CKLA Curriculum: Links to Research on Teaching and Learning

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Executive Summary

This paper examines research-based rationales guiding the three major dimensions of the CKLA program: (1) the two-strand approach to instruction in K–2, (2) the language-based and knowledge-driven approach to building children's capacity with complex text and vocabulary, (3) the importance of explicit and systematic phonics instruction to build automaticity with the written code.

The two-strand design in K–2 refers to the fact that the CKLA program, in these grades, is organized around two distinct blocks of language arts instruction, each with its own set of activities, materials, and goals. In the Knowledge strand, oral language and listening comprehension skills are honed through interactions with complex, knowledge-based texts.

Although developmental and cognitive perspectives on reading emphasize the strong relationship between early language skills, background knowledge, and later reading comprehension (Dickinson, Golinkoff, and Hirsch-Pasek, 2010; Kintsch, 1994; Neuman and Celano, 2006; Scarborough, Neuman, and Dickinson, 2009), instructional materials have not consistently mirrored this understanding (Pianta et al., 2007). CKLA designed a read-aloud component (the Knowledge strand) that blends language support, vocabulary, knowledge building, and listening comprehension skill development in an integrated manner.

In the Skills strand, time is dedicated to building decoding and word-level automaticity within controlled, decodable texts. The decision to split the instructional focus in the earliest grades is based in recent developmental models of reading that refute the notion that decoding and reading comprehension develop sequentially (Catts et al., 2012; Kendeou et al., 2009; Scarborough, 2005; Storch and Whitehurst, 2002). In Grade 3, the program continues to develop skills (e.g., grammar, spelling, morphology), but the content of the Knowledge strand begins to integrate into the Skills strand in more systematic ways. There are still almost-daily read-alouds, but students also read independently about the topics introduced during the read-alouds. This serves as a bridge toward the program design in Grades 4 and 5, where instruction moves away from the two-strand model toward a single, integrated language arts block. By Grades 4 and 5, the focus is on fluent reading for meaning-making and the emphasis, instructionally, is on increasing efficiency and skill in the integration of word- and text-level skills, as occurs with proficient readers (Perfetti, 2007). Although Grades 4 and 5 do not have two distinct strands of materials, the premise of the CKLA design—building both knowledge and skills—is consistent across all grade levels.

Although developmental and cognitive perspectives on reading emphasize the strong relationship between early language skills, background knowledge, and later reading comprehension (Dickinson, Golinkoff, and Hirsch-Pasek, 2010; Kintsch, 1994; Neuman and Celano, 2006; Scarborough, Neuman, and Dickinson, 2009), instructional materials have not consistently mirrored this understanding (Pianta et al., 2007). CKLA designed a read-aloud component (the Knowledge strand) that blends language support, vocabulary, knowledge building, and listening comprehension skill development in an integrated manner. The Knowledge strand uses interactive read-alouds to:

- provide exposure to complex language and texts as a means of supporting language development, in a manner that is particularly supportive for those from disadvantaged backgrounds, with language-based disabilities, or English language learners (D'angiulli, Siegel, and Maggi, 2004; Hargrave and Sénéchal, 2000);
- provide intentional word exposure to support vocabulary learning (Biemiller and Boote, 2006; Neuman et al., 2006; 2009);
- build children's knowledge and understanding of words and ideas needed to form a clear or coherent mental understanding—comprehension—of the text;
- provide all children a model of active and engaged text processing that, over time, becomes internalized (Snow and Ninio, 1986 Sulzby and Teale, 1986; Vygotsky, 1978).

CKLA read-alouds are an important tool used across grades to build children's independent capacity for understanding and analyzing complex text. The read-aloud experience is specifically designed to integrate key messages about successful reading from cognitive, developmental, and applied research bases.

The Knowledge strand further reflects current research through instructional design that utilizes:

- *a knowledge-based organization, intentionally sequenced within and across grades*, to help children draw multiple connections among words by supporting their ability to make inferences across words (Rehder and Hastie, 2004) and to link information together to form a coherent 'whole'(Gernsbacher, 1990; Graesser, Millis, and Graesser, 2011; Kintsch,1998; van den Broek et al., 2001; van den Broek, 2005; Zwaan and Radvansky, 1998).
- *interactive reading supports (teacher prompts occurring within the text) and post read-aloud discussions* to balance both literal and inferential questioning before, during, and/or after the read-aloud to ensure text-focused discussions that review and extend the concepts within the text (Brabham and Lynch-Brown, 2002; Hindman et al., 2012; Santoro et al., 2008; van Kleeck et al., 2006);

- *interactive reading supports and explicit vocabulary activities* to focus on vocabulary during and after reading (Beck and McKeown, 2001, 2007);
- *nonfiction texts* as a means of providing context for supporting inferential and analytic talk—the type of language talk seen as critical to vocabulary and language development (Zucker et al., 2010); and
- *highly scaffolded (not scripted) teacher guidance*, reflecting the growing research base that indicates the need for specific and fine-grained language and literacy instructional materials to elicit the high-quality interactions known to best support children's development (Dickinson et al., 2011).

CKLA read-alouds are an important tool used across grades to build children's independent capacity for understanding and analyzing complex text. The read-aloud experience is specifically designed to integrate key messages about successful reading from cognitive, developmental, and applied research bases. The interactive lesson format prioritizes the language basis of strong reading, while the knowledge-driven domain organization supports vocabulary acquisition, knowledge building, and comprehension development.

Effective phonics instruction includes: (1) systematic ordering of phonetic targets that progress in number and complexity over time; (2) systematic practice in which children have intentionally designed opportunities to apply and use the sound-spellings they are taught (DeGraaff et al., 2009); and (3) systematic instructional planning whereby methods of instruction are consistent and progress depending on students' learning (Bodrova and Leong, 2006; DeGraaff et al., 2009).

With regard to the written code, research shows that phonics instruction is not simply present or absent, but rather exists in degrees. What research suggests is that the degrees may matter—substantially—to children's outcomes. Effective phonics instruction includes: (1) systematic ordering of phonetic targets that progress in number and complexity over time; (2) systematic practice in which children have intentionally designed opportunities to apply and use the sound-spellings they are taught (DeGraaff et al., 2009); and (3) systematic instructional planning whereby methods of instruction are consistent and progress depending on students' learning (Bodrova and Leong, 2006; DeGraaff et al., 2009).

CKLA's systematic phonics component—the Skills strand—embodies these three dimensions of systematic instruction by:

- *explicitly teaching the 150 spellings for the 44 sounds of English in an intentionally sequenced progression from Kindergarten through Grade 2*. Research consistently demonstrates that explicit phonics instruction has important, lasting benefits to children's reading accuracy, and this is one of the most emphasized aspects of phonics instruction for English language learners, as well as children struggling to learn reading (August et al., 2005; Brady, 2011; DeGraaff et al., 2009; Ehri et al., 2001; Torgesen, 2006; Torgesen et al., 2001; Vaughn, 2007);

CKLA's approach balances both the motivation and mastery aspects of practice. To achieve this, the student Readers are phonetically controlled, containing only the sound-spelling patterns and sight words that have been taught to date. The Readers are colorful, chapter–length books with appropriately complex text (i.e., Lexiles on the books reflect grade-appropriate levels). The books offer mastery-oriented code practice while engaging children with strong characters and content.

- *including a variety of features designed to minimize confusion and maximize practice and application of each sound spelling*, consistent with research that such an approach leads to significant benefits in efficiency and in accuracy within children's learning (Share, 1995; Torgesen, 2006; Torgesen et al., 2001; Ziegler and Goswami, 2005). A key component of this design is the sequence of instruction, which progresses from the most common, least ambiguous spellings in Kindergarten to the least frequent, most confusing sound spellings in Grade 2;

- *emphasizing the use of systematic, mastery-oriented practice* that distinguishes the program from many other explicit phonics instructional programs. In reading skill acquisition, the end goal of practice is to achieve fluent, automatic reading, which is defined as "efficient, effective word-recognition skills that permit a reader to construct the meaning of text" (Pikulski and Chard, 2005, p. 510). CKLA's approach balances both the motivation and mastery aspects of practice. To achieve this, the student Readers are phonetically controlled, containing only the sound-spelling patterns and sight words that have been taught to date. The Readers are colorful, chapter–length books with appropriately complex text (i.e., Lexiles on the books reflect grade-appropriate levels). The books offer mastery-oriented code practice while engaging children with strong characters and content. Additionally, handwriting, spelling, fluency packets, and homework also focus primarily on sound-spelling patterns and sight words already taught;

- *using reading and writing activities that include both newly and previously taught spelling patterns* to distribute practice across time and contexts to enhance the practice effect (see Toppino and Gerbier, 2014). *Distributed practice* refers to the idea that learning is facilitated when students receive multiple exposures to a concept or skill, spaced over time (Carpenter et al., 2012; Cepeda et al., 2006; Gerbier and Toppino, 2015);

The CKLA program is designed to take a systematic and explicit approach to teaching the English code. The program's integrated approach to instruction, practice and extension, and progress monitoring/individualization creates a systematic instructional approach designed to support all learners and reflects the knowledge of cognitive science and reading development within its instructional apparatus.

- *teaching phonics and reading/writing fundamentals through an integrated system of assessment, general curriculum, and supplementary curricular materials designed for added differentiation and support*. Research finds that one of the challenges in providing differentiated instruction to students is a lack of specifically designed activities or ideas that relate to the skills or targets taught within the general curriculum (e.g., Al Otaiba et al., 2011). CKLA addresses this challenge by supplementing the core instructional materials, which already include Additional Support activities at the end of each lesson for more practice, with a comprehensive Assessment and Remediation (A&R) Guide. The A&R Guide aligns with each specific unit of instruction and provides ideas and activities for added or differentiated instruction around all key skills areas within Kindergarten and Grade 1. In Grade 2, the remediation materials emphasize activities to focus on automaticity with the code and fluency in later grades. Further, the A&R Guide provides specific progress-monitoring tools to allow teachers to consider children's broader progress and response to the curricula (with, again, suggestions and guidance on differentiation, depending on the results of these tools);

- *providing, as with the Knowledge strand, specific and fine-grained instructional guidance*, to elicit the high-quality interactions known to best support children's language and literacy development (Dickinson et al., 2011).

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Core Knowledge Language Arts (CKLA)Program: Links to Research on Teaching and Learning

The Common Core State Standards (CCSS) establish an ambitious vision for the K–12 education system. The standards demand that educational experiences, at every point along the developmental continuum, transparently and intentionally point children toward becoming "college and career ready." Embedded within the language arts standards is a shift in how to approach reading and writing as developmental processes. The standards move away from reading and writing as discrete skills and toward reading and writing as language-based, life-long developments that are tightly interwoven with children's growing knowledge of the world. As such, implementation of these standards requires a more content-rich curriculum. Investment has been made at the national, state, and district levels to support alignment of curricula to the CCSS. Yet common standards are not a guarantee that each curricular effort will be equally effective. Important to the reform effort is the recognition that guidance on the goals of instruction (i.e., the standards) does not direct or demand consistency in the quality of curriculum, materials, or methods.

The Core Knowledge Language Arts (CKLA) program meets the CCSS in ways that are consistent with the research on how children learn and on effective pedagogy. This paper establishes the links among the design of CKLA and research on children's learning and development, as well as research on effective teaching practices. To do this, the paper examines research-based rationales guiding the three major dimensions of the CKLA program: (1) the two-strand approach to instruction in K–2; (2) the language-based and knowledge-driven approach to building children's capacity with complex text and vocabulary; (3) the importance of explicit and systematic instruction to build automaticity with the written code.

A Two-Strand Model is Essential for Developing Skills and Comprehension in K–3

The Highlights: Developmental research points to the importance of a reading curriculum that provides equal weight to children's decoding development and oral language/comprehension development in the early years. However, cognitive research suggests the challenge, if not impossibility, of creating a single reading experience that would equally drive development of these two distinct cognitive processes (i.e., decoding and comprehension). Cognitively, engaging a young child in independent reading does not create an experience in which the child spends equal mental energy on building decoding skills and building language and comprehension skills. Further, to foster oral language skills, young children need language interactions with texts at levels that far surpass their decoding ability (Cunningham, 2005; Scarborough and Dobrich, 1994). CKLA addresses both cognitive and developmental bodies of research through its two-strand design in the early grades.

The two-strand design in K–2 refers to the CKLA program's organization, in these grades, around two distinct blocks of language arts instruction, each with its own set of activities, materials, and goals. The Skills strand emphasizes supporting children's acquisition of the written code of English—its spelling patterns, grammatical rules, and conventions—and practicing and applying these skills in meaningful activities to ensure automaticity and fluency. The Knowledge strand emphasizes teacher read-alouds that expose children to complex texts (beyond most children's reading levels) across a rich set of coherent and systematically ordered texts and topics. The materials are designed to build knowledge in areas of history, science, literature, and geography. The lesson activities also emphasize vocabulary acquisition, develop related comprehension skills orally, and build oral and written expression skills. In both strands, children engage with meaningful texts, reflect upon these texts, and apply various oral and written language skills. In Grades 3–5, these strands intertwine in developmentally guided ways. (To see specific exemplars of the program and/or information on more specific program features, please see the CKLA Program Guide at ca.ckla.amplify.com)

The Research Base for a Two-Strand Model

From the cognitive perspective, the act of reading—whether for young children, older children, or adults—requires decoding, that is, translating the written code to oral language, and comprehension, the act of using prior knowledge, language skills, and reasoning skills to form connections and make meaning (Gough and Tunmer, 1986; Graesser, Millis, and Graesser, 2011; Graesser, Singer, and Trabasso, 1994). Developmental models, however, demonstrate that equal cognitive attention does not go to decoding and comprehension for all readers at all levels (Kendeou et al., 2009). The skilled reader (typically Grade 4 and above) is extremely efficient in translating written text into oral language and meaning. When reading, the skilled reader puts minimal mental energy into decoding and has plenty of mental energy to focus on word- and text-level processes to make meaning of the text (Graesser et al., 2011; Perfetti, 2007; Vellutino et al., 2007). Research suggests that skilled readers use higher-order language skills and reasoning skills in an almost constant way during reading—making 200 to 300 inferences within a page of text (van den Broek et al., 2005). Much of this mental activity is not conscious, as the brain automatically works to form connections across words and concepts (e.g., the referent for a pronoun, connecting verbs about movement to setting changes), relating concepts of the text to concepts in memory (e.g., linking the word *winter* in a story to background knowledge about the weather associated with winter). However, these somewhat automatic inferences combine with more cognitively driven inferences (e.g., to form a causal chain of information) to create a mental picture of the text's meaning (Gernsbacher, 1990; Graesser et al., 2011; Kintsch, 1994; Zwaan and Radvansky, 1998).

For a child just learning to read, however, most mental energy is, by necessity, devoted to decoding. When decoding is not automatic, it may constrain the degree to which a child can extend his or her full capacity toward comprehension (Just, Carpenter, and Keller, 1996; Vellutino et al., 2007). For this child, engaging with a book requires a substantial amount of cognitive resources to decode the text (Vellutino et al., 2007). Although a beginning reader still seeks to make meaning of the text, there is less mental capacity to put toward text-level comprehension processes (e.g., making connections and linking words and ideas of text to those in memory). Indeed, research examining what young children actually *do* with text highlights that the number and complexity of mental connections a young child will make in real time during reading develops progressively (van den Broek et al., 2005). As a child's decoding becomes more fluent and automatic, more mental energy becomes available for the language and comprehension processes that define skilled reading.

Historically, the fact that young readers must spend much of their mental energy on decoding, as opposed to comprehension, was interpreted to mean that the pathway for building strong readers began with a focus on decoding. Indeed, most reading instructional programs, as well as early interventions, are grounded in the assumption that building strong decoders in the early school years naturally leads to strong reading comprehension in the later years of school. However, recent developmental models of reading refute the notion that decoding and reading comprehension develop sequentially in this way (Catts et al., 2012; Kendeou et al., 2009; Scarborough, 2009; Storch and Whitehurst, 2002). In fact, estimates suggest that approximately 13% of all children with reading difficulties in fourth grade had average, or even above-average, decoding skills in the first two or three years of school (Catts et al., 2012). Further, developmental models of reading suggest that decoding skill in the early years *primarily* contributes to decoding skill and automaticity in the later years, whereas strong *oral language* and listening comprehension skills in the early years are the primary precursors to strong reading comprehension in the later years. Collectively, these data suggest that decoding is necessary, but not sufficient, for building lifelong, strong readers. Rather, children must *concurrently* develop strong decoding skill, language skill, and the broad knowledge and vocabulary that enable comprehension.

Links to CKLA

These developmental and cognitive perspectives on reading raise the question: How do you create a *single* reading instructional experience (and a single set of instructional materials) within the K–2 years that builds children's decoding capacity and simultaneously stretches their language and comprehension development? In fact, cognitive models of reading suggest that such an experience may be difficult, if not impossible, to craft. This is because, cognitively, *engaging a young child in independent reading does not create an experience where the child spends equal mental energy on building decoding skills and building language and comprehension skills.* Further, to foster the oral language skills that underlie the comprehension of complex text, young children need to hear and discuss texts that far surpass their decoding ability (Cunningham, 2005; Scarborough and Dobrich, 1994).

When taken together, two key messages from developmental and cognitive models of reading guided the CKLA two-strand design within K–2: (1) curricula need to give equal weight to children's decoding development and oral language/comprehension development in the early years; and (2) this cannot be accomplished within a single block of time and a single set of materials.

In the two-strand design for K–2, children are always having an *integrated* experience with literacy—meaning that they interact with words and texts in meaningful ways. However, the strands have different learning objectives and thus teachers emphasize different specific skills and use different materials. This approach to K–2 instruction—providing dedicated time to hone oral language and comprehension skills in relation to complex, knowledge-based texts (Knowledge strand) and dedicated time to build decoding and word-level automaticity within authentic, skill-level texts (Skills strand)—reflects an understanding of cognitive models of reading and developmental needs around reading skill acquisition. In Grade 3, the program continues to develop skills (e.g., grammar, spelling, morphology), but the content of the Knowledge strand begins to integrate into the Skills strand in more systematic ways. There are still almost-daily read-alouds, but students also read independently about the topics introduced during the read-alouds. This serves as a bridge toward the program design in Grades 4 and 5, where instruction moves away from the two-strand model toward a singular language arts block. It is important to note that the integration of the two strands in Grades 4 and 5 also reflects developmental perspectives on reading. By Grades 4 and 5, the focus is on fluent reading for meaning-making and the emphasis, instructionally, needs to be on increasing efficiency and skill in the integration of word- and text-level skills, as occurs with proficient readers (Perfetti, 2007). Although Grades 4 and 5 do not have two distinct strands of materials—as occurs in the Knowledge strand and Skills strand for Grades K–2—the premise of the CKLA design is consistent across all grade levels.

Regardless of a two-strand or single-strand design (as this varies across grades), the theoretical and unique premise of CKLA remains consistent across all grades and is largely reflected in these two key ideas: (1) the importance of taking a language-based and knowledge-driven approach to building children's capacity for complex text; and (2) the importance of an explicit and systematic approach to teaching the code of English. The remainder of this paper will examine the research that underlies these instructional decisions and how CKLA reflects the research base.

A Language-Based, Knowledge-Driven Approach Increases Comprehension

The Highlights: Young children's capacity for comprehending complex text is understood, within cognitive science research, as an intertwining of oral language skills, vocabulary knowledge, and world knowledge. Being able to read is, essentially, "understanding speech written down" (Goswami et al., 2003, p. 273.). Although developmental and cognitive perspectives on reading emphasize the strong relationship between early language skills, background knowledge, and later reading comprehension (Dickinson, Golinkoff, and Hirsch-Pasek, 2010; Kintsch, 1994; Neuman and Celano, 2006; Scarborough, Neuman, and Dickinson, 2009), instructional materials have not consistently mirrored this understanding. CKLA's read-aloud component works to blend language support, vocabulary, knowledge building, and comprehension skill development in an integrated manner. In this way, CKLA read-alouds aim to close the gap between what we know about comprehension development (from cognitive and developmental research) and what we do in the classroom by taking a language-rich, knowledge-based approach to building children's skill in text comprehension.

The interactive read-aloud sits in the center of the continuum between oral and written language. It does not involve children reading but does expose children to written text—complex text—and taps into language skills and vocabulary designated as "literate" aspects of oral language (Dickinson and Smith, 1994; McKeown and Beck, 1992; Snow and Ninio, 1986. The interactive read-aloud involves an adult reading a text aloud to students and engaging students in the text through discussion. This exposure to complex language and complex text through books powerfully supports the language development of more vulnerable populations of children, such as those from disadvantaged backgrounds, those with language-based disabilities, or English language learners (D'angiulli, Siegel, and Maggi, 2004; Hargrave and Sénéchal, 2000). Yet read-alouds are valuable for all children as *all children* learn language the same way—by the language that they hear around them and, most especially, the language directed toward them (Hoff, 2006; Paez, Bock, and Pizzo, 2011). Notably, the nature of vocabulary used and complexity of language used within speech is naturally and significantly more simplified than the language within text (Cunningham, 2005; Hayes and Ahrens, 1988). Text requires formal grammatical structures and precise vocabulary as there is no shared referent or point of focus, as occurs when listener and speaker are face-to-face. In fact, studies find that the number of rare words used per 1,000 words in *children's books* is approximately double that found in the speech of adults with a college education to friends or spouses and is approximately equal to the number of rare words used within expert witness testimony (Cunningham and Stanovich, 1998; Hayes and Ahrens, 1988).

For all children, the read-aloud provides exposure to complex language experiences through text. Further, the read-aloud usually creates an emotionally positive experience for engaging in complex text, as it is one supported by an adult. Cognitively, the interactive read-aloud provides children a model of active and engaged text processing that, over time, children can come to internalize (Snow and Ninio, 1983; Sulzby and Teale, 1986; Vygotsky, 1978). What is important and unique about the read-alouds within CKLA is in the dual focus given to *how* the read-aloud is conducted (i.e., to support language development), as well as on *what* content is introduced through the read-aloud, and when (i.e., systematically ordered content related to history, science, and literature). The design of CKLA read-alouds—a consistent, language-based lesson format and a coherent, knowledge-driven organization over time—defines the program's language-rich, knowledge-focused approach. Next, we consider the research base underlying these two aspects of the CKLA read-alouds.

Design Principle 1: A read-aloud lesson format designed to support language skills is critical to later reading comprehension.

According to the most current National Assessment of Educational Progress in reading, 33% of our nation's fourth-grade children cannot comprehend text above the basic level (National Center for Education Statistics, 2011), a trend largely unchanged for over three decades. Although developmental perspectives emphasize the strong relationship between early language skills and later reading comprehension (Dickinson, Golinkoff and Hirsch-Pasek, 2010; Hoff, 2013; Kendeou et al., 2009; NICHD ECCRN, 2005; Storch and Whitehurst, 2002; Vellutino et al., 2007), the classroom, and its instructional materials, have not consistently mirrored this understanding (Pianta et al., 2007). Studies looking at how instructional time is spent moment by moment find that classroom instruction underemphasizes robust language and listening skills known to be causally linked to later reading ability (e.g., vocabulary, decontextualized language/complex syntax). This lack of support for oral language development in early childhood classrooms is not benign; it may be directly implicated in maintaining, and even in entrenching, inequalities in reading achievement (Pfost, Dorfler, and Artelt, 2012).

This trend—that initial differences in young children's reading abilities widen in the early school years—has been historically noted and called the Matthew Effect (Stanovich, 1986). However, recent research finds that this 'rich get richer/poor get poorer' trend in reading is not due to children failing to achieve decoding skills in the early grades, as has often been thought. In fact, recent research suggests that children who begin school with weakness related to decoding appear to catch up (Pfost et al., 2012) and the children who fall further and further behind do so as a function of their comprehension and overall reading ability, both of which draw heavily on oral language and listening comprehension (Pfost et al., 2012). These findings suggest that classrooms in the early grades are not sufficiently supporting vocabulary growth, knowledge acquisition, and other developmental capacities needed for successful reading in the later grades.

One practice that offers great potential for supporting young children's language skills and academic knowledge is the read-aloud (Cunningham, 2005; Duke and Pearson, 2008; Morrow, 2003; Pinnell and Jagger, 2003; Sénéchal and LeFevre, 2002). Although the practice of adults reading aloud to young children is a classic and common one, often the quality of the read-aloud falls short of what is needed to support language and reading development (Scarborough and Dobrich, 1994). A key difference between effective read-alouds and less beneficial ones is the nature of interactions that occur in and around the book (Hindman, Wasic, and Erhart, 2012; Teale, 2003; van Kleeck, Vander Woude, and Hammett, 2006; Zucker et al., 2010). Research points to the importance of read-alouds being **interactive**. Interactive read-alouds engage children in the book through comments and questions. These interactions are ideally cognitively complex and model the active text analysis that strong readers eventually engage in independently.

A critical dimension of interactive read-alouds is the balance of both literal and inferential questioning before, during, and/or after the read-aloud to ensure the book launches text-focused discussions that review *and extend* the concepts within the book (Brabham and Lynch-Brown, 2002; Hindman et al., 2012; Santoro et al., 2008; van Kleeck et al., 2006). The point of these questions and of the talk during the shared reading experience is to scaffold children's experience with the text to ensure all children are supported in making meaning of the book (van Kleeck, 2003; Pentimonti and Justice, 2010). A second, well-recognized practice within shared interactive read-alouds is the focus on vocabulary during and after reading (Beck and McKeown, 2001, 2007). By selecting specific words critical to comprehension of the text and important for children's general knowledge, teachers can most effectively use the shared reading experience to enhance children's vocabulary. Although the value of these practices are almost universally endorsed within the research community, the quality of these language-rich practices continues to fall short in the classroom (Hoffman, Roser, and Battle, 1993; Pentimonti and Justice, 2010). This is especially true for the use of nonfiction texts, as research finds children's guided interactions with these texts are minimal to nonexistent (Duke, 2000).

It is not entirely surprising that teachers and classrooms have difficulty implementing language-rich and vocabulary-rich practices during shared reading, as the nuances of these practices can be quite challenging. Research finds that instructional materials geared at eliciting high quality reading and language experiences in the classroom often lack extensive support for teachers around these same practices (Justice et al., 2008; Dickinson, Freiberg, and Barnes, 2011). The most effective shared reading programs contain highly specified and structured lesson materials that help teachers integrate the use of general language support strategies into specific materials and activities. Thus, the applied literature suggests that the potential of the read-aloud for supporting young children's language and reading development is largely unrealized and points to the importance of curricular materials that are cognizant of the challenges in creating a highly effective read-aloud.

Links to CKLA

CKLA read-alouds are highly responsive to this base of reading and language research, as well as applied research on teaching and learning. The structure of the read-aloud lessons reflects an emphasis on oral language development through vocabulary work, question asking and answering, open-ended discussions, and integration of oral and written language. Indeed, the read-aloud structure emphasizes talk before, during, and after the reading, which is consistent with most effective read-aloud programs.

Read-aloud lessons typically begin with "Introducing the Read-Aloud," a 10-minute section that starts with a discussion of the upcoming text and ends with the class setting a specific purpose for listening. "Presenting the Read-Aloud" is the 10–15 minute section in which the teacher actually reads the text. The read-aloud is conducted in an interactive manner (with comments and short questions interspersed throughout) and each chunk of text has accompanying visuals to support understanding and implicit vocabulary learning (displayed in a large flip book or on a Smart Board). Following the read-aloud are "Comprehension Questions" (10–15 minutes), which include structured literal and inferential questions about the read-aloud. The order and manner of these questions are designed to scaffold children's oral expression and participation (e.g., by balancing the nature and type of questions and priming children to build up to more difficult questions), while also reinforcing content. The final discussion question typically provides opportunity for a peer-sharing routines such as "Think-Pair-Share" or "Question-Pair-Share." Lessons also include a short, explicit focus on language and/or vocabulary with structured "Word Work" activities (e.g., explicit instruction on one or two key words from the lesson) or syntax activities provided at the end of the lesson. This type of highly-interactive and language-rich and vocabulary-supportive read-aloud is seen as particularly valuable ELL students (Calderón et al., 2005; Calderón and Minaya-Rowe, 2003; Calderón, 2007, 2009; Hickman and Vaughn, 2004). The text talk that occurs around and within the read-aloud provides opportunity for repetition of key ideas and vocabulary, and can help make the text and content accessible to ELL students through the teacher-guided supports provided during read-aloud, such as intonation, definition-providing, and extensions towards children's own knowledge and background. In CKLA these supports are intentionally placed for the teacher to help ensure the interactions known to support children's development actually occur. Lessons end with "Application" activities that help children integrate oral and written language, as well as synthesize and organize the information they received from the read-aloud.

The highly scaffolded instructional apparatus of CKLA reflects the growing body of research that points to the importance of such support to eliciting high quality interactions during curricular activities. For example, within the Teacher Guide, the read-aloud text is annotated to suggest to teachers when to pause reading and engage the class in quick vocabulary checks, clarifications, or to ask a brief question about the read-aloud (these are called Guided Listening Supports). Teachers are provided specific suggestions related to individual comprehension questions, addressing how to support the success of various learners (e.g., suggestions for returning to relevant text passages to support students' answering of these questions) and techniques for elaborating children's answers. These suggestions, specific to the question and to the content of the read-aloud, provide teachers a perspective on how to integrate language and vocabulary teaching techniques to the specific lesson or question at hand. Although this guidance is not a required script, it does reflect the growing research base indicating that language and literacy instructional materials need to be much more specific and fine-grained to elicit the high-quality interactions known to support children's development (Dickinson et al., 2011).

This type of high-support curricular apparatus may be particularly important as teachers integrate nonfiction texts into their classroom. Historically, teachers' use of nonfiction and informational texts has been very limited in primary-grade classrooms (Duke, 2000; Lane and Wright, 2007; Pentimonti et al., 2010). And yet, research finds that nonfiction texts may provide a particularly useful context for supporting inferential and analytic talk—the type of language talk seen as critical to vocabulary and language development (Zucker et al., 2010). The design of CKLA seeks to support teachers' use of nonfiction (and fiction) read-aloud lessons so this becomes a rich context that can support children's content, vocabulary, and language arts learning.

Design Principle 2: A knowledge-oriented approach to read-alouds builds vocabulary and supports comprehension skills development, both of which are critical to later reading comprehension.

Traditionally, reading or language arts instruction prioritizes comprehension skills development over knowledge acquisition, with the assumption that comprehension skills are necessary prerequisites to gaining knowledge and vocabulary from text. What research finds, however, is that the relationship is not so simple. Knowledge and vocabulary are not only *the results* of developing comprehension skills, but *contributors* to children's comprehension. Vocabulary and content knowledge are both strong predictors of children's later reading success (Nation and Snowling, 2004; NICHD ECCRN, 2005; Oulette, 2006; Sénéchal, Oulette, and Rodney, 2006; Storch and Whitehurst, 2002; Willingham, 2006). In CKLA, children develop knowledge and vocabulary efficiently through well-organized read-alouds.

Design Principle 2 Part 1—How a knowledge-driven approach helps comprehension

A knowledge-driven approach to a read-aloud program creates a learning context that is more supportive, rather than demanding, of children's general reading comprehension development. Cognitive models of reading show that the basis of strong comprehension is the ability to link information together to form a coherent 'whole' (Gernsbacher, 1990; Graesser, Millis, and Graessser, 2011; Kintsch, 1998; van den Broek, 2001, 2005; Zwaan and Radvansky, 1998). However, this same research demonstrates that text is often full of holes and leaves the job of connecting information—between sentences and between paragraphs—to the reader. This means, essentially, that to form a mental understanding of text, a reader (or a child listening to text read aloud) must fill in holes and make connections that are implied, but not stated, within a text. And a critical piece of the process is to take what is read and fill in what is known, or fill in holes based on background knowledge. The ways that comprehension relies on background knowledge are numerous. With background knowledge, the reader fills in gaps (e.g., when reading "It was winter, but Jane forgot her coat," the reader's background knowledge will fill in the idea that not having a coat in winter is a problem, Jane is probably cold, her mother may be upset, Jane might get sick), disambiguates meanings of words and sentences (e.g., when presented with the sentence "He had to run but in the end, he won the position," the reader with sufficient vocabulary and world knowledge can suppress the idea of run as a physical act and select the idea of run in an election), and integrates information across sentences to make inferences (e.g., when presented with the information "Jane fell in a pile of snow and started to cry," the reader will return to previous information about Jane forgetting her coat and previous inferences about her probably being cold and fill in the hole that she was crying because she had no coat and got cold and wet when she fell; a child who has had experience with forgetting a coat and getting a lecture from an adult may even begin to predict what might happen next when Jane tries to explain her situation to an adult).

Thus, from a cognitive perspective, 'comprehension' reflects a mental web of connections and ideas that weave together a text and knowledge (Kintsch, 1998). As this is woven together—through automatic, mental activation of known words and ideas as well as with active attempts to create inferences (such as cause-effect and character motivation)—the reader understands the text. Readers who lack prior knowledge of the topic in the text do not have the mental store of words and ideas needed to form a clear or coherent mental understanding of the text. As a result, they often fail to fill in conceptual gaps within the text and fail to make inferences that go beyond information explicitly stated in the text (Davis and Gutherie, 2014; McKeown et al., 1991; Pearson, Hansen, and Gordon, 1979; Voss and Silfies, 1996). This is true even when they receive training in comprehension strategies (McNamara, 2004). In fact, some research would suggest that comprehension strategies *arise* out of a reader having sufficient background knowledge, rather than the other way around. One of the most powerful pieces of evidence of this idea comes from studies showing how knowledge can actually compensate for low reading skill and low cognitive ability in readers (Adams, Bell, and Perfetti, 1995; Bjorklund, and Schneider, 1996; Recht and Leslie, 1988; Schneider, Korkel, and Weinert, 1989). When children who are generally weak readers are presented with a text on a topic they know a lot about, their comprehension is better than that of generally strong readers who do not know about the topic. This research would suggest that the teaching of reading strategies would not be sufficient for paving a pathway to strong reading comprehension in the absence of building knowledge (see also Willingham, 2006).

Links to CKLA

The organizing framework of the read-aloud component of CKLA creates a context where knowledge and comprehension skill development are built hand-in-hand. The read-alouds are organized around domains, or topics of study. The domains of CKLA expose children to a broad array of topics related to literature (e.g., classic genres such as Greek myths or tall tales), science (e.g., astronomy, the human body, insects), and American and world history (e.g., ancient civilizations, the War of 1812). Within the academic year, domains are ordered intentionally, or systematically, to build on one another (see the CKLA Program Guide at ca.ckla.amplify.com for a grade-level list of domains). For example, ideas introduced by domains early in the Kindergarten year (e.g., nursery rhymes like "Little Bo Peep" and "Baa, Baa Black Sheep," content from the *Plants* and *Farms* domains) show up later in the year (e.g., when the *Colonial Towns and Townspeople* domain covers how tradespeople saved farming families time and effort and how cloth was made from cotton, flax, or wool), thus allowing children to return to previously learned knowledge in a new way. The CKLA instructional apparatus explicitly points teachers toward these sorts of connections and primes them to bring up previously taught information as it becomes relevant within new domains.

Domains are also organized across years (i.e., K–5) to reflect a coherent, spiraling approach to knowledge building. For example, topics are sometimes expanded (e.g., the Kindergarten *Plants* domain is expanded on in the Grade 2 *Cycles in Nature* domain), refined (e.g., content introduced in the Kindergarten *Colonial Towns and Townspeople* domain is refined in the Grade 1 *A New Nation* domain, the Grade 3 *Colonial America* domain, and the Grade 4 *American Revolution* domain), or grow in complexity (e.g., the complexity of the relationships between plants and animals intentionally grows from the Kindergarten *Plants* domain, to the Grade 1 *Animals and Habitats* domain, to the Grade 3 *Ecology* domain). Again, this building of knowledge creates a situation where all children have a shared and relevant base of knowledge that they can use to support their comprehension of new and increasingly complex text. The domain approach mirrors what we understand of reading, from a cognitive perspective, because it prioritizes the use of comprehension skills in contextually meaningful situations. As discussed, research on text comprehension points to the fact that comprehension requires readers (or listeners) to use various strategies—implicitly and explicitly—to form inferences and links among aspects of the text. Background knowledge is a key ingredient in using these strategies successfully. Consistent with this, CKLA approaches comprehension strategies within read-aloud lessons as a means to an end, not ends themselves. The focus is on knowledge-building through the texts and on having children *use* their growing knowledge to facilitate their analytic interactions with texts on the same topic. Thus, children are encouraged to use comprehension strategies, as needed, at various points during the read-aloud. Their success in using these strategies is scaffolded by teachers' instructional support (e.g., some explicit teaching) but also supported by the fact that they are being given the background knowledge that is fundamental to their success in applying comprehension strategies. For example, within a domain, children will stay on a topic for approximately two to three weeks. By hearing read-alouds on a single topic for such an extended period, children build vocabulary and knowledge that they pull upon when making predictions, monitoring known versus unknown information, considering inconsistencies or differences among stories, etc. Teachers guide children's use of this knowledge through the questions and discussion that occurs before the read-aloud (i.e., the "Introducing the Read-Aloud" section), the Guided Listening Supports (that help children notice and link relevant information during the read-aloud), and discussion questions (that guide children to return to the text and consider it after the read-aloud). *Thus instruction in comprehension skills is explicit, but embedded, within a knowledge-focused context.* This approach to teaching comprehension skills reflects what research shows about how comprehension unfolds cognitively among skilled readers (for more on this topic see Willingham, 2006).

Design Principle 2: Part 2: How a knowledge-driven approach helps vocabulary

The link between vocabulary and reading success is well established (e.g., Nation and Snowling, 2004; NICHD ECCRN, 2005; Oulette, 2006; Sénéchal, et al., 2006; Storch and Whitehurst, 2002). Notably, effective vocabulary support within the classroom is *particularly* important for children with vulnerabilities in reading development. For example, recent research shows that reading gains as a result of vocabulary learning are stronger in children with reading difficulties that those without such difficulties (Elleman et al., 2009). In fact, classroom vocabulary support had three times the effect on children's reading comprehension for children with vulnerabilities in reading as opposed to higher performing peers. Similarly, one of the most critical ways to support the success of ELL students is a robust and constant focus on vocabulary development (and creating a context that lets vocabulary learning be naturally reinforcing, as time is often a challenge in seeking to support the vocabulary learning of ELL students) (August et al., 2005; D'angiulli et al., 2004).

It is not possible to teach children the number of vocabulary words needed to ensure robust vocabulary learning. Children with average vocabulary development are learning approximately 3,000 words per year (Cunningham, 2005). Children who are in the lowest 25th percentile of vocabulary have a 6,000 word gap in fourth grade when compared to the average fourth-grade child (as discussed in McKeown and Curtis, 2014). This leaves more vulnerable children—such as those with language vulnerabilities or ELL students—with the task of learning approximately 4,000 to 5,000 words per year, at least, to even begin to catch up to their peers. Explicit teaching can be quite effective for deepening children's knowledge of a few, select words, but such methods can only teach a few hundred words, at the most, within a year of school (Beck, McKeown, and Kucan, 2013). Further, a meta-analysis of vocabulary interventions demonstrated a weaker effect of such explicit methods for more vulnerable children (Marulis and Neuman, 2010).

Thus, implicit means of teaching words through exposure to those words in everyday contexts is a necessary and large part of vocabulary learning. However, a simple and singular exposure to a word is not enough. For example, research finds that children will only retain approximately 25% of words to which they are both exposed and taught during book reading, even when the book is repeated two to four times (Biemiller and Boote, 2006). This is confirmed by cognitive research that finds children's capacity for learning new words from a single exposure (i.e., ability to 'fast-map' words) is much more limited than originally thought. Initial impressions of words that are heard are very likely to fade or disappear and do not reflect lasting learning processes for vocabulary (Gershkoff-Stowe and Hahn, 2007; Wilkinson, Ross, and Diamond, 2003).

Rather than simple, fairly singular exposure to words as a means of supporting vocabulary, research suggests that implicit vocabulary learning is best supported with *intentional word exposure* (Biemiller and Boote, 2006; Neuman, et. al, 2006; 2009). Word learning that occurs in isolated moments of learning is not likely to be effective. This is because the exposure is ad hoc. Even if words are repeated a few times (as might occur within multiple readings of a story or within some effort to teach a word that occurs at random), the words lack context (Beck and McKeown, 2007). Children may or may not hear the word again and there is little structure to help children link the word to more words (thus helping them retain the new word). Further, teaching words that occur at random, or in an ad hoc manner, does not ensure that children are hearing the range of academic and sophisticated words that distinguish children with larger versus smaller vocabularies (Beck, McKeown, and Kucan, 2013; Nagy and Townsend, 2012; Spycher, 2009).

Intentional word exposure takes into account the context of the word learning. Recent research emphasizes the value of organizing opportunities for word learning around topics of study. This approach has demonstrated significant impacts on children's vocabulary learning as well as learning of academic content and knowledge. Notably, a content-based approach to vocabulary instruction appears effective within populations that have historically shown weaker responses to vocabulary instruction—including children who are demographically at risk and English language learners (Neuman and Kaefer, 2013; Spycher, 2009). A content-organized and intentional approach to vocabulary exposes children to networks of words on a singular topic and, as such, exposes children to words that represent *categories* of information and *exemplars* of those categories. As such, the words children hear through these topics of study—across read-alouds and discussions (and potentially extensions and class activities)—have some degree of shared properties and include higher-level words (i.e., categories) and lower-level words (i.e., exemplars). This structure mirrors the structure of how words are organized and stored, mentally. As such, the content-based organization helps children to draw multiple connections among words by supporting their ability to draw inference across words (Rehder and Hastie, 2004). For example, a child who hears about the category *weather* and hears multiple stories on types of weather will be primed to form inferences of how weather ideas relate (e.g., weather states representing a continuum of calm to stormy become connected to weather terms about storm types; Neuman, 2009). This type of domain-organized knowledge formation and word clustering represents important cognitive processes for deep and lasting word learning and knowledge building (Gelman and Brenneman, 2004; Neuman, 2009; Neuman & Kaefer, 2013). Thus, research is increasingly emphasizing the value of a content-oriented approach to exposing and teaching children a wide range of words in a deep and lasting way.

Links to CKLA

The domain structure prioritizes knowledge acquisition within the language arts block and serves to scaffold children's vocabulary in important ways. For each domain, children are exposed to vocabulary that reflects *networks* of words, as has been discussed within the research. It is important, when considering the value of the domain structure of CKLA, that a distinction is made between domains and theme-based units used in many early childhood programs and curricula. Themes tend to be loosely connected topics, such as leaders or community helpers. In this approach, children are exposed to a breadth of exemplars of the theme, but these exemplars usually do not have a common vocabulary (nor much in common). The looseness of themes makes it less likely that children will draw connections and inferences across many words they hear within a theme (e.g., vocabulary related to a librarian and fireman are largely distinct but both could be exemplars on a theme-based unit of community helpers). In contrast, domains are focused topics with a common vocabulary and tend to be areas of study or expertise for adults (thus are topics that can also be refined and expanded across the grades). As such, domains are organized specifically to support children's exposure to and acquisition of networks of words on a single topic where the words are likely to have many shared properties and work together hierarchically. Having children hear structured vocabulary is an important way to facilitate children's vocabulary learning (Neuman, 2009). Of course, the repetition of core vocabulary in these focused domains also means that core concepts and facts are repeated. So children are acquiring vocabulary and knowledge, giving them a rich understanding of the domain.

Also important to children's vocabulary is the way that domains are ordered over time. Domains build on one another within a year; they also expand and refine across years. Therefore, children gain multiple exposure to the common vocabulary and concepts shared among related domains (e.g., five senses; human body), as well as begin building wider, broader networks of more loosely related words and ideas. This approach builds breadth and depth to vocabulary, which research points to as an essential component of robust word-learning programs (Beck, McKeown, and Kucan, 2013). Further, this repetition of words and concepts in new contexts and after some time has passed, reflects an important concept within learning and memory called distributed practice (more on this idea in a subsequent section). Distributed practice is one of the most powerful ways to support long-term knowledge and skill acquisition.

Conclusions

CKLA read-alouds are an important tool used across grades to build children's independent capacity for reading and analyzing complex text. The read-aloud experience is specifically designed to integrate key messages about successful reading from cognitive, developmental, and applied research bases. The interactive lesson format prioritizes the language basis of strong reading, while the knowledge-driven domain organization supports vocabulary acquisition, knowledge building, and comprehension development. In the next section of the paper, the focus turns to the second key idea around which the CKLA program is built: the importance of systematic and explicit instruction in supporting children's acquisition and fluency with the written code of English.

Explicit and Systematic Instruction is Critical to Building Efficient Word-Level Skills

Highlights. It is not enough to ask whether a reading program has explicit phonics instruction. Research shows that phonics instruction is not simply present or absent, but rather exists in degrees. What research suggests is that the degrees may matter—substantially—to children's outcomes. Effective phonics instruction includes: (1) systematic ordering of phonetic targets that progress in number and complexity over time; (2) systematic practice in which children have intentionally designed opportunities to apply and use the sound-spellings they are taught (DeGraaff et al., 2009); and (3) systematic instructional planning whereby methods of instruction are consistent and progress depending on students' learning (Bodrova and Leong, 2006; DeGraaff et al., 2009). CKLA embodies these three dimensions of systematic instruction. Its emphasis on building in systematic, mastery-oriented practice distinguishes the program from many other explicit phonics instructional programs.

Design principle 1: Explicit and systematic teaching of phonics elements is critical.

Explicit and systematic phonics instruction selects a specific set of sound-spelling targets to introduce at any given point in time and then slowly adds in new targets in an intentional order. Such instruction begins with easier targets (e.g., letters that largely represent only one sound) and moves toward more complex and abstract relations over time (e.g., letter pairs that can represent multiple sounds or more complex syllable structures; DeGraaff et al., 2009). Research consistently demonstrates that explicit phonics instruction has important, lasting benefits to children's reading accuracy and this is one of the most emphasized aspects of phonics instruction for English language learners, as well as children struggling to learn reading (August et al., 2005; Brady, 2011; DeGraaff et al., 2009; Ehri et al., 2001; Torgesen, 2006; Torgesen et al., 2001; Vaughn, 2007). One of the reasons for this is the nature of English (as opposed to other languages such as German or Finnish). English has the most inconsistent orthography of all languages (Goswami, 2003). Across even the most common words in English, letter-sound relations are inconsistent and variable. For such an inconsistent language, instruction needs to work to minimize children's confusion and maximize children's ability to use and apply learned knowledge about the code; such an approach leads to significant benefits in efficiency and in accuracy within children's learning (Share, 1995; Torgesen, 2006; Torgesen et al., 2001; Ziegler and Goswami, 2005). As a result, there is an important distinction to be made between programs that provide information on letter-sound correspondences on an as-needed basis versus those that approach the letter-sound relationships as a central focus of instruction (i.e., explicit phonics; Ehri, et al., 2001; DeGraaff, 2009). Research consistently and overwhelmingly shows that explicit, systematic phonics instruction is most effective.

Across the various methods of explicit and systematic phonics instruction, however, there is not a clear consensus if one approach is superior to another, although the trend of the data is to show either no differences or a slight advantage to synthetic phonics, particularly in the early grades (Brady, 2011; Johnston, McGeowan, and Watson, 2012; National Reading Panel, 2000; Torgesen, 2006; Walton, Walton, and Felton, 2001; Wyse and Goswami, 2008; Ziegler and Goswami, 2005). Theoretically, both synthetic and analytic phonics work to make the code systematic, but make different demands on children in the process. For example, in analytic phonics children learn to approach words as having patterns (e.g., *–og*, *–ag*, *–it*). In this method, children are taught to rely on their growing knowledge of patterns to decode (e.g., they are taught to draw an analogy between the words *van*, *man*, *tan*). In synthetic phonics, children learn to understand the varied relationship between a single sound and a letter or set of letter combinations and then use this knowledge to blend letter combinations into sounds to decode words (DeGraaff et al., 2009). These two approaches both seek to make the task of "cracking the code" easier for children, but do so in different ways. For example, English has more regularity in syllable- or rime-level units than it does in single sound-level units. Thus, a focus on teaching children to decode using knowledge of rime- or syllable-level units minimizes the exceptions children encounter but maximizes the *amount* of information children will need to learn. For example, for children to use rime-level information to read the 3,000 most common one-syllable words of English, children would need to remember approximately 600 different orthographic patterns (Goswami, 2005; Treiman et al., 1995). In contrast, a synthetic phonics approach would seek to minimize the information children need to remember by focusing on far fewer single sound-letter combinations and teaching children to use this granular information to blend into syllables, rimes, and words. However, the trade-off is that children are also likely to encounter many more exceptions to the information taught during the learning process. In English, most exceptions or irregularities exist at the single sound-letter level (e.g., the letter "a" appears in these common words and makes a different sound each time: *cat*, *was*, *saw*, *made*, *car*; from Goswami, 2005).

Recent research points to the potential importance of children being able to switch between using larger spelling units (such as a rime) and smaller spelling units (such as a phoneme-letter) when reading English (Ziegler and Goswami, 2005). In these experimental studies, children who were good readers demonstrated an efficient approach to reading, where they would switch between their use of rime or syllable information and single sound-letter information to read (Goswami et al., 2003; Walton, Walton, and Felton, 2001; Ziegler and Goswami, 2005). What is important within this research is the fact that children would switch among these approaches as a result of the words they encountered—*not* because they had received any particular instructional method teaching one way or the other. This suggests that the children who are best at learning to decode may need to access various approaches to word decoding; using phonetic information at a single sound/phoneme level and using phonetic patterns at a syllable- or rime-level. This research suggests that instructional approaches that help children make choices about switching among these various approaches may be most effective.

Links to CKLA

The CKLA program (particularly within Grades K–2) is typically described as a synthetic-phonics approach; however, the lessons actually take a multiprong approach to teaching children phoneme-letter patterns, sight words, and word patterns. Thus, CKLA reflects a blended approach consistent with the latest research on phonics instruction. In CKLA, the Kindergarten year is the year that most strongly adheres to a strict synthetic-phonics approach. In Kindergarten, children are first taught to relate a single spelling to each of the 44 sounds of English. CKLA seeks to minimize the challenges of this approach (i.e., that children will encounter exceptions to what they know) by teaching children the *most common and least ambiguous spelling for each sound* of English (e.g., a_e is taught for a long "a" sound because there are few exceptions). Thus, in Kindergarten, children learn to read the most frequent spellings for the sounds of English and learn sound-letter patterns that are likely to follow the rules (as the spellings taught first are also the least ambiguous). As with classic synthetic-phonics programs, CKLA also places an emphasis on phonemic-awareness skills in Kindergarten (i.e., blending/segmenting), which research has shown to be critical to supporting many young readers, particularly in Kindergarten (Torgesen, et al., 2001; Blachman, 1997). Although few long-term differences have been seen between synthetic phonics and other explicit phonics programs, there is some evidence that synthetic phonics may provide an early boost to reading development in the Kindergarten year (Foorman et al., 1997).

However, in looking at CKLA phonics instruction more holistically (i.e., across K–2), it's clear that the approach cannot be described as purely synthetic. First, across K–2, children are taught sight words as whole units (even beginning in Kindergarten). This instruction, along with the phonics instruction, ensures that benchmark lists of sight words (e.g., Dolch/Fry) are known by children within grade-expected time frames (see the CKLA Program Guide for more information on the links to the Dolch and Fry Words list at ca.ckla.amplify.com). Further, the instructional approach taken in Grades 1 and 2 is a blended approach, where children are still given information in single sound-letter patterns, but this information is introduced in ways that also builds their understanding of larger-grained units of words (e.g., syllables, rimes). For example, research states that the rime pattern *–ight* occurs approximately 90 times in English, thus making it a potentially useful rime pattern to know (Goswami, 2005). Although the CKLA program would not teach *–ight* as a whole, it will teach that "igh" is an alternative spelling for the long "i" sound. Within such a lesson, children will examine words that have this "igh" spelling versus words with other spellings of the long /ie/ sound (e.g., i_e) and will—explicitly and with teacher guidance—examine lists of words following these two spelling patterns and discuss commonalities among words. In this way, the CKLA approach, while synthetic in its premise, actually embeds instruction around phoneme-level *and* word-, syllable-, rime-level information. Thus, it shows consistency with the research that speaks to the value of learning multiple strategies when learning to read English.

Design Principle 2: Systematic practice and reinforcement of code-related skills is necessary for building automaticity.

In reading skill acquisition, the end goal of practice is to achieve fluent, automatic reading, which is defined as "efficient, effective word-recognition skills that permit a reader to construct the meaning of text" (Pikulski and Chard, 2005, p. 510). To build such automaticity, practice is a necessary component (Willingham, 2009). Unfortunately, the design and nature of practice is often overlooked within reading programs, despite it being an important aspect of systematic reading support. For example, research finds that children's literacy and language learning can be influenced by the actual number of exposures a child is given to specific targets over the course of a long instructional period, suggesting that practice which is focused, rather than ad hoc, may be critical (McGinty et al., 2011; Proctor-Williams, 2009; DeGraaff et al., 2009). Yet, research also finds that simple drilling is not an effective approach to supporting children's long-term acquisition of information (Cepeda et al., 2006). The research on learning and memory tend to point toward three key components of effective practice that are important for reading programs: (1) motivation and attention, (2) understanding basic skills, and (3) extended practice. The primary link among these ideas is that they each are seen as strategies that can facilitate memory for information (Baker and Wigfield, 2003; Bandura, 1997; Cepeda et al., 2006; Willingham, 2009).

Regarding motivation and attention, research finds that emotionally interesting information commands attention and is more easily remembered. Motivation and attention, in and of themselves, may not be enough. Learning theories point to the important link between a sense of self-efficacy and motivation (Bandura, 1997). Notably, a critical component of self-efficacy—or sense of capacity within a certain situation, such as reading—comes from the sense of mastery within practice. When a child feels successful, the task is motivating and this sense of success or mastery builds belief in their efficacy and capacity for the larger task at hand (Usher and Pajares, 2008). Such success naturally builds confidence and willingness to try a new, potentially more difficult task and/or continue to persist in the same task.

The second aspect of practice that research highlights is the importance of practice with basic skills. This base of research points to the importance of building *automaticity* within a skill set, whether it be in reading or in any other skill (Just and Carpenter, 1996; La Berge and Samuels, 1974). Cognitive science distinguishes between *knowing* something—such as knowing aspects of letter-sound relations—and knowing something so a degree of *automaticity* has been achieved (Willingham, 2009). The difference is that the first level—the *knowing* level—requires that effort is put forth, first to retrieve relevant information that is known and then to use that information in working memory to problem solve (e.g., sounding out in reading). There are limits to this process of retrieval and problem solving in terms of how much information can be retrieved and used at once (Baddley, 1992). When something is practiced enough—even something that is *known*—the brain begins to handle the information differently so that more information can be used at once (some call this 'chunking') and information can be used more quickly, with less effort. An analogy drawn in the literature is to driving. When you first start driving, it takes all of your concentration to go through the individual steps involved in driving. However, once the task is learned and as it becomes automatic, the small steps of driving (e.g., turning the key, checking the mirror, changing the gear) become consolidated and automatic; it is easy at this point to drive while also conversing or thinking about other things (Willingham, 2009). For reading development, this automaticity corresponds to the stage of development called "consolidated alphabetic" (Ehri, 2005), where children not only know letter-sound correspondences—and use them fairly accurately—but children are able to read in a way that seems effortless. From a cognitive perspective, the only route toward that level of reading development is practice (see a discussion in Willingham, 2009). This explains, in part, why there is such a strong relation between strong readers and how much they read (Cunningham and Stanovich, 1991, 1997).

Finally, research suggests that practice must offer opportunities for extended learning in different contexts and at different points in time. The premise for this recommendation comes from the science of learning and memory and the concept called distributed practice. Distributed practice refers to the idea that learning is facilitated when a child (or adult) is given multiple exposures spaced over time to a concept or skill (Carpenter et al., 2012; Cepeda, et al., 2006; Gerbier and Toppino, 2015). One reason for this effect may be that spacing out practice naturally leads to slight variations in the contexts (or situations) and this enhances the practice effect (see Toppino and Gerbier, 2014). When there is variation in the context (e.g., practicing a letter-sound relationship in various words or encountering a word in various stories or in a story and discussion later), a person now has multiple episodes, or situations, that link to a particular idea and this helps build deeper understanding (and more robust memory) for the skill or concept (see also Willingham, 2009).

Links to CKLA

Collectively, research points to practice experiences that are successful (thus motivating), that allow for the building of automaticity within basic skills (thus intense and consistent), and that build capacity to extend skills into varied contexts. Typically, practice experiences in reading do not sufficiently integrate these three parameters of practice and tend to emphasize one over the other. However, the CKLA phonics program was designed with the cognitive science of practice in mind; it explicitly weaves in all three dimensions of systematic practice across lessons, units, and grades. In K–2, the program teaches children 150 spellings for the 44 sounds of English. It introduces an average of 5–10 letter-sound relationships within each unit of instruction; each unit lasts approximately 2–3 weeks. The program provides *daily* lessons in phonics. The lesson formats vary, but in every lesson, there is practice in the basic letter-sound relationship(s) of focus, which includes a fairly intensive set of activities to further practice these relationships (e.g., approximately 15 minutes daily of writing, spelling, and word-level reading and word sorting, using sound-spellings that were just taught). Then, each day, children are given the chance for extended practice through independent and/or small group reading or writing activities. These opportunities for extended practice reflect naturalistic activities where children are building other skills, such as grammatical skills related to sentence activities, genre writing, or reading and reading comprehension. For example, children may be responding to questions from texts, using words in sentence-level work, or applying their knowledge of sound-spelling correspondence within the plan, draft, and edit processes of various writing genres that they are taught.

One of the most unique aspects of extended practice afforded by CKLA are the student Readers. In K–2, children read chapter books that are 100% decodable because they correspond to the unit of phonetic instruction in which they are placed. CKLA's developers designed their own books because they wanted to create texts that offered children extended reading practice that was both mastery oriented *and* engaging. In other reading programs, it is common to use books that may be engaging, but only loosely related to the phonetic code children know (e.g., leveled along varied parameters of language and vocabulary but not by phonetic patterns; see Nelson et al., 2012; Shanahan, 1983). Such books fail to provide the mastery-oriented practice that research sees as critical to self-efficacy and automaticity. CKLA's books balance both aspects of practice (motivation and mastery). To achieve this, the books are phonetically controlled, meaning that the words used contain only the sound-spelling patterns and sight words taught to date. A challenge for such controlled books is to ensure they are not repetitive or boring. To write engaging books, CKLA's developers created a database that provided every single English word that adhered to the sound-spelling patterns taught to date in each unit of instruction. This provided a wealth of words that children were able to decode in each unit, and enabled the writers to develop lengthy chapter books on interesting topics. The result are colorful, chapter book–length books per unit. The texts are appropriately complex (i.e., Lexiles on the books reflect grade appropriate levels; see the CKLA Program Guide at ca.ckla.amplify.com) and thus afford children an integrated literary experience (meaningful stories with literary elements, such as dialogue, and complex language). The books are able to offer mastery-oriented code practice while engaging children with strong characters and content (e.g., in Grade 1, there is a book about a young girl who travels to Mexico and visits the Aztec ruins and another about a family on a sightseeing trip in London).

In addition to the core classroom activities just described, the program offers two additional tools for extended practice. The first are spelling lists designed to be practiced at home. These spelling lists sometimes correspond to sound-spellings just taught and sometimes return to previously taught patterns. This design choice—to use spelling lists to practice already learned sound-spelling patterns—is a direct implementation of the idea of distributed practice (i.e., returning to information after time has passed), which has been shown in cognitive science to be critical for long-term learning. Extended practice is also provided in the form of fluency work explicitly built into the program. In Kindergarten and Grade 1, repeat readings of decodable texts are supported.

Starting in Grade 2, there are additional on-line Fluency Packets (see ca.ckla.amplify.com) that correspond to each unit. Fluency work, generally, is seen as valuable to children's rate, accuracy, *and comprehension* (National Reading Panel, 2000; Samuels, 2005). This approach to fluency within CKLA reflects the goal of fluency work as being an integrated task (one that supports decoding and comprehension) and the fluency work sits within the broader structure of the Skills strand, which places emphasis on practice for mastery and motivation. Thus, fluency work is an integrated aspect of the program's systematic approach to instruction and practice.

Design Principle 3: A systematic approach to progress monitoring and instructional planning is critical to effective instructional individualization.

Research shows that young children show significant variability in their acquisition of reading. Early recognition of differences in learning rates and trajectories, combined with adjustments to instruction that work to support weaknesses, provide a powerful combination for preventing reading difficulties. Such intervention is essential before difficulties become pronounced and eventually intractable (e.g., Fletcher and Vaughn, 2009; Fuchs and Fuchs, 2006; Vellutino et al., 1996). These practices have recently come to represent a model of reading instruction called Response to Intervention (RTI; Gersten et al., 2009). Although the 2004 reauthorization of the Individuals with Disabilities Education Improvement Act (IDEA, 2004) focused on RTI as an identification process for special education, more recent thinking has tended to look at RTI as a general education reform, which works to support the individual needs of students in the hope to prevent reading difficulties (Fuchs and Fuchs, 2012). Models of RTI can vary in their specifics. However, the research points to the fact that all effective RTI models provide instruction, monitor response to the instruction through assessments, and provide individualized instruction where needed (either as part of the Tier 1 curricula and/or in a Tier 2 context involving extra time or intensity) (Al Otaiba, et al., 2011; Bender et al., 2009).

A strong baseline curriculum is a critical component of an effective, systematic approach to student learning and is the first step toward effective individualization. Children's abilities cannot be assessed in the absence of a strong curriculum; their capacity and needs can't be determined until they have been given an optimal opportunity to learn (Vellutino et al., 1996). In fact, research finds that with a strong reading curricula, 80% of children should be reaching grade-level proficiency without additional intervention (Batsche et al., 2007). The second important step toward systematic and individualized instructional planning is to ensure teachers can monitor children's response to the core curriculum. Although different models of RTI promote the use of different types of assessments, curriculum-based assessments reflect a key component of most models because these are most informative regarding instructional interventions and individualization (Busch and Reschly, 2007). Finally, differentiation of instruction to support children's growth and access to the curriculum is an important aspect of what happens within a strong Tier 1 level, or within a strong general classroom approach. Research into instructional individualization finds that varying the group size, the focus of instructional target, and the type of activity (e.g. independent reading vs. reading aloud with a teacher) can matter substantially to what children are learning (Connor et al, 2009; Al Otaiba et al., 2011). Research finds that one of the challenges in providing differentiated instruction to students is a lack of specifically designed activities or ideas that relate to the skills or targets that are being taught within the general curriculum. For example, research found that general training on differentiation and a base of activities (that may not necessarily be designed for use within a curriculum) was less effective in supporting student learning than a system of assessment, curriculum, and added or supplementary activities that can be used for differentiation (Al Otaiba et al., 2011).

Links to CKLA

The CKLA approach to teaching phonics and reading/writing fundamentals is that of an integrated system of assessment, general curriculum, and supplementary curricular materials to be used for differentiation. Children are given assessments of their code knowledge each year as an initial placement process. From that, children are placed into a unit of instruction and, if this unit is below grade level, are given recommended added or supplementary differentiated instruction through the use of the Assessment and Remediation Guide (A&R Guide). The A&R Guide tracks to each specific unit of instruction and provides ideas for added or differentiated instructional activities around all key skills areas within Kindergarten and Grade 1. In Grade 2, the remediation materials emphasize activities to focus on automaticity with the code and fluency in later grades. Further, the A&R Guide provides specific progress-monitoring tools to allow teachers to consider children's broader progress and response to the curricula (with, again, suggestions and guidance on differentiation, depending on the results of these tools). Teachers can use these monitoring tools as needed. However, all children are given the curricular-based measures embedded into the general curricular materials. These unit-level assessments, designed as quick checks to ascertain how well children are learning within each unit of instruction, are accompanied by guidance about how to review and/or weave in individualized support from the A&R Guide when children fall below expected levels within these measures.

Conclusions

The CKLA program is designed to take a systematic and explicit approach to teaching the English code. The program's integrated approach to instruction, practice and extension, and progress monitoring/individualization creates a systematic instructional approach designed to support all learners and reflects the knowledge of cognitive science and reading development within its instructional apparatus.

Closing

This paper intends to highlight critical features of the CKLA program and demonstrate the research foundations for the design principles that guided its development. This paper is not an exhaustive review of the literature related to reading and reading instruction, nor does it fully present the extensive instructional materials available through the CKLA program. However, the information included in this paper shows that CKLA goes far beyond simple CCSS alignment. Rather, the CKLA program reflects what is known to research—though often poorly represented in classrooms—about children's learning and development related to both oral and written language. As such, the program reflects an aligned system that addresses the standards and, more importantly, equates what science says to what is done in the classroom.

Questions/comments can be directed to the Core Knowledge Foundation at ckla@coreknowledge.org.

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