not implementation.
3. Mastery experiences change beliefs and behavior.
4. Clinical practices and tools make research actionable.

With regard to the first two core principles, the instructional core involves a complex interaction among the student, the teacher, and the content being taught. In other words, in order for meaningful student learning to occur, there must be an interplay among the teacher's knowledge of good teaching practices, the content he or she is teaching, and the instructional materials being used, along with students' understanding/experiences with the content and engagement with the learning. Note the two-way interaction between each of the three components in the graphic (shown at right and on p. 8 in the book). Thus, discussions about instruction during team meetings should include all three of these elements rather than just one or two.



The second core principle recognizes that challenges with a new curriculum usually center around whether or not teachers are teaching or implementing the curriculum (i.e., using the strategies, instructional routines, and materials of the curriculum). However, the authors wisely point out that "teachers can only implement instructional practices that they already know how to perform" (p. 10). Thus, learning a new curriculum requires organizational structures to be in place and time allotted for teachers to collaboratively understand, practice, and reflect on the new aspects of the curriculum. This collaborative time also involves teachers' ability to incorporate any new approaches with their existing knowledge of pedagogy and content, and to reflect on how students were successful or not successful with these new approaches. We at CORE agree that teacher learning is an important factor for success teaching a curriculum; however, implementation also plays an important role. Expectations set by leadership and agreements made by the staff that all will commit to teaching the new curriculum are factors that also must be present.

The Internal Coherence Framework (cont.)

In Chapter 7, the authors suggest two common challenges with teachers' conversations during team meetings—unfocused discussions and lack of interdependence in teams—and how to address those challenges. The authors note that in team meetings, there is a prevalence of individual sharing and less "joint work." This joint work, or interdependence, is fostered by teachers working together to "make sense of new instructional practices and their impact on students' understanding" (p. 158). The authors introduce a framework of instructional conversations that is based on the question, "How do some team discussions support teachers' collective efforts to improve teaching and learning more than others?" (p. 162). Two factors seem to contribute to the quality of the conversations. One is *instructional relevance*, which refers to the degree to which the conversations address all elements of the instructional core: teacher, student, and materials. In other words, it is the *what* of the conversation. The second factor is *depth of inquiry,* which refers to the *how* of the discussions—the extent to which the conversations "center on the knowledge building processes of sharing, examining, constructing, planning, and monitoring, and how much a team uses these to collectively, develop, test, and revise its understanding and practices" (p. 165).

Chapter 7 is one of the most informative chapters because it addresses a complex issue. In the current design of teacher work in the United States (isolation and little or no collaboration time), it is no wonder that teacher teams, if they exist, lack interdependence and have limited quality instructional conversations. The chapter goes on to describe a process for teacher teams to analyze their own discussions to determine their level of instructional relevance and depth of inquiry.

The book also includes important information about how to use the Internal Coherence Survey and the Internal Coherence Rubric, which are more general than, but similar to, CORE's own Literacy and Math Implementation Rubrics (found here; scroll all the way down). The Internal Coherence Survey and Rubric and CORE Implementation Rubrics tools help teams provide a focus for next steps.

We highly recommend this book for school leadership teams as well as district teams to study. As the authors note in the closing thoughts of the book,

> "The internal coherence experience transforms school faculties into collaborative cultures guided by the relentless pursuit of an instructional focus . . . Using the information generated from both professional learning communities and schoolwide peer observations, teachers increase their capacity to serve the learning of all students, identifying what works and what does not." (p. 218)

Words Matter in Math

by Dean Ballard, Director of Mathematics, CORE, Inc.

While working in a middle school classroom in Anchorage, Alaska, a couple of years ago, I observed the teacher conducting an interesting math lesson. The teacher provided students a chart for tallying the sums of rolling two numbered cubes (standard dice). She told the class to copy the chart and use it to collect their individual data—"to tally their sums on the chart." The students immediately went to work on the assignment. As I circulated around the room I noticed one student who had the chart correctly copied and was rolling both dice, but was tallying numbers only from 1 to 6. I asked the student why he had tallies only for the numbers from 1 to 6. He held one of the die up to my face, looked at me like I was an idiot and said, "'Cause the dice only have numbers from 1 to 6 on them." I thought about it for a moment and realized he had been tallying **some** results from rolling the dice, just not the **sums** of the dice. I'm continually learning as a math teacher, coach, and consultant that concepts, communication, and vocabulary go hand-in-hand in mathematics. How we communicate affects understanding and can be either an obstacle to learning or a highly effective tool for developing and deepening learning of mathematics at all grade levels.

Math is often called a universal language or the language of numbers. However, learning the language of math is like learning a second language (Kenny et al., 2005). As with learning any second language, it is essential for students to talk, write, and read in mathematical language. These types of communication are important for learning mathematical concepts, procedures, and applications (National Research Council, 2001; NCTM, 2014; CCSSM, 2010; Hattie, Fischer & Fry, 2017). Language plays an important role in mathematics, just as language is critical in learning other school subjects (Schleppegrell, 2010). Not only is "depth of word knowledge the most reliable predictor of English learner academic achievement across grade levels and curriculum . . . [but] mounting research has highlighted the benefits of planned, intentional vocabulary instruction to support literacy and content learning for all students" (Kinsella, 2017). Talking, writing, and reading about math all require facility with mathematics vocabulary, which makes teaching math vocabulary a priority (Fogelberg et al., 2008).

Challenges with Mathematical Vocabulary

Mary Schleppegrell described mathematics as a multifaceted language that is "conceptually dense." Students must constantly learn new mathematical ideas in large part through the integration of several aspects of mathematical language that includes specialized words and academic language along with "the language of mathematics symbolism"—the meaning constructed through visual representations such as graphs, charts and diagrams (2010). Additionally, math-specific terms, words with multiple meanings, and little words are causes of confusion for students (Fogelberg et al., 2008). The chart to the right provides examples of words and word types that add to the challenges with mathematical language.

Challenging Word Types in Math

Double Meanings		Homophones		
table	fraction	plane	vs.	plain
base	volume	whole	vs.	hole
line	similar	sum	vs.	some
Multiple Terms – Same Idea		**Small Words/Phrases**		
or	fewer	add	vs.	sum
many	then	solve	vs.	compute
an	any	justify	vs.	prove
Unique Terms		**Similar Sounding Words**		
hypotenuse	parallelogram	tens	vs.	tenths
coefficient	quadratic	sixty	vs.	sixteen
place value	denominator	then	vs.	than

Words Matter in Math (cont.)

Schleppegrell also identified several semantic challenges with mathematics (2007, pp. 143–144).

- Long, dense noun phrases, such as

  The volume of a rectangular prism with sides 8, 10, and 12 cm
- Classifying adjectives that precede the noun, such as

  prime number, rectangular prism
- Qualifiers that come after the noun, such as

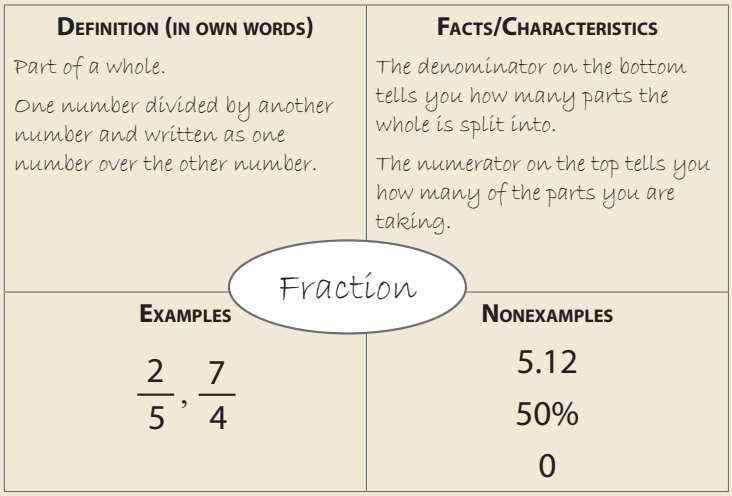
  A number which can be divided by one and itself
- Conjunctions such as

  if, when, therefore, given, assume, etc.

Reading in math is a necessary skill. Math textbooks, which serve as a primary resource, are one important part of students' mathematical education. Word problems, application problems, and challenging tasks are also vital parts of learning and understanding mathematics (Hattie et al., 2017; NCTM, 2014; National Governors Association, 2010; Smith & Stein, 2005). However, struggles with math vocabulary can greatly inhibit students' ability to decipher what they read. The greater the vocabulary knowledge, the greater the ability to read with comprehension (Brummer & Kartchner Clark, 2014; Honig, Diamond & Gutlohn, 2013). In order to understand mathematics, students need to understand the language of mathematics.

Importance of Vocabulary Instruction in Mathematics

Students need explicit instruction to help them learn to read math texts and word problems (Kenney et al., 2005). Activities that build students' vocabulary are an important part of instruction (e.g., use of word walls and anchor charts). Because math terms are tightly linked to math concepts, learning these terms helps students also engage in discussing and writing about mathematical ideas, solutions, and connections (Brummer & Kartchner Clark, 2014). Consider the word *fraction*. To define *fraction* a student must demonstrate understanding of the mathematical idea of a fraction. An example of a vocabulary activity for the term *fraction* is the use of a Frayer Model (Frayer, Frederick, & Klausmeier, 1969). The Frayer Model diagram shown to the right illustrates how the understanding of *fraction* is deepened, reinforced, and/or developed as a student creates and completes this chart.



Students should also be required to use specific math vocabulary both orally and in writing beyond vocabulary-specific activities. The California Department of Education finds that teaching math vocabulary in context is "essential for instruction" and goes on to provide an excellent set of recommendations (2015, p. 685):

- Explicitly teach academic vocabulary for mathematics, and structure activities in which students regularly employ key mathematical terms. Be aware of words that have multiple meanings (such as root, plane, table, and so forth).

Words Matter in Math (cont.)

- Provide communication guides, sometimes called sentence frames, as a temporary scaffold to help students express themselves not just in complete sentences but articulately within the Mathematical Practice standards.
- Use graphic organizers and visuals to help students understand mathematical processes and vocabulary.

Conclusion

Words matter in math. Attention must be given to the variety of challenges students face when learning and using the language of mathematics, such as math-specific words, words with multiple meanings, small words, and semantic challenges (e.g., long, dense noun phrases). Teachers must explicitly draw attention to mathematical terms as they arise throughout instruction by illustrating the meaning of the terms, helping students associate images with terms (Marzano et al., 2001), and providing constant reinforcement.

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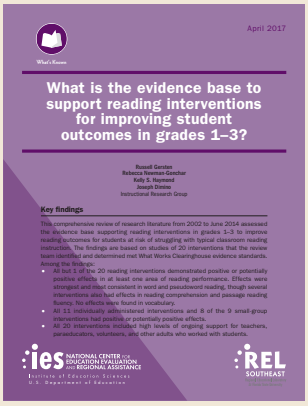
CORE® **Reading Expert**

Evidence Base to Support Reading Interventions

by Dale Webster, Ph.D., Chief Academic Officer, CORE, Inc.

The last two editions of the Academic Quarterly (Fall 2016 and Winter 2017) focused on reading interventions at the word and comprehension levels. In this edition, we highlight a recent report co-authored by the REL Southeast and the Institute for Education Sciences entitled "What is the evidence base to support reading interventions for improving student outcomes in grades 1–3?"



The purpose of this report was to assess the current evidence base on the use of reading interventions for improving student outcomes in grades 1–3. Twenty-three efficacy studies of 20 different Tier 2 (strategic) interventions were selected for review. Studies of Tier 3 (intensive) interventions were not selected to be part of the review. Of the 20 Tier 2 interventions, 19 showed positive or potentially positive effects. Unfortunately, but not surprisingly, no effects were found for vocabulary.

You can download the full report here.

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- How to intentionally use everyday instructional practices in order to support English language development (ELD)
- How to use visual, graphic, and class discussion supports that are evidence-based practices for ELD instruction

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- Look for CORE's upcoming blog on dyslexia, coming June 13!

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