

Chapter 1

The Componential Model of Reading (CMR): Implications for Assessment and Instruction of Literacy Problems



R. Malatesha Joshi

Abstract Literacy skills—defined as reading, writing, and spelling—are fundamental for academic achievement as well as being a productive citizen in society. However, despite spending trillions of dollars over the decades, literacy skills in the USA have not improved. In this chapter, a model, called the Componential Model of Reading (CMR) is described and how it can help in the assessment and intervention of reading problems. Some of the common assessment and intervention techniques are also outlined to help the teachers and administrators to solve the reading problems at school.

According to the most recent Nation’s Report Card (National Assessment of Educational Progress; NAEP, 2017), about one-third of fourth-grade students in the USA have difficulty with literacy skills and cannot comprehend fourth-grade-level materials. There are serious consequences of poor reading at all levels—individual, societal, and national. At the individual level, about 75% of students who drop out of high school have reading problems and about 85% of individuals in the juvenile court system are functionally illiterate (Sweet, 2004). An important aspect of the value of literacy skills has been highlighted by the fact that when these juvenile delinquents are equipped with literacy skills, there is only a 16% chance that they will return to the prison system. However, when they are not equipped with literacy skills, there is a 70% chance that they will return to prison, which costs taxpayers approximately \$25,000 per year per inmate. Further, more than 50% of individuals on government sponsored welfare assistance and about the same percentage with substance abuse problems have difficulty with reading. At the societal level, many states can predict the number of prison cells needed after about ten years based on the number of poor readers in fourth grade (Lyon, 2001). At the national level, it costs about \$11,000 in health care for those with less than a fourth-grade reading level, but costs less than \$3,000 for individuals with a fourth-grade reading level and above. Overall, illiteracy costs more than a trillion dollars in the USA. These facts have led the National Institute of Health (NIH) to declare literacy a “public health issue” (Sweet, 2004).

R. M. Joshi (✉)

College of Education & Human Development, Texas A&M University, College Station, TX, USA
e-mail: mjoshi@tamu.edu

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Through the National Institute of Child Health and Development, the US Department of Education's Institute for Educational Sciences, and the National Science Foundation, the federal government in the USA spends tens of millions of dollars each year on reading the research. Many of these funds are intended to help find suitable identification and intervention techniques to overcome literacy problems. Despite the amount of money spent both on research and actual remediation, the reading performance has stayed about the same for almost 40 years in the USA (see below and also Moats Chap. 3, this volume, on the gap between research findings and classroom practice). In this chapter, after providing a brief historical introduction about reading problems, I provide the rationale for the Componential Model of Reading (CMR) and how it can be applied to solve the national crisis of illiteracy. Some assessment techniques and instructional recommendations are also provided.

1.1 A Brief History of Reading Problems

During the late nineteenth century, Hinshelwood (1895) and Morgan (1896) independently published reports of individuals who, despite adequate intelligence, exhibited reading difficulties. After many decades, when a better understanding of the causes of reading disabilities was understood, the term learning disabilities (LD) was used to include children who have difficulty acquiring reading skills despite normal intelligence and exposed to literacy environment including formal instruction. Even though other types of learning difficulties such as math were included in the category of LD, the term LD was primarily used with reading disabilities given that close to 80% of the children classified as LD had reading-related problems (Aaron, Joshi, & Quotroche, 2008). With the passage of the Specific Learning Disabilities Act in 1969 and the Education for All Handicapped Children Act in 1975, the field of learning disabilities had an official status. Since the definition included the discrepancy between intelligence and achievement, the administration of IQ tests was the primary test instrument along with an achievement test. However, identifying LD through intelligence has not been found to be successful for various reasons. First of all, the relationship between reading and intelligence is bidirectional in the sense that IQ scores can improve for good readers and can go down among poor readers (Stanovich, 1993). Further, intelligence does not explain much of the statistical variance in reading; IQ explains only about 25% of the variance seen in the reading scores of all students (Stanovich, Cunningham, & Feeman, 1984). Further, the IQ-achievement discrepancy definition does not provide recommendations for appropriate instruction. Because of these and other problems with the discrepancy definition, many researchers called for disbanding the practice of identifying children as having learning disabilities based on IQ scores (Aaron, 1997; Fletcher, Denton, & Francis, 2005; Fuchs & Fuchs, 2006; Joshi, Williams, & Wood, 1998; Miciak & Fletcher, Chap. 7, this volume).

In 2004, the Individuals with Disabilities Education Improvement Act was reauthorized to include Response to Intervention (RtI) to identify children with LD. RtI generally includes three tiers with Tier 1 addressing whole class instruction; Tier 2

includes small group instruction and Tier 3 is aimed at even more intensive instruction. Despite its appeal, RtI has been criticized (see Carreker & Joshi, 2010, for a review) and it has not been as successful as it was hoped for. “Although identification models based on Response to Intervention appear potentially promising, the notion that they represent real progress for identification and intervention for children with dyslexia should be considered a *popular myth* until evidence from the rigorous evaluation is available” (Wagner, 2008, p. 188; emphasis added). These sentiments are further supported by Berkeley, Bender, Peaster, and Saunders (2009), who, after reviewing the RtI implementation in the 50 states, concluded that RtI “holds a similar *trajectory* as the discrepancy model” (p. 94). Similarly, based on a meta-analysis of 13 studies, Tran, Sanchez, Arellano, and Swanson (2011) summarized that “Overall ... regardless of the type of treatment and identification criteria, RtI conditions *were not effective* in mitigating learner characteristics to pretest conditions” (p. 283; emphasis added). Considering some of the shortcomings of RtI and the fact that the model addresses mostly academic problems, a new broader concept called Multi-tiered Systems of Support (MTSS) has been introduced that encompasses both RtI and Positive Behavioral Interventions and Supports (PBIS) (McIntosh & Goodman, 2016). Even though many states are testing the success of MTSS, we do not yet have clear research support for the utility of MTSS.

1.2 Componential Model of Reading (CMR)

An alternate model that has been useful in identifying and remediating reading difficulties is the Simple View of Reading (SVR) proposed by Gough and his colleagues (Gough & Tunmer, 1986; Hoover & Gough, 1990). According to SVR, reading consists of two broad components: decoding and comprehension and is expressed by the formula $RC = D \times LC$, where RC refers to reading comprehension; D is decoding, and LC refers to linguistic comprehension. According to SVR, both decoding and comprehension are needed for reading comprehension and if $D = \text{zero}$, then RC will be zero; similarly, if LC is zero, then also RC is zero. It should be understood that decoding and linguistic comprehension are two major components and there may be subcomponents within a component. For example, phonological awareness appears to be a subcomponent of decoding and vocabulary a subcomponent of linguistic comprehension. Recently, researchers have debated whether to include other factors such as fluency (Adlof, Catts, & Little, 2006; Joshi & Aaron, 2000) and vocabulary as separate components (Braze, Tabor, Shankweiler, & Mencl, 2007; Protopapas, Simos, Sideridis, & Mouzaki, 2012; Tunmer & Chapman, 2012). However, just the two components of SVR can explain 40–80% of the variance in RC, depending on the grade level and the transparency of orthography. By contrast, it was mentioned that IQ can explain only about 25% of the variance in RC without providing information on the type of remedial instruction needed such as decoding, vocabulary, or comprehension, information that the SVR provides. Further, SVR has been found to be applicable in other orthographies (i.e., written languages) as well as for students

for whom English as second language (ESL) and English as foreign language (EFL) (see Joshi, 2018; Joshi, Ji, Breznitz, Amiel, & Yulia, 2015; Joshi, Tao, Aaron, & Quiroz, 2012).

The advantages of the SVR is that it identifies the weak component so that appropriate intervention can be provided. For instance, Aaron, Joshi, and Williams (1999) administered decoding, listening comprehension, and reading comprehension measures to approximately 200 students in grades 3, 4, and 6 and found that approximately 7% of the students had good decoding skills but poor comprehension—both listening comprehension and reading comprehension. These children could be considered as exhibiting the hyperlexia-type reading difficulty (Gough & Tunmer, 1986). About 8% of the children performed poorly on decoding tasks but adequately on linguistic comprehension skills. Thus, their reading comprehension problem was due to poor decoding and not due to poor linguistic comprehension skills. These children could be considered as exhibiting dyslexia-type reading difficulty (Gough & Tunmer, 1986). Further, another 8% of the students had both decoding and linguistic comprehension problems and could be classified as low-ability readers or “garden-variety poor readers,” as they have been called (Gough & Tunmer, 1986).

The SVR has also been found to be helpful in suggesting the use of appropriate instructional procedures. For instance, contrary to using only one type of reading instruction for all poor readers, Aaron, Joshi, Boulware-Gooden, and Bentum (2008) first identified the weak component of reading, whether it was decoding or linguistic comprehension, and then provided systematic decoding and comprehension instruction to both groups for 12 weeks. They were compared to another group of poor readers who were receiving the business-as-usual instruction in their schools. After 12 weeks, those with decoding problems showed significant gains in reading with decoding instruction but did not improve when provided with systematic comprehension instruction. Similarly, comprehension instruction was more helpful for those with linguistic comprehension problems. Poor readers who did not receive differentiated instruction did not make any significant gains in reading comprehension. This demonstrates that when a student has decoding skills, no matter what kind of good comprehension instruction is provided, decoding skills did not improve. An analogy may be helpful here. An automobile may not start if the battery is dead or the alternator is broken. If the alternator is broken, no matter what kind of a good battery we put in, the car will not run because the battery was not the problem. Hence, in order to improve reading among poor readers, first the poor component based on SVR should be identified and then be provided with systematic and evidence-based instruction. Thus, SVR is a simple yet valuable model to identify and improve reading problems. Unfortunately, many state-level reading tests, and even some of the universal screeners, provide a singular, overall reading comprehension score. Such a singular score does not allow teachers to know the source(s) of a student’s reading comprehension difficulty.

Based on the recent findings relating to the influence of home environment, school practices, and teacher knowledge, Joshi and colleagues (e.g., Aaron, Joshi, Boulware-Gooden et al. 2008; Aaron, Joshi, & Quatroche, 2008; Joshi et al., 2012) expanded the SVR into the Componential Model of Reading. The Componential Model of Read-

ing (CMR) consists of three domains: cognitive domain, psychological domain, and ecological domain. The cognitive domain consists of two components relating to reading, word recognition and comprehension, heavily influenced by the SVR. The psychological domain consists of factors such as motivation, teacher knowledge, and teacher expectations. The ecological domain consists of factors such as home environment, classroom environment, parental involvement, peer influence, dialectical differences, and orthography (i.e., the nature of the written language). Each one of these factors appears to contribute to the development of fluent reading. A special issue of the *Journal of Learning Disabilities* (Volume 45, 2012) provides empirical support for CMR.

It has been fairly well established that the factors involved in the ecological domain such as home environment, socioeconomic status (SES), and exposure to an enriched literacy environment can influence literacy development. Chiu and McBride-Chang (2006) examined many of the ecological factors such as home environment, number of books available at home, enjoyment of reading, and SES among close to 200,000 Grade 5 students from 43 countries and found that these factors influenced performance on a reading comprehension measure in almost every country. Further, Labov (1995), Charity, Scarborough, and Griffin (2004), and Seidenberg (2017) have suggested that the linguistic features of African-American English (AAE), which some African-American children speak, may be a source of some of African-American children's literacy problems given that there is more often a gap between phonology and orthography than typically found in Standard American English. Further, Treiman (2004) and Washington and Craig (2002) have found that AAE affects spelling performance among African-American children. Orthography is defined as the visual representation of a language as conditioned by phonological, syntactic, morphological, and semantic features of the language. Examples of orthographies are Chinese orthography and English orthography (Joshi & Aaron, 2006). In transparent orthographies, the sound and the symbol map onto each other closely compared to opaque orthographies where the correspondences between sound and symbol are not straightforward. Generally, Spanish and Finnish are considered to be highly transparent orthographies, while English is considered to be an opaque orthography. However, there are various degrees of transparencies depending on where the orthography falls on the continuum of the one-to-one match to one-to-many match between sounds and symbols. In a seminal study by Seymour, Aro, and Erskine (2003), it was shown that it might take about two years of formal instruction to develop decoding skills in English orthography compared to only one year of formal instruction in transparent orthographies like German, Spanish, and Finnish. Additionally, it has also been reported that while both speed and accuracy of reading words might have been affected among children with reading difficulties in English-speaking children, only speed of word recognition, but not the accuracy of reading words, might be affected in German- and Spanish-speaking children with reading difficulties (Joshi & Aaron, 2006). This has important implications for assessing and teaching children with reading difficulties.

Factors in the psychological domain, such as motivation and teacher knowledge, can also affect literacy development. Motivation can include aspects such as per-

ceived autonomy, self-efficacy, and valuing reading, and all these factors have been found to affect reading performance (Wigfield, Gladstone, & Turci, 2016). Teacher knowledge, especially relating to language constructs, can also affect literacy development in school children. Beginning with the seminal study of Moats (1994), a series of studies by Joshi and colleagues and McCutchen and her colleagues have reported the importance of teacher knowledge relating to literacy and how a workshop during summer can improve teacher knowledge and in turn can improve students' academic performance (Binks-Cantrell, Washburn, Joshi, & Hougen, 2012; Joshi et al. 2009; McCutchen et al., 2002).

1.3 Assessment Techniques Based on CMR

Below is a brief outline of the common assessment techniques as well as remedial recommendations based on the CMR. Practitioners must also familiarize themselves with the current tests and publications by well-known test developers such as Psychological Corporation and Pro-Ed publishers.

1.3.1 Ecological Domain

Factors relating to the ecological domain should be part of an assessment in the evaluation of students suspected of having literacy difficulties. Many of the aspects of the ecological domain, such as home environment, can be assessed by surveys and questionnaires. These types of surveys should include information about parent/caregiver education, parent/caregiver occupation, languages spoken at home, literacy activities at home, frequency of visits to the library, access to computers and technology, extracurricular activities, and sibling information. The Texas English Language Proficiency Assessment System (TELPAS, Texas Education Agency, 2012) is a criterion-referenced measure to assess speaking, listening, reading, and writing of limited-English language speakers from Grades K-12. Oral and Written Language Scales (OWLS-II, Carrow-Woolfolk, 2011) is another standardized measure that could be used to assess language difficulties from ages 3–22 and has four scales: Listening Comprehension, Oral Expression, Reading Comprehension, and Written Expression. Dialectical differences can be measured through the standardized instrument of Diagnostic Evaluation of Language Variation (DELV; Seymour, Roepert, & de Villiers, 2009). This is a criterion-referenced test which has been used by many researchers.

1.3.2 *Psychological Domain*

Most of the instruments to measure motivation are self-report questionnaires and may involve Likert-type scoring. Perhaps, one of the better-known instruments to measure motivation is Motivations for Reading Questionnaire (MRQ), developed by Wigfield and Guthrie in 1997. The instrument consists of 53 items and measures 11 constructs such as reading efficacy, social reasons for reading, and compliance. Teacher knowledge relating to literacy/language constructs can be measured by the standardized instrument developed by Binks-Cantrell, Joshi, and Washburn (2012). This survey measures both the content knowledge as well as pedagogical knowledge and has been used by many researchers.

1.3.3 *Cognitive Domain*

Even though only two major components of reading were identified (i.e., word recognition and linguistic comprehension), there are several subcomponents that make up the two components. For instance, phonological awareness is foundational for decoding, and vocabulary is a subcomponent of linguistic comprehension, even though they are not given a separate status.

Decoding. Phonological awareness (PA) is defined as the knowledge that the spoken language consists of smaller units such as rhymes, syllables, and sounds. The smallest unit of sound is called a phoneme. Phonemic awareness, which is a type of phonological awareness, involves identifying the individual sounds/phonemes in the spoken word (Lieberman, 1987). In virtually every alphabetic written language, it has been demonstrated that PA, and especially phonemic awareness, is a prerequisite for becoming a good decoder. Further, teaching phonemic awareness skills systematically and explicitly also improve decoding skills (Goldenberg, Tolar, Reese, Francis, & Mejia-Arauz, 2014). Some of the standardized measures to measure PA skills are the Lindamood Auditory Conceptualization Test (LAC, Lindamood & Lindamood, 2004); the Test of Phonological Awareness—Second Edition: PLUS (TOPA-2+, Torgesen & Bryant, 2004), and the Comprehensive Test of Phonological Processing—Second Edition (CTOPP-2, Wagner, Torgesen, Rashotte, & Pearson, 2013).

A word of caution about administering phonological awareness tasks: It is a good idea to ask the student why they answered in a particular way. For instance, some of the tasks, like rhyming tasks, have only two or three choices and so the chances of getting it correct by guessing are high. So, for an item like, “Does *bat* rhyme with *cat*?” it is a good idea to ask why the student thinks they rhyme.

In addition to PA tasks, naming of both uppercase and lowercase letters of the alphabet arranged in random order, and the common sounds of the letters should be explored. Juel (1995) found that students who knew the names of letters and their common sounds at the end of Grade 1 had a very high probability (about 0.90) that

they would be good readers at the end of Grade 4. By contrast, those who did not know the names of the letters and the common sounds by the end of Grade 1 had a high probability (about 0.88) that they would be poor readers by the end of Grade 4. Thus, it is very important that the students know the names and the common sounds of letters to become a good reader and speller.

Decoding skill is generally measured through a nonword (also referred to as nonsense word or pseudoword) reading task. These are pronounceable, made-up words used to test the student's knowledge of letter-sound correspondences. Reading real words, in some instances, may be due to repeated exposure to a word (e.g., reading *Pine* if the student has lived on *Pine Street*). Decoding skill, sometimes also referred to as word-attack skill, is generally measured by the Woodcock Reading Mastery Test-III (Woodcock, 2011). Other major academic assessment batteries now have nonsense word reading subtests. We also strongly recommend administering a spelling task for its various advantages. First of all, it can be administered in a group setting, so many students can be tested at the same time. Further, as Shankweiler, Lundquist, Dreyer, and Dickinson (1996) noted "... although spelling is ... not a component of reading, it provides a valuable indicator of the level of orthographic skill on which all literacy activities ultimately depend. Word recognition and all subsequent higher level processes that take place in reading are constrained by the ability to fluently transcode print into language" (p. 287). Further, there is a high degree of relationship between reading and spelling in the order of about +0.8 (Ehri, 1997). Additionally, we also recommend that spelling errors of students be scored both quantitatively as right or wrong and also qualitatively taking into consideration factors such as sound substitutions based on place and manner of articulation. The Spelling subtest from the Wide Range Achievement Test—5 (WRAT-5, Wilkinson & Robertson, 2017) and Test of Written Spelling—5 (TWS-5, Larsen, Hammill, & Moats, 2013) are two of the commonly administered standardized measures of spelling.

Rapid Automatized Naming and Rapid Alternating Stimulus Tests (RAN/RAS; Wolf & Denckla, 2005) measure speed of processing that has been found to be helpful in identifying children with literacy problems and have been widely used. They are quick, easy to administer and also can be administered in a non-threatening manner. Decoding skill and speed of processing can be measured simultaneously through the Test of Word Reading Efficiency—Second Edition (TOWRE-2; Torgesen, Wagner, & Rashotte, 2012).

Linguistic Comprehension. The second component in the cognitive domain is linguistic comprehension. It is strongly recommended that both listening comprehension and reading comprehension measures be administered. In the listening comprehension measure, the experimenter reads the passage and asks comprehension questions and in reading comprehension, the student has to read and answer the comprehension questions. In typically developing readers, all three skills—decoding, listening comprehension, and reading comprehension should be within the normal range. If there is a problem in one of the skills, reading will be affected. If there is a problem only in decoding, then it might affect reading comprehension but not listening comprehension. This is generally the case with students with the dyslexia-type

problem. Among students with both listening and reading comprehension problems, their performance in decoding may be within the average range, which is generally seen among students with the hyperlexia-type reading difficulty. If the student has problems in both decoding and comprehension, generally the student is classified as either a low-ability reader or a garden-variety poor reader (Stanovich, 1988). This method of assessing reading problems bypasses administering intelligence tests and also pinpoints the weak component so that appropriate instructional procedures can be implemented.

The Woodcock Reading Mastery Tests (Woodcock, 2011) have both listening and reading comprehension measures. Further, we recommend administering two different types of comprehension measures as Joshi as well as Keenan and their colleagues have shown that reading comprehension scores can differ depending on the tests used (Joshi, Williams, & Wood, 1998; Keenan, Betjemann, & Olson, 2008; Keenan & Meenan, 2014). The Woodcock Reading Mastery Tests measure reading comprehension through the cloze procedure while the Gates-MacGinitie Reading Tests (MacGinitie, MacGinitie, Katherine Maria, & Dreyer, 2000) measure silent reading and follows the multiple-choice format for responses. The Gray Oral Reading Tests (GORT-5, Wiederholt & Bryant, 2012) measures oral reading fluency and reading comprehension. It is important to measure both literal comprehension (comprehension is assessed based on the information directly stated in the text) and inferential comprehension (comprehension is assessed based on information not explicitly stated and the student has to infer). Studies by Oakhill, Berenhaus, and Cain (2015) have shown that some students can perform well on literal comprehension but not on inferential comprehension materials.

For a general battery of tests, Woodcock–Johnson Tests of Achievement—IV (WJIV-ACH) (Schrank, McGrew, Mather, & Woodcock, 2014) is a useful tool to use for speakers of the English language. It has been recently updated and gives profiles for reading and writing performance. By measuring decoding, listening comprehension, and reading comprehension, WJIV-ACH can highlight the strengths and weaknesses of various components of reading. The Spanish equivalent of the Woodcock tests is the Woodcock–Muñoz Bateria III (Woodcock, Schrank, Muñoz-Sandoval, McGrew, & Mather, 2005) and is widely used to assess the reading difficulties of Spanish-speaking children in the USA.

WJIV-ACH also measures writing skills. The Test of Written Language (TOWL-IV; Hammill & Larsen, 2009) is a norm-referenced measure for ages 9–18 and measures skills such as vocabulary, spelling, punctuation, sentence combining, and story composition.

The instruments discussed above are just a sample of different instruments that could be applied to assess literacy problems based on the CMR. However, it is useful to follow some of the well-known publishers such as Pro-Ed, Psychological Corporation/Pearson, and Riverside for updates and new publications.

1.4 Intervention Based on the CMR

As mentioned earlier, the ecological domain of the CMR consists of factors such as home environment, classroom environment, parent/caregiver involvement, peer influence, dialect differences, and the specific written language/orthography. Some of the factors in the ecological domain such as home environment cannot be altered to any great degree by classroom teachers, yet an awareness of the home environment can help the teachers to interact with students with understanding and compassion. The classroom environment can be set up in such a way to make the students more attentive and conducive to learning. All teachers must be aware that AAE is not an impoverished version of more Standard English dialects, rather it is a separate but equivalent system, as complex and rule governed as Academic English (AE) but with some alternative rules and conventions for expressing the same syntactic relationships, semantic content, and verbal pronunciations (Labov, 1998). Speakers of AAE have to be made aware of the dialectical differences between AAE and AE used in classrooms and textbooks. Teachers can readily understand the difficulties experienced by many ESL students in learning to read, but they are typically unaware of the difficulties encountered by students who speak AAE. The boundaries of a foreign language and English are usually clear cut. However, due to the extensive overlap between the AAE dialect and AE, it is not easy to tell precisely where one leaves off and the other begins. This makes it difficult for the student to know what is acceptable and what is not acceptable in AE. Pittman, Joshi, and Carreker (2014) found that after nine weeks of systematic and explicit instruction that included teaching spelling through the use of morphemes, Greek and Latin roots, and word origins, poor-performing African-American students not only improved their spelling but also maintained it during the semester even after the instruction was discontinued.

Since there is a high percentage of Spanish-speaking children in US schools, knowing the regularity of Spanish orthography and the many cognate words of English and Spanish (e.g., *attention/latención*; *exceptional/exceptional*; *curious/curioso*) can help the teacher to modify instruction to meet the needs of Spanish-speaking ESL learners. There are also many students in US schools whose first language is other than English and Spanish. Knowing that Chinese is a morpho-syllabic language with the basic unit being a character at the morpheme level and not a letter of an alphabet can help teachers understand why children whose first language is Chinese make certain kinds of errors while learning to read and write English. Similarly, knowing that Arabic is written from right to left and many of the textbooks in Arabic, after about Grade 3, leave out the written vowels can also help teachers to understand the literacy problems of students whose first language is Arabic.

Motivation and teacher knowledge are two of the factors under the psychological domain. Motivation can be improved by Concept-Oriented Reading Instruction (CORI) (Wigfield & Guthrie, 1997; Wigfield et al., 2016) which focuses on enhancing children's reading motivation and comprehension in a content domain like science or social studies. By providing reading strategy instruction and implementing practices

that focus motivation such as self-efficacy, value of reading, and collaboration, CORI has been a useful model in improving motivation as well as reading.

Teacher knowledge of the language constructs needed to teach literacy skills is very important, but unfortunately several studies have shown that teachers are not equipped with this knowledge (Binks-Cantrell, Joshi, & Washburn, 2012; Joshi et al., 2009). However, as McCutchen et al. (2002) demonstrated, even a short summer course providing the knowledge of language constructs and pedagogical knowledge cannot only improve the knowledge among teachers but also the literacy achievement of their students.

The cognitive aspects of CMR—decoding and comprehension—can be developed by many instructional activities that are based on empirical evidence, outlined by the National Reading Panel (NRP, 2000, see also Kilpatrick & O'Brien, Chap. 8 this volume). Phonemic awareness can benefit all children in various grade levels and reading levels and it is most effective when it is direct and systematic. Phoneme deletion and phoneme blending are useful activities and just about 10–15 minutes of instruction in a small group can have lasting effects. Similarly, decoding can be improved by explicit instruction through a synthetic phonics approach. Spelling instruction should include explicit instruction of letter-sound correspondences, history of English, and etymology. Emphasizing rote memory or expecting students to copy words ten times are not recommended. Joshi, Treiman, Carreker, and Moats (2008) provide a detailed outline of what concepts to teach at each grade level. Vocabulary can also be improved by analyzing morphemic patterns and etymology. Just knowing a few morphemes like *ology* (study of), *spect* (to see), *duct* (to lead), and *scribe* (to write) can literally make hundreds of words. Thus, it is extremely important to teach morphemic patterns in words in multiple contexts and multiple meanings to improve the depth and breadth of vocabulary. Comprehension can be improved through empirically based approaches such as reciprocal teaching (Brown & Palincsar, 1987). Most of the successful comprehension programs include some common themes, such as collaborative or cooperative learning, having activities before reading (such as what I know), during reading (what I want to know); and after reading (what I learned as a result of my reading); and comprehension monitoring (stopping and asking questions such as “Is it making sense?” “Am I understanding what I have read so far?”), and being an active reader by constantly predicting what is going to happen next. Detailed explanations of various methods and programs can be found in Aaron, Joshi, Boulware-Gooden et al. (2008).

One of the empirically based writing instructional approaches is Self-Regulated Strategy Development (SRSD) (Graham, Harris, & Mason, 2005) that can be used from Grade 2 through high school and has strong empirical support. SRSD for writing instruction is somewhat similar to reciprocal teaching in the sense that some of the steps in the program aim to develop background knowledge and model it, and then, students are guided to independent performance.

1.5 Summary and Conclusions

Reading problems are a huge concern in the USA and it affects individuals, society, and the nation, financially and academically. The NAEP (2017) data show that 64% of fourth-graders and 66% of eighth-graders perform at or below proficiency in reading—proficiency being defined as “solid academic performance.” Further, 31% of fourth-graders and 24% of eighth-graders were at or below the basic level, referring to only partial mastery of the prerequisite knowledge and skills needed for successful academic performance. Performance at the end of Grade 1 in reading skills can predict the reading development in Grade 4 (Juel, 1995) and poor reading performance by Grade 3 is the strongest predictor of dropout from high school (Alexander, Entwisle, & Kabbini, 2001). Unfortunately, the statistics about poor performance in reading have remained the same for decades despite billions of dollars spent on improving reading skills. The traditional method of identifying reading problems using IQ scores as well as the recent implementation of RTI has not produced promising results (further see Kilpatrick & O’Brien, Chap. 8 this volume). Since literacy problems might be caused by various factors, a comprehensive model such as the CMR might help in the assessment and intervention in order to solve literacy problems and thus help the individual, society, and the nation.

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