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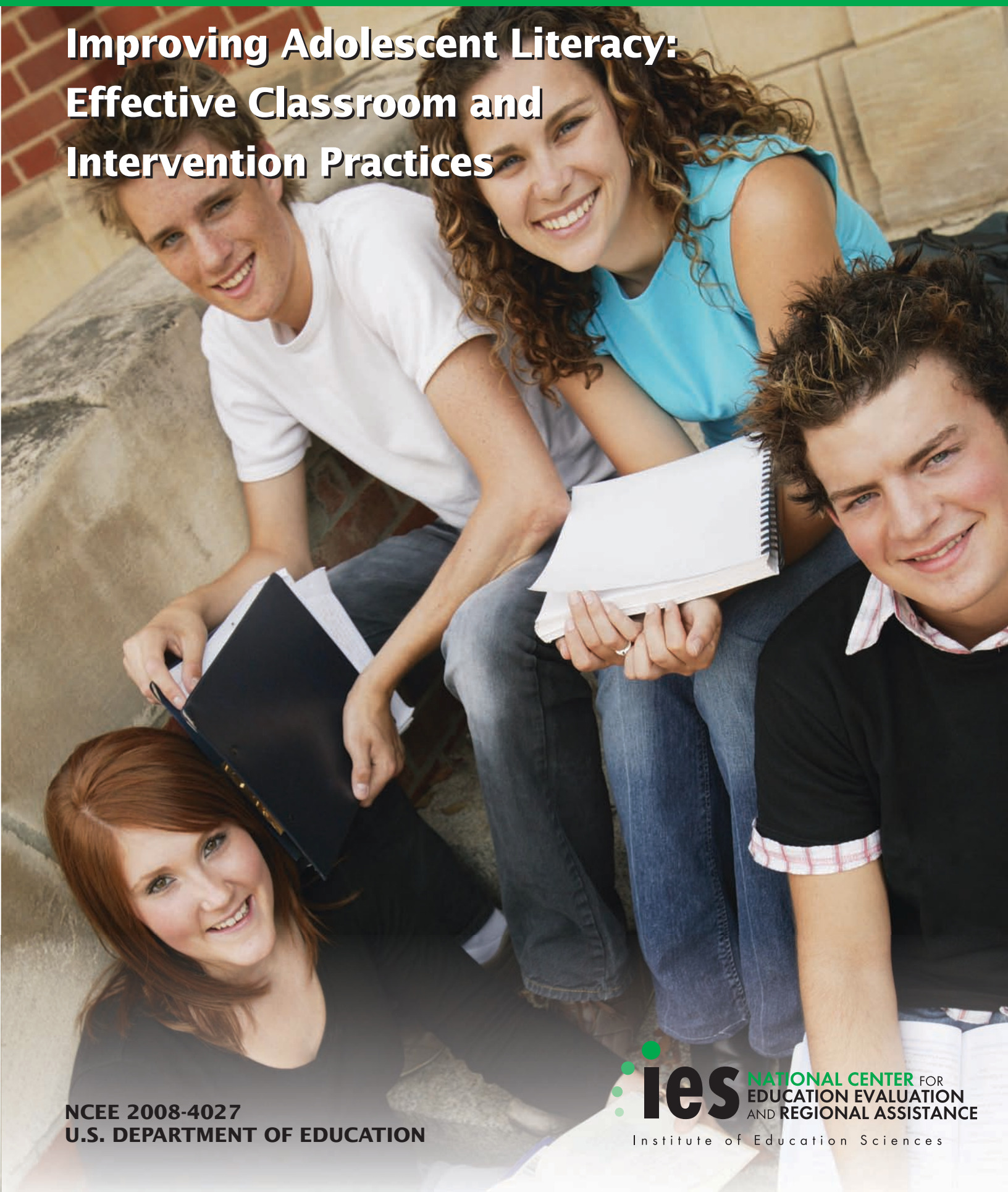
Improving Adolescent Literacy: Effective Classroom and Intervention Practices



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The goal of this practice guide is to formulate specific and coherent evidence-based recommendations that educators can use to improve literacy levels among adolescents in upper elementary, middle, and high schools. The target audience is teachers and other school personnel with direct contact with students, such as coaches, counselors, and principals. The guide includes specific recommendations for educators and the quality of evidence that supports these recommendations.

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IES PRACTICE GUIDE

Improving Adolescent Literacy: Effective Classroom and Intervention Practices

August 2008

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Introduction

The goal of this practice guide is to present specific and coherent evidence-based recommendations that educators can use to improve literacy levels among adolescents in upper elementary, middle, and high schools. The panel purposefully included students in 4th and 5th grades within the realm of adolescents because their instructional needs related to literacy have more in common with those of students in middle and high school than they do with students in early elementary grades. Many students in grades 4 and up experience difficulty acquiring the advanced literacy skills needed to read in the content areas.[1] The target audience for the practice guide is teachers and other school personnel who have direct contact with students, such as coaches, counselors, and principals. The practice guide includes specific recommendations for educators along with a discussion of the quality of evidence that supports these recommendations.

We, the authors, are a small group with expertise on this topic. The range of evidence we considered in developing this guide is vast, ranging from experimental studies in which reading was the dependent variable, to trends in the National Assessment of Educational Progress (NAEP) data, to correlational and longitudinal studies, again with reading as the major variable of interest. For questions about what works best, high-quality experimental and quasi-experimental studies—such as those meeting the criteria of the What Works Clearinghouse (http://www.ies.ed.gov/ncee/wwc)—have a privileged position. In all cases we pay particular attention to findings that are replicated across studies.

Although we draw on evidence about the effectiveness of specific practices in reading instruction, we use this information to make broader points about improving practice. In this guide we have tried to take findings from research or practices recommended by experts and describe how recommendations might actually unfold in school settings. In other words, we aim to provide sufficient detail so that educators will have a clear sense of the steps necessary to make use of the recommendations.

A unique feature of practice guides is the explicit and clear delineation of the quality—as well as quantity— of evidence that supports each claim. To do this, we used a semi-structured hierarchy suggested by IES. This classification system uses both the quality and the quantity of available evidence to help determine the strength of the evidence base grounding each recommended practice (table 1).

Strong refers to consistent and generalizable evidence that a practice causes better outcomes for students in measures of reading proficiency.[2]

Moderate refers either to evidence from studies that allow strong causal conclusions but cannot be generalized with assurance to the population on which a recommendation is focused (perhaps because the findings have not been widely replicated) or to evidence from studies that are generalizable but have more causal ambiguity than offered by experimental designs (statistical models of correlational data or group comparison designs for which equivalence of the groups at pretest is uncertain).

Low refers to expert opinion based on reasonable extrapolations from research and theory on other topics and evidence from

1. Biancarosa and Snow (2004); Heller and Greenleaf (2007).

2. Following What Works Clearinghouse guidelines, we consider a positive, statistically significant effect or large effect size (greater than 0.25) as an indicator of positive effects.

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Table 1. Institute of Education Sciences levels of evidence for practice guides

Strong	In general, characterization of the evidence for a recommendation as strong requires both studies with high internal validity (i.e., studies whose designs can support causal conclusions) and studies with high external validity (i.e., studies that in total include enough of the range of participants and settings on which the recommendation is focused to support the conclusion that the results can be generalized to those participants and settings). Strong evidence for this practice guide is operationalized as: • A systematic review of research that generally meets the standards of the What Works Clearinghouse (WWC) (see http://ies.ed.gov/ncee/wwc/) and supports the effectiveness of a program, practice, or approach with no contradictory evidence of similar quality; OR • Several well-designed, randomized controlled trials or well designed quasi-experiments that generally meet the WWC standards and support the effectiveness of a program, practice, or approach, with no contradictory evidence of similar quality; OR • One large, well-designed, randomized controlled, multisite trial that meets the WWC standards and supports the effectiveness of a program, practice, or approach, with no contradictory evidence of similar quality; OR • For assessments, evidence of reliability and validity that meets the Standards for Educational and Psychological Testing.[a]
Moderate	In general, characterization of the evidence for a recommendation as moderate requires studies with high internal validity but moderate external validity, or studies with high external validity but moderate internal validity. In other words, moderate evidence is derived from studies that support strong causal conclusions but where generalization is uncertain, or studies that support the generality of a relationship but where the causality is uncertain. Moderate evidence for this practice guide is operationalized as: • Experiments or quasi-experiments generally meeting the WWC standards and supporting the effectiveness of a program, practice, or approach with small sample sizes and/or other conditions of implementation or analysis that limit generalizability and no contrary evidence; OR • Comparison group studies that do not demonstrate equivalence of groups at pretest and therefore do not meet the WWC standards but that (a) consistently show enhanced outcomes for participants experiencing a particular program, practice, or approach and (b) have no major flaws related to internal validity other than lack of demonstrated equivalence at pretest (e.g., only one teacher or one class per condition, unequal amounts of instructional time, highly biased outcome measures); OR • Correlational research with strong statistical controls for selection bias and for discerning influence of endogenous factors and no contrary evidence; OR • For assessments, evidence of reliability that meets the Standards for Educational and Psychological Testing[b] but with evidence of validity from samples not adequately representative of the population on which the recommendation is focused.
Low	In general, characterization of the evidence for a recommendation as low means that the recommendation is based on expert opinion derived from strong findings or theories in related areas and/or expert opinion buttressed by direct evidence that does not rise to the moderate or strong levels. Low evidence is operationalized as evidence not meeting the standards for the moderate or high levels.

a. American Educational Research Association, American Psychological Association, and National Council on Measurement in Education (1999).

b. Ibid.

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studies that do not meet the standards for moderate or strong evidence.

The What Works Clearinghouse standards and their relevance to this guide

In terms of the levels of evidence indicated in table 1, we rely on What Works Clearinghouse (WWC) evidence standards to assess the quality of evidence supporting educational programs and practices. The WWC addresses evidence for the causal validity of instructional programs and practices according to WWC standards. Information about these standards is available at http://ies.ed.gov/ncee/wwc. The technical quality of each study is rated and placed into one of three categories:

- *Meets Evidence Standards* for randomized controlled trials and regression discontinuity studies that provide the strongest evidence of causal validity.

- *Meets Evidence Standards with Reservations* for all quasi-experimental studies with no design flaws and randomized controlled trials that have problems with randomization, attrition, or disruption.

- *Does Not Meet Evidence Screens* for studies that do not provide strong evidence of causal validity.

Appendix D provides more technical information about the studies and our decisions regarding the level of evidence for each recommendation. To illustrate the types of studies reviewed, we describe one study for each recommendation. Our goal in doing this is to provide interested readers with more detail about the research designs, the intervention components, and the way impact was measured.

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Improving Adolescent Literacy: Effective Classroom and Intervention Practices

Overview

Data from the 2007 National Assessment of Educational Progress (NAEP) in reading report that 69 percent of 8th grade students fall below the proficient level in their ability to comprehend the meaning of text at their grade level.[1] Equally alarming, 26 percent of students read below the basic level, which means that they do not have sufficient reading ability to understand and learn from text at their grade level. When these data are coupled with reports showing that even high school students with average reading ability are currently unprepared for the literacy demands of many workplace and postsecondary educational settings, the need for improved literacy instruction of adolescents is apparent.[2]

Reading ability is a key predictor of achievement in mathematics and science,[3] and the global information economy requires today's American youth to have far more advanced literacy skills than those required of any previous generation.[4] However, as long-term NAEP data[5] and other studies show,[6] improvements in the literacy skills of older students have not kept pace with the increasing demands for literacy in the workplace. These studies, and those mentioned earlier, suggest the need for serious attention to the challenges of improving reading instruction in upper elementary, middle, and high school. Yet reading instruction as a formal part of the curriculum typically decreases as students move beyond upper elementary grades.

To acquire the skills they need, students must work hard to refine and build upon their initial reading skills, and teachers in upper elementary grades and in middle and high school classes should help students acquire more advanced skills once they understand the demands that content area tasks actually present, especially to students who struggle with reading.[7] However, many teachers report feeling unprepared to help their students or do not think that teaching reading skills in content-area classes is their responsibility.[8]

For more than 50 years[9] the realities of student reading difficulties and teacher lack of preparation to address them have been met by calls for more instruction in higher-level reading skills for adolescents and for professional development in content-area reading instruction for middle and high school teachers. Although the debate about the role of content-area teachers in reading instruction continues,[10] the time has come to consider seriously the support that needs to be given to struggling readers and the role that every teacher needs to play in working toward higher levels of literacy among all adolescents, regardless of their reading abilities.

A significant difficulty in working toward higher levels of literacy involves structural barriers at the middle and high school levels that need to be overcome.

1. Lee, Griggs, and Donahue (2007).
2. Pennsylvania Department of Education (2004); Williamson (2004).
3. ACT (2006).
4. Snow, Burns, and Griffin (1998).
5. Perie and Moran (2005).
6. ACT (2006).
7. Heller and Greenleaf (2007).
8. Heller and Greenleaf (2007).
9. Artley (1944); Moore, Readence, and Rickman (1983).
10. Heller and Greenleaf (2007).

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Researchers[11] have found that some teachers circumvent the need for students to read texts by adjusting their assignments or methods of presenting content, rather than helping students learn the discipline-specific strategies needed for content-area work. Another researcher[12] found that content-area teachers expressed resistance to the work of the high school reading specialists, whose job is to provide students with additional help outside their regular class structure. And still others[13] have suggested that teachers who strive primarily to cover the content of their disciplines are unaware that by increasing students' ability to read their assignments they could actually increase the depth and breadth of content that could be covered efficiently. A final barrier[14] is that when schools actually institute programs to help struggling adolescent readers, they are housed within special education programs and thus serve only a small proportion of the students whom they could benefit.

In determining what to include in the adolescent literacy practice guide, the panel recognized that recommendations for instructional strategies must be evidence-based. That is, rigorous studies have shown the practices to be associated with improvements in students' reading proficiency. While fully understanding that all aspects of literacy are important for success in middle and high school, panel members decided to focus specifically on studies about reading, that is, studies in which reading was a dependent variable. Although aware of the challenges faced by English language learners, we also focused on students whose first language was English.[15] The search for sources focused only on studies of reading programs conducted within a school or clinical setting and excluded those offered in organized after school programs. These decisions narrowed the number of empirical studies from which recommendations could be drawn.

Finally, the research that met the criteria for inclusion in this guide included few studies involving the use of computer technology. Despite great interest in and increasing use of software for reading instruction in middle and high schools, there is little experimental or quasi-experimental research demonstrating the effectiveness of that work. Most recently, the National Evaluation of Educational Technology[16] assessed the effectiveness of four software packages for literacy instruction at the 4th grade level, using an experimental design with a national sample of 45 schools, comprising 118 teachers and 2,265 students. Although the individual products were not identified by specific results, none of the tested software products produced statistically significant improvements in student reading achievement at the end of the first of two years of the study. At the same time, the National Reading Panel suggested that there is some promise in using computers to supplement classroom instruction; however, these conclusions do not rise to the level of a supported endorsement.

A major source for identifying strategies that can have an immediate impact on student reading achievement was the *Report of the National Reading Panel*,[17] especially its sections on comprehension

11. Schoenbach et al. (1999).

12. Darwin (2003).

13. Kingery (2000); O'Brien, Moje, and Stewart (2001).

14. Barry (1997).

15. The Institute of Education Sciences has published a practice guide on effective literacy instruction for English language learners, which can be accessed at http://ies.ed.gov/ncee.

16. Dynarski et al. (2007).

17. National Reading Panel (2000a).

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and vocabulary. What makes the National Reading Panel evidence so important is that the eligible research for vocabulary consisted mostly of studies of students in grades 3 and above, while the research on comprehension involved mostly students in grades 4 and above. The analysis of adolescent literacy practices presented in summary form in *Reading Next: A Vision for Action and Research in Middle and High School Literacy*[18] has also been influential in shaping discussions on adolescent literacy and has provided a starting point for developing this guide.

Adolescent literacy is a complex concept because it entails more than the scores that students achieve on standardized reading tests. It also entails reading to learn in subjects that present their ideas and content in different ways. Students need to be able to build knowledge by comprehending different kinds of texts, mastering new vocabulary, and sharing ideas with others. Although causal links have not been empirically established between improvements in reading and increases in course grades and scores on subject-based tests, students' reading difficulties will obviously impede their ability to master content-area coursework fully. Test score data and research continually confirm that many adolescents first need to improve their reading comprehension skills before they can take full advantage of content-area instruction.

In determining what to include in this practice guide, panel members also recognized that recommendations must be practical. Teachers must perceive the value of each recommendation so that they envision themselves integrating the recommendations into their instruction to make content-area reading assignments accessible to all students—those who are learning to make sense of new and unfamiliar academic areas, those whose skills are marginal at best, and also those who struggle with reading. The first two recommendations focus on strategies for vocabulary and comprehension instruction: Provide explicit vocabulary instruction (Level of evidence: Strong) and provide direct and explicit comprehension strategy instruction (Level of evidence: Strong) (table 2).

Although its research base is not as strong as that for vocabulary and comprehension, the third recommendation concerns discussion of and about texts. Most, if not all, the studies that examined instruction in comprehension strategies indicated the importance of practicing those strategies in the context of discussions about the meaning of texts. Further, there is evidence that encouraging high-quality discussion about texts, even in the absence of explicit instruction in reading comprehension strategies, can have a positive impact on reading comprehension skills. Small- and large-group discussions also provide teachers with an important window into students' thinking that can inform future instruction. Therefore, the third recommendation focuses on the use of discussion in improving the reading outcomes of students: Provide opportunities for extended discussion of text meaning and interpretation (Level of evidence: Moderate).

The fourth recommendation concerns student motivation and engagement. These two factors are widely recognized as important moderators for learning, but there is limited scientific evidence that links these factors directly to student achievement in reading. Nonetheless, all teachers can recognize the importance of bolstering students' motivation and finding ways to increase students' engagement with the material they are asked to read. The recommendation provided in this practice guide ties motivation and engagement specifically to literacy outcomes: Increase student motivation and engagement in literacy learning (Level of evidence: Moderate).

18. Biancarosa and Snow (2004).

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Table 2. Recommendations and corresponding levels of evidence to support each

Recommendation	Level of evidence
1. Provide explicit vocabulary instruction.	**Strong**
2. Provide direct and explicit comprehension strategy instruction.	**Strong**
3. Provide opportunities for extended discussion of text meaning and interpretation.	**Moderate**
4. Increase student motivation and engagement in literacy learning.	**Moderate**
5. Make available intensive and individualized interventions for struggling readers that can be provided by trained specialists.	**Strong**

Panel members also recognized that some students need more intense help to improve literacy skills than classroom teachers can provide. Because of this, our fifth recommendation concerns struggling readers, those students who probably score well below their peers on state reading tests and whose reading deficits hinder successful performance in their coursework. Under normal classroom instructional conditions, these students are unable to make needed improvements in their reading skills, so they typically cannot meet grade-level standards in literacy throughout middle and high schools. They need additional help that the classroom teacher cannot be expected to provide. Unless their reading growth is dramatically accelerated by strong and focused instruction, they will continue to struggle to make sense of the materials assigned to them in their coursework, and they are at serious risk of being unable to use literacy skills successfully in their postsecondary lives. However, if they are identified from among their peers as being struggling readers and if their weaknesses in reading are carefully assessed by trained specialists using measures that detect strengths and weaknesses, and this assessment is followed by intensive interventions that are focused on their particular needs, they will have more opportunities to improve their literacy skills substantially. This improvement should then translate into gains in content-area achievement (Level of evidence: Strong).

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Scope of the practice guide

This practice guide provides five recommendations for increasing the reading ability of adolescents. The first three recommendations are strategies that classroom teachers can incorporate into their instruction to help students gain more from their reading tasks in content-area classes. The fourth recommendation offers teachers strategies for improving students' motivation for and engagement with learning. Together, the recommendations offer a coherent statement: specific strategies are available for classroom teachers and specialists to address the literacy needs of all adolescent learners. The fifth recommendation refers specifically to adolescent struggling readers, those students whose poor literacy skills weaken their ability to make sense of written material.

Although not an exhaustive list, the recommendations are representative of panel members' thinking about methods that have the strongest research support and those that are appropriate for use with adolescents. The first four recommendations can be implemented easily by classroom teachers within their regular instruction, regardless of the content areas they teach. Recommendations for teaching students about the discourse patterns of specific subjects that adolescents study (for example, different ways of presenting information, creating arguments, or evaluating evidence in science compared with history) are not included in this guide because the formal evidence base for these methods is not yet sufficiently developed. The fifth recommendation refers to reading interventions that in many cases must be provided by reading specialists or specially trained teachers.

In offering these recommendations, we remind the reader that adolescent literacy is complex. There are many reasons why adolescents have difficulty making sense of texts, and there are many manifestations of these difficulties. Addressing students' needs often requires coordinated efforts from teachers and specialists.

Readers should also note that appropriate professional development in reading has been shown to produce higher achievement in students.[19] Providing professional development to content-area teachers focused on instructional techniques they can use to meet the literacy needs of all their students, including those who struggle, is highly recommended in this practice guide. Professional development also needs to address the specific literacy demands of different disciplines. One attempt at specifying these demands describes specific skills in mathematics, science, social studies, and English.[20] Focusing on these skills would be an ideal starting point for professional development for content-area teachers who want to incorporate elements of literacy instruction in their content area instruction.

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19. National Reading Panel (2000a).

20. International Reading Association (2006).

Checklist for carrying out the recommendations

Recommendation 1. Provide explicit vocabulary instruction

☐ Dedicate a portion of regular classroom lessons to explicit vocabulary instruction.

☐ Provide repeated exposure to new words in multiple contexts, and allow sufficient practice sessions in vocabulary instruction.

☐ Give sufficient opportunities to use new vocabulary in a variety of contexts through activities such as discussion, writing, and extended reading.

☐ Provide students with strategies to make them independent vocabulary learners.

Recommendation 2. Provide direct and explicit comprehension strategy instruction

☐ Select carefully the text to use when beginning to teach a given strategy.

☐ Show students how to apply the strategies they are learning to different texts.

☐ Make sure that the text is appropriate for the reading level of students.

☐ Use a direct and explicit instruction lesson plan for teaching students how to use comprehension strategies.

☐ Provide the appropriate amount of guided practice depending on the difficulty level of the strategies that students are learning.

☐ Talk about comprehension strategies while teaching them.

Recommendation 3. Provide opportunities for extended discussion of text meaning and interpretation

☐ Carefully prepare for the discussion by selecting engaging materials and developing stimulating questions.

☐ Ask follow-up questions that help provide continuity and extend the discussion.

☐ Provide a task or discussion format that students can follow when they discuss text in small groups.

☐ Develop and practice the use of a specific "discussion protocol."

Recommendation 4. Increase student motivation and engagement in literacy learning

☐ Establish meaningful and engaging content learning goals around the essential ideas of a discipline as well as around the specific learning processes used to access those ideas.

☐ Provide a positive learning environment that promotes student autonomy in learning.

☐ Make literacy experiences more relevant to student interests, everyday life, or important current events.

☐ Build classroom conditions to promote higher reading engagement and conceptual learning through such strategies as goal setting, self-directed learning, and collaborative learning.

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Recommendation 5. Make available intensive individualized interventions for struggling readers that can be provided by qualified specialists

☐ Use reliable screening assessments to identify students with reading difficulties and follow up with formal and informal assessments to pinpoint each student's instructional needs.

☐ Select an intervention that provides an explicit instructional focus to meet each student's identified learning needs.

☐ Provide interventions where intensiveness matches student needs: the greater the instructional need, the more intensive the intervention. Assuming a high level of instructional quality, the intensity of interventions is related most directly to the size of instructional groups and amount of instructional time.

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Recommendation 1. Provide explicit vocabulary instruction

Teachers should provide students with explicit vocabulary instruction both as part of reading and language arts classes and as part of content-area classes such as science and social studies. By giving students explicit instruction in vocabulary, teachers help them learn the meaning of new words and strengthen their independent skills of constructing the meaning of text.

Level of evidence: Strong

The panel considers the level of evidence supporting this recommendation to be *strong*, based on six randomized controlled experimental studies and three well designed quasi-experiments that demonstrated group equivalence at pretest.[1] An additional six studies with weaker designs provided direct evidence to support this recommendation.[2] A single subject design study also provided evidence about the effect of vocabulary instruction on students' outcomes.[3] The research supporting explicit vocabulary instruction includes students in upper elementary, middle, and high schools from diverse geographic regions and socioeconomic backgrounds and addresses a wide variety of strategies of vocabulary instruction.

1. Barron and Melnik (1973); Baumann et al. (2002); Baumann et al. (2003); Bos and Anders (1990); Brett, Rothlein, and Hurley (1996); Lieberman (1967); Margosein, Pascarella, and Pflaum (1982); Nelson and Stage (2007); Xin and Reith (2001).

2. Beck, Perfetti, and McKeown (1982); Jenkins, Matlock, and Slocum (1989); Koury (1996); Ruddell and Shearer (2002); Stump et al. (1992); Terrill, Scruggs, and Mastropieri (2004).

3. Malone and McLaughlin (1997). The standards for judging the quality of a single subject design study are currently being developed.

One caveat is critical to interpreting the research on vocabulary instruction. While all of these studies show effects on vocabulary learning, only some show that explicit vocabulary instruction has effects on standardized measures of reading comprehension. Although reading comprehension is clearly the ultimate goal of reading instruction, it is important to note that the construct of comprehension includes, but is not limited to, vocabulary. While it is likely that the cumulative effects of learning vocabulary would eventually show effects on reading comprehension, we believe additional research is necessary to demonstrate this relationship.

Brief summary of evidence to support the recommendation

In the early stages of reading most of the words in grade-level texts are familiar to students as part of their oral vocabulary. However, as students progress through the grades, print vocabulary increasingly contains words that are rarely part of oral vocabulary. This is particularly the case for content-area material. In many content-area texts it is the vocabulary that carries a large share of the meaning through specialized vocabulary, jargon, and discipline-related concepts. Learning these specialized vocabularies contributes to the success of reading among adolescent students. Research has shown that integrating explicit vocabulary instruction into the existing curriculum of subject areas such as science or social studies enhances students' ability to acquire textbook vocabulary.[4]

Children often learn new words incidentally from context. However, according to a meta-analysis of the literature, the probability that they will learn new words while reading is relatively low—about 15 percent.[5] Therefore, although incidental

4. Baumann et al. (2003); Bos and Anders (1990).

5. Swanborn and de Glopper (1999).

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learning helps students develop their vocabulary, additional explicit instructional support needs to be provided as part of the curriculum to ensure that all students acquire the necessary print vocabulary for academic success. In many academic texts, students may use context clues within the text, combined with their existing semantic and syntactic knowledge to infer the meaning of unfamiliar words.[6] Explicit vocabulary instruction may be essential to this development of these types of inference skills.

Words are best learned through repeated exposure in multiple contexts and domains. Many content-area texts, such as those in biology and physics, however, include specialized vocabulary, jargon, and discipline-related concepts that students may not encounter outside their textbooks. This aspect of presenting content-area material limits the amount of exposure students will have with these unfamiliar terms. If students encounter unknown words in almost every sentence in a textbook, learning the content becomes daunting and discouraging. Explicit instruction in specialized vocabularies is an important way to contribute to successful reading among adolescent students.[7]

Research has shown that integrating explicit vocabulary instruction into the existing content-area curriculum in content areas such as science or social studies enhances students' ability to acquire textbook vocabulary.[8] Additional studies that examined students' scores on the vocabulary subtests of standardized reading tests demonstrated that explicit vocabulary instruction had a substantial effect on students' vocabulary acquisition in the context of a variety of texts, including prose, expository texts, and specialized word lists.[9]

Explicit vocabulary instruction is a name for a family of strategies that can be divided into two major approaches: direct instruction in word meaning and instruction in strategies to promote independent vocabulary acquisition skills. Direct instruction in word meaning includes helping students look up definitions in dictionaries and glossaries, read the words and their definitions, match words and their definitions, participate in oral recitation, memorize definitions, and use graphic displays of the relationships among words and concepts such as semantic maps. Strategies to promote independent vocabulary acquisition skills include analyzing semantic, syntactic, or context clues to derive the meaning of words by using prior knowledge and the context in which the word is presented. Research shows that both approaches can effectively promote students' vocabulary.[10] The first approach can add to students' ability to learn a given set of words, whereas the second approach has the added value of helping students generalize their skills to a variety of new texts in multiple contexts. In that respect, the two approaches are complementary rather than conflicting.

Some students acquire words best from reading and writing activities, whereas other students benefit more from visual and physical experiences.[11] For example, short documentary videos may help students learn new concepts and terms because they provide a vivid picture of how the object looks in the context of its

6. Swanborn and de Glopper (1999).

7. Beck et al. (1982).

8. Baumann et al. (2003); Bos and Anders (1990)

9. Barron and Melnik (1973); Baumann et al. (2002); Beck et al. (1982); Brett et al. (1996); Nelson and Stage (2007)

10. Baumann et al. (2003); Bos and Anders (1990); Jenkins et al. (1989)

11. Barron and Melnik (1973); Xin and Reith (2001).

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environment or specialized use.[12] Using computer software to teach vocabulary is an effective way to leverage instructional time and provide a variety of practice modes—oral, print, and even multimedia elaborations of words and concepts. Programs that allow students to engage in independent practice can free teachers to work with other students in other instructional modes.

Other studies have shown that students also learn vocabulary through rich discussions of texts (see recommendation 3). For instance, one study showed that discussion improved knowledge of word meanings and relationships for students reading biology texts.[13] Discussion was also used in another study as part of the intervention.[14] Discussion seems to have its effects by allowing students to participate as both speakers and listeners. While this is not explicit instruction, it does have some additional benefits. For example, discussion might force students to organize vocabulary as they participate, even testing whether or not the vocabulary is used appropriately. It also presents opportunities for repeated exposure to words, shown to be a necessary condition for vocabulary learning. Vocabulary learning in these cases did not result from explicit instruction, but teachers who recognize potential of this kind of learning can supplement these interactions with new vocabulary with brief, focused explicit instruction to ensure that students share a common understanding of unfamiliar words and terms and have an opportunity to practice new vocabulary.

Although the research noted so far demonstrates the positive effects of explicit vocabulary instruction on vocabulary acquisition, there are mixed results with respect to the effects of such instruction on general measures of comprehension. Only a small number of the studies on explicit vocabulary instruction included comprehension outcome measures and found meaningful increases in students' reading comprehension. It may be that whereas limited vocabulary interferes with comprehension, additional literacy skills are needed for successful reading comprehension.

How to carry out the recommendation

1. Dedicate a portion of the regular classroom lesson to explicit vocabulary instruction. The amount of time will be dictated by the vocabulary load of the text to be read and the students' prior knowledge of the vocabulary. Making certain that students are familiar with the vocabulary they will encounter in reading selections can help make the reading task easier. Computer instruction can be an effective way to provide practice on vocabulary and leverage classroom time.

2. Use repeated exposure to new words in multiple oral and written contexts and allow sufficient practice sessions.[15] Words are usually learned only after they appear several times. In fact, researchers[16] estimate that it could take as many as 17 exposures for a student to learn a new word. Repeated exposure could be in the same lesson or passage, but the exposures will be most effective if they appear over an extended period of time.[17] Words that appear only once or twice in a text are typically not words that should be targeted for explicit instruction because there may never be enough practice to learn the word completely. Students should be provided with the definitions of these infrequent words.

12. Xin and Reith (2001).

13. Barron and Melnik (1973).

14. Xin and Reith (2001).

15. Jenkins et al. (1989).

16. Ausubel and Youssef (1965).

17. Ausubel and Youssef (1965).

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3. Give sufficient opportunities to use new vocabulary in a variety of contexts through activities such as discussion, writing, and extended reading. This will ensure that students begin to acquire a range of productive meanings for the words they are learning and the correct way to use those words in addition to simply being able to recognize them in print.

4. Provide students with strategies to make them independent vocabulary learners. One way is to give them strategies to use components (prefixes, roots, suffixes) of words to derive the meaning of unfamiliar words; another is to make use of reference material such as glossaries included in their textbooks.[18]

Potential roadblocks and solutions

1. Students may vary in their response to different vocabulary instruction strategies. For example, some students respond better to sensory information than to verbal information about word meaning. Teachers need to combine multiple approaches in providing explicit vocabulary instruction.[19] For instance, as described above, it is helpful to expose students to vocabulary numerous times either in one lesson or over a series of lessons. It is also helpful to combine this repeated exposure with a number of different explicit instruction strategies, such as using direct instruction techniques (getting students to look up definitions in dictionaries), helping promote students to independently acquire vocabulary skills (using context clues to derive meaning), offering students the opportunity to work on the computer using various software, and allowing students to discuss what they have read.

2. Teachers may not know how to select words to teach, especially in content areas. Content-area textbooks are loaded with too much specialized vocabulary and jargon. Teachers need to select carefully the most important words to teach explicitly each day. Several popular methods of selecting words for vocabulary instruction are available. Two methods seem important for adolescent readers:

- One method uses as a criterion the frequency of the words in instructional materials.[20] This, again, is more important for elementary materials where the vocabulary is selected from a relatively constrained set of instructional materials. For most adolescents, this constraint on vocabulary in instructional materials diminishes over time, making the frequency method of selecting words less useful for teaching adolescent students reading content. However, for adolescent students who have limited vocabularies, selecting high-frequency, unknown words remains an important instructional strategy.

- Another method uses three categories of words: Tier I, Tier II, and Tier III. This concept has been applied most effectively for literary texts with students at elementary levels. Tier I words are those typically in readers' vocabularies and should not be the focus of instruction. These high-frequency words are usually acquired very early. Tier III words are rare words that are recommended for instruction only when they are encountered in a text. That leaves Tier II words as the focus of explicit vocabulary instruction prior to reading a text. The criteria for what constitutes membership in each tier are not sharply defined, but are loosely based on frequency and the utility for future reading.[21]

18. Baumann et al. (2002); Baumann et al. (2003).

19. Lieberman (1967).

20. Biemiller (2005); Hiebert (2005).

21. Beck et al. (1982).

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- For adolescent readers of content materials, vocabulary should be selected on the basis of how important the words are for learning in the particular discipline, rather than the tier in which the word is located. For example, in a 9th-grade biology text, the word "cytoskeleton" might be a target for prereading instruction in a chapter on cell biology, even though it would generally be considered a Tier III word because it almost never appears in general reading or conversation. Most of the words for adolescent readers should be selected on the basis of how important they are to understanding the content that students are expected to read. For much content material, the words that carry the burden of the meaning of the text are rare words, except in texts and materials related to a specific discipline. Despite the rarity of the words, they are often critical to learning the discipline content and thus should be the subject of explicit instruction, which is almost the only way they can be learned.

3. Teachers may perceive that they do not have time to teach vocabulary. Teachers are often focused on the factual aspect of students' content-area learning and find little time to focus on other issues in reading. Whenever reading is part of a lesson, a few minutes spent on explicit vocabulary instruction will pay substantial dividends for student learning. Some effort in teaching students to become independent vocabulary learners will lessen the amount of time required by teachers as part of the lesson.[22] Making students even slightly more independent vocabulary learners will eventually increase the amount of content-area instructional time.

Using computers can give teachers the opportunity to provide independent practice on learning vocabulary. Teachers will be able to leverage instructional time by having students work independently, either before or after reading texts.

22. Baumann et al. (2002); Baumann et al. (2003).

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Recommendation 2. Provide direct and explicit comprehension strategy instruction

Teachers should provide adolescents with direct and explicit instruction in comprehension strategies to improve students' reading comprehension. Comprehension strategies are routines and procedures that readers use to help them make sense of texts. These strategies include, but are not limited to, summarizing, asking and answering questions, paraphrasing, and finding the main idea. Comprehension strategy instruction can also include specific teacher activities that have been demonstrated to improve students' comprehension of texts. Asking students questions and using graphic organizers are examples of such strategies. Direct and explicit teaching involves a teacher modeling and providing explanations of the specific strategies students are learning, giving guided practice and feedback on the use of the strategies, and promoting independent practice to apply the strategies.[23] An important part of comprehension strategy instruction is the active participation of students in the comprehension process. In addition, explicit instruction involves providing a sufficient amount of support, or scaffolding, to students as they learn the strategies to ensure success.[24]

23. Brown, Campione, and Day (1981); Dole et al. (1991); Kame'enui et al. (1997); Pearson and Dole (1987); Pressley, Snyder, and Cariglia-Bull (1987).

24. Brown et al. (1981); Palincsar and Brown (1984); Pearson and Gallagher (1983).

Level of evidence: Strong

The panel considers the level of evidence supporting this recommendation to be *strong*, on the basis of five randomized experimental studies[25] and additional evidence from a single subject design study[26] that examined the effects of teaching main idea summarization on adolescents' comprehension of narrative and informational texts. In addition, this body of research is supported by numerous other studies that vary in research design and quality and by additional substantive reviews of the research.[27]

Brief summary of evidence to support the recommendation

Approaches for teaching reading comprehension to adolescents are a common concern among middle and high school teachers because many adolescent students have a hard time comprehending their content-area textbooks.[28] Therefore, helping students comprehend these texts should be a high priority for upper elementary, middle, and high school teachers. Using comprehension strategies may be a new idea for many teachers. However, comprehension strategy instruction has been around for some time and is the topic of a number of resource books available

25. Hansen and Pearson (1983); Katims and Harris (1997); Margosein et al. (1982); Peverly and Wood (2001); Raphael and McKinney (1983).

26. Jitendra et al. (1998). The standards for judging the quality of a single subject design study are currently being developed.

27. Dole et al. (1991); Gersten et al. (2001); National Reading Panel (2000b); Paris, Lipson, and Wixson (1983); Paris, Wasik, and Turner (1991); Pearson and Fielding (1991); Pressley, Johnson et al. (1989); Pressley, Symons et al. (1989); Rosenshine and Meister (1994); Rosenshine, Meister, and Chapman (1996); Weinstein and Mayer (1986).

28. Biancarosa and Snow (2006); Chall and Conrad (1991); Kamil (2003); Moore et al. (1999).

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to help teachers teach strategies to their students.[29] Four ideas about teaching comprehension strategies that are important for teachers to understand can be gleaned from the research:

The effectiveness of a number of different strategies has been demonstrated in the small set of experimental studies meeting the WWC standards. These strategies included having students summarize main ideas both within paragraphs and across texts, asking themselves questions about what they have read, paraphrasing what they have read, drawing inferences that are based on text information and prior knowledge, answering questions at different points in the text, using graphic organizers, and thinking about the types of questions they are being asked to answer. It appears that teaching these specific strategies is particularly powerful. However, other strategies have been evaluated in the literature and demonstrated to be useful as well.[30] The point here is that it may not be the particular strategies that make the difference in terms of student comprehension. Many researchers think that it is not the specific strategy taught, but rather the active participation of students in the comprehension process that makes the most difference on students' comprehension.[31] The strategies listed above might be particularly useful for middle and high school teachers students who are passive readers. These students' eyes sometimes glaze over the words on the page because they are not actively processing the meaning of what they are reading. Instruction in the application of comprehension strategies may help these students become active readers.

Most of the research studies compared the use of one or more strategies against a control condition that typically included traditional, or "business as usual" instruction. So, it is really not possible to compare one or more strategies against another. We cannot say that paraphrasing is more powerful than main-idea summarizing, or that drawing inferences on the basis of text information and prior knowledge is better than answering questions at different points in the text. Very little research tells us that. We can say that it appears that asking and answering questions, summarizing, and using graphic organizers are particularly powerful strategies. But even with these strategies we cannot say which ones are the best or better than others for which students and for which classrooms.

It appears that multiple-strategy training results in better comprehension than single-strategy training. All the strong studies that support this recommendation include teaching more than one strategy to the same group of students. For example, one study used finding the main ideas and summarizing to help students comprehend texts better.[32] Another study taught students to make connections between new text information and prior knowledge, make predictions about the content of the text, and draw inferences.[33] This finding is consistent with those from the National Reading Panel, which also found benefits from teaching students to use more than one strategy to improve their reading comprehension skills.[34]

29. Blanchowicz and Ogle (2001); Harvey and Goudvis (2000); Keene (2006); Keene and Zimmerman (1997); McLaughlin and Allen (2001); Oczkus (2004); Outsen and Yulga (2002); Stebick and Dain (2007); Tovani (2004); Wilhelm (2001); Zwiers (2004).

30. Brown et al. (1996); Cross and Paris (1988); Dewitz, Carr, and Patberg (1987); Idol (1987); Klingner, Vaughn, and Schumm (1998); Paris, Cross, and Lipson (1984); Pressley (1976); Reutzel (1985).

31. Gersten et al. (2001); Pressley et al. (1987).

32. Katims and Harris (1997).

33. Hansen and Pearson (1983).

34. National Reading Panel (2000a).

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Direct and explicit instruction is a powerful delivery system for teaching comprehension strategies. This finding comes from one of the five strong studies and from a number of other studies.[35] Direct and explicit instruction involves a series of steps that include explaining and modeling the strategy, using the strategy for guided practice, and using the strategy for independent practice. Explaining and modeling include defining each of the strategies for students and showing them how to use those strategies when reading a text. Guided practice involves the teacher and students working together to apply the strategies to texts they are reading. This may involve extensive interaction between the teacher and students when students are applying the strategies to see how well they understand the particular text they are reading. Or, it may involve having students practice applying the strategies to various texts in small groups. Independent practice occurs once the teacher is convinced that students can use the strategies on their own. At that point, students independently practice applying the strategies to a new text.

How to carry out the recommendation

Upper elementary, middle, and secondary school teachers can take several action steps to implement explicit strategy instruction, which involves helping students actively engage in the texts they read. A number of different strategies can be taught directly and explicitly to students and applied to content-area texts they read. Assisting students in learning how to apply these strategies to their texts will empower them and give them more control over their reading and understanding. Specifically, to implement explicit strategy instruction, teachers can do the following:

1. Select carefully the text to use when first beginning to teach a given strategy. Although strategies can be applied to many different texts, they cannot be applied blindly to all texts. For example, using main-idea summarizing is difficult to do with narrative texts because narrative texts do not have clear main ideas. Main-idea summarizing should be used with informational texts, such as a content-area textbook or a nonfiction trade book. Similarly, asking questions about a text is more easily applied to some texts than to others.

2. Show students how to apply the strategies they are learning to different texts, not just to one text. Applying the strategies to different texts encourages students to learn to use the strategies flexibly.[36] It also allows students to learn when and where to apply the strategies and when and where the strategies are inappropriate.[37]

3. Ensure that the text is appropriate for the reading level of students. A text that is too difficult to read makes using the strategy difficult because students are struggling with the text itself. Likewise, a text that is too easy eliminates the need for strategies in the first place. Begin teaching strategies by using a single text followed by students' applying them to appropriate texts at their reading level.

4. Use direct and explicit instruction for teaching students how to use comprehension strategies. As the lesson begins, it is important for teachers to tell students specifically what strategies they are going to learn, tell them why it is important for them to learn the strategies,[38] model how to use the strategies by thinking aloud with a text,[39] provide guided practice with feedback so that students have opportunities to practice

35. Duffy et al. (1987); Fuchs et al. (1997); Klingner et al. (1998); Schumaker and Deshler (1992).

36. Pressley and Afflerbach (1995).

37. Duffy (2002); Paris et al. (1983).

38. Brown et al. (1981)

39. Bereiter and Bird (1985)

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using the strategies, provide independent practice using the strategies, and discuss with students when and where they should apply the strategies when they read and the importance of having the will to use the strategies along with the skill. Even if students know how to use strategies as they read, research demonstrates that they have to make the effort to actually use them when they read on their own.[40]

5. Provide the appropriate amount of guided practice depending on the difficulty level of the strategies that the students are learning. For example, the strategy of predicting can be demonstrated briefly and with a few examples. However, summarizing a paragraph or a passage may require several steps within guided practice. First, provide support for students in cooperative learning groups. As students work in these groups, assist them directly if necessary by modeling how to use a given strategy again or by asking questions to generate ideas about how they would use it. If necessary, give students direct answers and have them repeat those answers. Second, as students become better at using the strategies, gradually reduce the support, perhaps by asking them to break the cooperative learning groups into pairs so they have fewer peers to rely on. Third, reduce support further by asking students to use the strategies on their own with texts they read independently.[41]

6. When teaching comprehension strategies, make sure students understand that the goal is to understand the content of the text. Too much focus on the process of learning the strategies can take away from students' understanding of the text itself.[42] Instead, show students how using the strategies can help them understand the text they are reading. The goal should always be comprehending texts—not using strategies.

40. Paris et al. (1991); Pressley et al. (1987)

41. Brown et al. (1981)

42. Pearson and Dole (1987)

Potential roadblocks and solutions

1. Most teachers lack the skills to provide direct and explicit comprehension strategy instruction. Most teacher education programs do not prepare preservice teachers to teach strategies. In addition, teachers may find it particularly challenging to model their own thinking by providing thinkaloud of how they use strategies as they read. Many teachers use various strategies automatically as they read and are not aware of how they use the strategies they are teaching. Professional development in direct and explicit instruction of comprehension strategies will assist all teachers, including language arts and content-area teachers, in learning how to teach strategies. One component of professional development should be coaching teachers in the classroom as they teach. In addition, it is often helpful for teachers to practice thinking aloud on their own. They can take a text and practice explaining how they would go about summarizing the text or finding the main idea. Teachers will need to become conscious of many of the reading processes that are automatic for them.

2. Content-area teachers may believe that they are not responsible for teaching comprehension strategies to their students. They may also believe that they do not have enough time to teach these strategies because they have to cover the content presented in their curriculum guides and textbooks. Because teaching comprehension strategies improves students' ability to comprehend their textbooks, it is a valuable classroom activity for content-area teachers, not just language arts teachers. Teaching comprehension strategies should expand students' long-term learning abilities. Although it may take a short time to teach several strategies, that time should pay off in the long term by helping students learn more independently from their textbooks and other source material they are asked to read in their classrooms. After all, the goal of using comprehension strategies is improved comprehension—of all text materials that students read.

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3. Some teachers and students may "lose the forest for the trees." Teachers may misunderstand or misinterpret the research on teaching comprehension strategies, such that they think teaching comprehension is all about teaching a specific sequence of comprehension strategies, one after the other. Likewise, students too may misunderstand and misinterpret teachers' emphasis on strategies, such that they inappropriately apply strategies to the texts they are reading. Teachers and students may miss the larger point of the strategies, that is, active comprehension.

A critically important part of professional development is the focus on the end goal of comprehension. As teachers learn how to teach the various strategies, they need to keep this goal in mind. Likewise, teachers need to emphasize to students the idea that the end goal of strategy use is comprehension, not just the use of many strategies. It is important for teachers to ensure that students understand that using strategies is a way to accomplish the goal of comprehension.

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Recommendation 3. Provide opportunities for extended discussion of text meaning and interpretation

Teachers should provide opportunities for students to engage in high-quality discussions of the meaning and interpretation of texts in various content areas as one important way to improve their reading comprehension. These discussions can occur in whole classroom groups or in small student groups under the general guidance of the teacher. Discussions that are particularly effective in promoting students' comprehension of complex text are those that focus on building a deeper understanding of the author's meaning or critically analyzing and perhaps challenging the author's conclusions through reasoning or applying personal experiences and knowledge. In effective discussions students have the opportunity to have sustained exchanges with the teacher or other students, present and defend individual interpretations and points of view, use text content, background knowledge, and reasoning to support interpretations and conclusions, and listen to the points of view and reasoned arguments of others participating in the discussion.

Level of evidence: Moderate

The panel considers the level of evidence for this recommendation to be *moderate*, on the basis of four small quasi-experimental studies[43] and one large correlational study.[44] A potential limitation in one of the quasi-experimental studies[45] as well as the large correlational study is that the quality of written responses to writing prompts was the outcome assessment, rather than a more direct standardized test of reading comprehension. Among the four quasi-experimental studies, one used rigorous design that demonstrated pretest group equivalence[46] and the other three used less rigorous designs with low internal validity.[47] The small body of research identified to directly support this recommendation is supplemented by a recently completed meta-analysis of 43 studies that used slightly more lenient inclusion criteria than the literature search for this practice guide,[48] as well as a large descriptive study of middle and high schools that were selected because they were "beating the odds" in terms of their student literacy outcomes.[49]

Brief summary of evidence to support the recommendation

Arguably the most important goal for literacy instruction with adolescents is to increase their ability to comprehend complex text. Further, the goal is not simply to enable students to obtain facts or literal meaning from text (although that is clearly desirable), but also to make deeper interpretations, generalizations, and conclusions. Most state and national literacy standards require middle and high school students to go considerably beyond literal comprehension to be considered proficient readers. For example, the revised framework for the NAEP indicates that 8th graders who read at the proficient level should be able to "summarize major ideas, provide evidence in support of an argument,

43. Bird (1984); Heinl (1988); Reznitskaya et al. (2001); Yeazell (1982).

44. Applebee et al. (2003).

45. Reznitskaya et al. (2001).

46. Reznitskaya et al. (2001).

47. Bird (1984); Heinl (1988); Yeazell (1982).

48. Murphy et al. (2007).

49. Langer (2001).

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and analyze and interpret implicit causal relations."[50] They should also be able to "analyze character motivation, make inferences…, and identify similarities across texts."[51]

The theory underpinning discussion-based approaches to improve reading comprehension rests on the idea that students can, and will, internalize thinking processes experienced repeatedly during discussions. In high-quality discussions students have the opportunity to express their own interpretations of text and to have those positions challenged by others. They also have the opportunity to defend their positions and to listen as others defend different positions. Good discussions give students opportunities to identify specific text material that supports their position and to listen as other students do the same. In the course of an effective discussion students are presented with multiple examples of how meaning can be constructed from text. Thus, for teachers one key to improving comprehension through discussion is to ensure that students experience productive ways of thinking about text that can serve as models for them to use during their own reading.

A challenge to finding empirical research to demonstrate the unique value of high-quality discussions in improving comprehension is that in instructional research, discussion is often combined with strategy instruction. Most successful applications of strategy instruction involve extended opportunities for discussing texts while students are learning to independently apply such strategies as summarizing, making predictions, generating and answering questions, and linking text to previous experience and knowledge. In effect, students' interactions with one another, and with the teacher as they apply various strategies give students multiple opportunities to discover new ways of interpreting and constructing the meaning of text. One brief study of strategy instruction with a diverse group of 4th graders mentioned explicitly that the assignment to practice making predictions, clarifying confusions, and paraphrasing in small groups was a very useful way to stimulate high-quality discussions of the meaning of texts.[52]

The most convincing evidence for the effectiveness of discussion-oriented approaches to improve reading comprehension comes from studies that focused on developing interpretations of text events or content or on a critical analysis of text content.[53] Within these general guidelines, one feature of effective discussions is that they involve sustained interactions that explore a topic or an idea in some depth rather than quick question and answer exchanges between the teacher and students.[54] One large study of the extent of this type of sustained discussion in language arts classes in middle and high schools found, on average, only 1.7 minutes out of 60 devoted to this type of exchange, with classrooms varying between 0 and slightly more than 14 minutes. Classrooms that were more discussion-oriented produced higher literacy growth during the year than those in which sustained discussions were less frequent.[55]

Another characteristic of high-quality discussions is that they are usually based on text that is specifically selected to stimu-

50. National Assessment Governing Board (2007, p. 46).

51. National Assessment Governing Board (2007, p. 46).

52. Klingner et al. (1998).

53. Murphy et al. (2007).

54. Applebee et al. (2003); Reznitskaya et al. (2001).

55. Applebee et al. (2003).

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late an engaging discussion.[56] Questions that lead to good discussions are frequently described as "authentic" in that they ask a real question that may be open to multiple points of view, such as "Did the way John treat Alex in this story seem fair to you?" or "What is the author trying to say here?" or "How does that information connect with what the author wrote before?"[57] Very different from questions asked primarily to test student knowledge, this type of question is designed to provide an opportunity for exploration and discussion. Although it should be possible to identify expository texts that could be the basis for productive discussion, most experimental studies of discussion-based approaches thus far have used narrative texts, a limitation in the research base at present.

Discussions that have an impact on student reading comprehension feature exchanges between teachers and students or among students, where students are asked to defend their statements either by reasoning or by referring to information in the text.[58] In a large-scale investigation of classrooms that produced strong literacy outcomes, it was noted that teachers provided many opportunities for student to work together to "sharpen their understandings with, against, and from each other."[59]

How to carry out the recommendation

To engage students in high-quality discussions of text meaning and interpretation, teachers can:

1. Carefully prepare for the discussion. In classes where a choice of reading selections is possible, look for selections that are engaging for students and describe situations or content that can stimulate and have multiple interpretations. In content-area classes that depend on a textbook, teachers can identify in advance the issues or content that might be difficult or misunderstood or sections that might be ambiguous or subject to multiple interpretations. Alternatively, brief selections from the Internet or other sources that contain similar content but positions that allow for critical analysis or controversy can also be used as a stimulus for extended discussions.

Another form of preparation involves selecting and developing questions that can stimulate students to think reflectively about the text and make high-level connections or inferences. These are questions that an intelligent reader might actually wonder about—they are not the kind of questions that teachers often ask to determine what students have learned from the text. Further, the types of discussion questions appropriate for history texts would probably be different from those for science texts, as would those for social studies texts or novels. Because part of the goal of discussion-based approaches is to model for students the ways that good readers construct meaning from texts, it seems reasonable to suggest that discussions of history texts might be framed differently from those of science texts.

2. Ask follow-up questions that help provide continuity and extend the discussion. Questions that are used to frame discussions are typically followed by other questions about a different interpretation, an explanation of reasoning, or an identification of the content from the text that supports the student's position. In a sustained discussion initial questions are likely to be followed by other questions that respond to the student's answer and lead to further thinking and elaboration.

56. Bird (1984); Heinl (1988); Reznitskaya et al. (2001); Yeazell (1982).

57. Applebee et al. (2003); Bird (1984); Heinl (1988); Reznitskaya et al. (2001); Yeazell (1982).

58. Bird (1984); Heinl (1988); Reznitskaya et al. (2001); Yeazell (1982).

59. Langer (2001, p. 872).

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If the reading comprehension standards that students are expected to meet involve making inferences or connections across different parts of a text or using background knowledge and experience to evaluate conclusions, students should routinely have the opportunity to discuss answers to these types of questions in all their reading and content-area classes.

3. Provide a task, or a discussion format, that students can follow when they discuss texts together in small groups. For example, assign students to read selections together and practice using the comprehension strategies that have been taught and demonstrated. In these groups students can take turns playing various roles, such as leading the discussion, predicting what the section might be about, identifying words that are confusing, and summarizing. As these roles are completed, other students can then respond with other predictions, other things that are confusing, or different ways of summarizing the main idea. While students are working together, the teacher should actively circulate among the groups to redirect discussions that have gone astray, model thinking strategies, or ask students additional questions to probe the meaning of the text at deeper levels.

4. Develop and practice the use of a specific "discussion protocol." Because it is challenging to lead the type of discussion that has an impact on students' reading comprehension, it may be helpful for teachers to identify a specific set of steps from the research or best practice literature.[60] This could be done either individually or collaboratively in grade-level or subject-area teams. An example of a discussion protocol is provided in one of the research studies used to support this recommendation.[61] In this study teachers were trained to follow five guidelines: ask questions that require students to explain their positions and the reasoning behind them, model reasoning processes by thinking out loud, propose counter arguments or positions, recognize good reasoning when it occurs, and summarize the flow and main ideas of a discussion as it draws to a close. To be effective these types of discussions do not need to reach consensus; they just need to give students the opportunity to think more deeply about the meaning of what they are reading.

Potential roadblocks and solutions

1. Students do not readily contribute their ideas during discussions because they are either not engaged by the topic or afraid of getting negative feedback from the teacher or other students. Students might not actively participate in text-based discussions for a number of reasons, but these two are the most important. One strategy to deal with the first problem is to create opportunities for discussion by using text that has a very high interest level for students in the class but may only be tangentially related to the topic of the class. For example, a newspaper article on the problem of teen pregnancy might be integrated in a biology class, one on racial profiling in a social studies class, or one on child labor practices in a history class. Students typically find discussion and interaction rewarding, and once a good pattern is established, it can be generalized to more standard textbook content.

It is also important to establish a non-threatening and supportive environment from the first class meeting. As part of this supportive environment, it is important to model and encourage acceptance of diverse viewpoints and discourage criticism and negative feedback on ideas. Teachers can help students participate by calling on students who may not otherwise contribute, while asking questions they know these students can answer.

Student-led discussions in small groups can be another solution for students who

60. Adler and Rougle (2005); Beck and McKeown (2006).

61. Reznitskaya et al. (2001).

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are hesitant to engage in whole-classroom discussions. As mentioned before, the quality of these discussions can be increased, and student participation broadened, if teachers provide an organizing task or activity that students can focus on as discuss the content of a text.

2. Discussions take classroom time, and too much time spent on an extended discussion of a single topic may interfere with coverage of all the content in the curriculum. This problem may require district- or state-level intervention. If curriculum standards require shallow coverage of a very wide range of content, the pressure teachers feel to teach the curriculum may limit opportunities for extended discussion of particular issues. Pressure to cover a very broad curriculum could also limit teachers' freedom to bring in additional material on a specific topic that might help stimulate more engaging discussions. However, if literacy standards require students to think deeply (that is, to make connections, criticize conclusions, and draw inferences), many students will require the opportunity to acquire these skills by being able to observe models of this type of thinking during discussions. In the absence of adjustments to the curriculum, teachers should carefully identify a few of the most important ideas in their content area for deeper consideration through extended classroom discussion that focuses on building meaning from text.

3. Teachers lack the skills in behavior management, discussion techniques, or critical thinking to guide productive discussion and analysis of text meanings. Leading instructive discussions requires a set of teaching skills that is different from the skills required to present a lecture or question students in a typical recitation format. It is also true that discussions can create challenges for classroom control that may not occur in other instructional formats. Most teachers will need some form of professional development to build their skills as discussion leaders or organizers. Within schools, it could be very helpful for content-area teachers to experience these kinds of discussions themselves as a way of learning what it feels like to participate in effective, open discussions. Also, a number of useful books on this topic can be the basis for teacher book study groups. The following resources provide helpful information and strategies related to improving the quality of discussions about the meaning and interpretation of texts:

- Adler, M., & Rougle, E. (2005). *Building literacy through classroom discussion: Research-based strategies for developing critical readers and thoughtful writers in middle school*. New York: Scholastic.
- Applebee, A. N. (1996). *Curriculum as conversation: Transforming traditions of teaching and learning.* Chicago: University of Chicago Press.
- Beck, I. L., & McKeown, M. G. (2006). *Improving comprehension with Questioning the Author: A fresh and expanded view of a powerful approach*. New York: Guilford.
- Beers, K. (2003). *When kids can't read—what teachers can do*: *A guide for teachers 6–12*. Portsmouth, NH: Heinemann.
- Langer, J. A. (1995). *Envisioning literature: Literary understanding and literature instruction*. New York: Teachers College Press.

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Recommendation 4. Increase student motivation and engagement in literacy learning

To foster improvement in adolescent literacy, teachers should use strategies to enhance students' motivation to read and engagement in the learning process. Teachers should help students build confidence in their ability to comprehend and learn from content-area texts. They should provide a supportive environment that views mistakes as growth opportunities, encourages self-determination, and provides informational feedback about the usefulness of reading strategies and how the strategies can be modified to fit various tasks. Teachers should also make literacy experiences more relevant to students' interests, everyday life, or important current events.

Level of evidence: Moderate

The panel considers the level of evidence to support this recommendation to be *moderate*, on the basis of two experiments[62] and one quasi-experimental study that had no major flaws to internal validity other that lack of demonstrated baseline equivalence.[63] Three studies of weaker design,[64] six experimental and quasi-experimental studies with low external validity,[65] and two meta-analyses[66] also provided additional evidence to support this recommendation.[67] The recommendation to improve adolescent literacy through classroom instructional practices that promote motivation and engagement is further supported by substantial theoretical support for the role of motivation and engagement to support long-term growth in complex literacy skills.[68]

Brief summary of evidence to support the recommendation

Although the words motivation and engagement are often used interchangeably, they are not always synonymous. Whereas motivation refers to the desire, reason, or predisposition to become involved in a task or activity, engagement refers to the degree to which a student processes text deeply through the use of active strategies and thought processes and prior knowledge. It is possible to be motivated to complete a task without being engaged because the task is either too easy or too difficult. Research shows that the messages teachers communicate to students—intentionally or unintentionally—can affect students' learning goals and outcomes.[69]

Correlational evidence suggests that motivation to read school-related texts declines as students progress from elementary to

62. Schunk and Rice (1992). This article contains two studies.

63. Guthrie et al. (1999).

64. Graham and Golan (1991); Grolnick and Ryan (1987); Guthrie, Wigfield, and VonSecker (2000).

65. Mueller and Dweck (1998). The external validity of the six studies detailed in this article was considered low because the reasoning measures included did not directly measure literacy skills.

66. Deci, Koestner, and Ryan (1999); Tang and Hall (1995). The meta-analyses described in these two articles were considered to have low external validity because they focused on the general psychological concept of the motivation to learn rather than the motivation to read or improvement in literacy skills.

67. Graham and Golan (1991); Grolnick and Ryan (1987); Guthrie et al. (2000).

68. See, for example, Sweet, Guthrie, and Ng (1998).

69. Graham and Golan (1991).

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middle school.[70] The strongest decline is observed among struggling students.[71] To promote students' motivation to engage in literacy activities, teachers should use instructional strategies that spark students' interest. Initial curiosity (or "situational interest") can then serve as a hook to create long-term, personal interest (or "generative interest").

Teachers may believe that they can encourage students' learning by emphasizing external incentives and reminding students of the impact of learning on grades. However, research has suggested that this strategy actually has detrimental effects on students' motivation and engagement. When teachers put pressure on students to work hard to achieve good grades, students' levels of text recall and reading comprehension are lower than when teachers note that they are interested in the amount of information that students can remember and understand and that it is up to students to determine how much they would like to engage in learning.[72] Two meta-analyses of the literature have shown that providing extrinsic rewards to students may increase students' initial motivation to read as well as their pleasure and interest in learning about the world.[73] Earning tangible rewards, such as toys, food, and prizes, and avoiding punishments were found to have more detrimental effects than receiving verbal rewards.[74]

Verbal rewards or praises for student educational performance can be categorized by focus: ability or effort. Praising students for being smart, fast, or knowledgeable can lead to students' perception that their achievement is an indicator of their intelligence or ability. These students are likely to develop performance goals—for example, the goal of achieving good grades or looking smart. When faced with failure, students with performance goals might infer that they do not have the required ability and seek only those opportunities that make them look smart. On the other hand, students praised for their effort might view ability as an expandable entity that depends on their effort. These students are likely to develop learning goals—for example, the goal of enjoying explorations and challenges or acquiring new skills and knowledge. They might interpret failure as an indicator of their lack of effort rather than lack of ability. [75]

Research also shows that when teachers stress performance outcomes, students develop performance goals. Likewise, when teachers put more emphasis on the learning process and provide a supportive environment where mistakes are viewed as growth opportunities instead of failures, students are more likely to develop learning goals. Studies have consistently shown that students who have learning goals are more motivated and engaged and have better reading test scores than students who have performance goals.[76] In one experimental study researchers randomly assigned students to one of two conditions. In the first condition they told students that many people make mistakes at the beginning of a task and become better with practice. They encouraged students to see the task as a challenge and to have fun trying to master it. In the other condition students were told that people are either good or not so good at certain tasks and that their completion of the task would indicate how good they are at it. The researchers found that stu-

70. Gottfried (1985).

71. Harter, Whitesell, and Kowalski (1992).

72. Grolnick and Ryan (1987).

73. Deci et al. (1999); Tang and Hall (1995).

74. Deci et al. (1999).

75. Mueller and Dweck (1998).

76. Graham and Golan (1991); Grolnick and Ryan (1987); Schunk (2003).

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dents in the first condition put more effort into deep processing of semantic meaning of words and had better memory of the words learned.[77]

The points raised above emphasize the importance of helping students acquire authentic, personally meaningful learning goals. An important part of the process involves teacher feedback. Students' motivation is highest when they receive feedback that is informational but not controlling—for example, when it is not perceived as pressure to attain a particular outcome.[78] Students benefit from informational feedback that conveys realistic expectations, links performance to effort, details step by step how to apply a reading strategy, and explains why and when this strategy is useful and how to modify it to fit different tasks.[79] Students who receive such feedback believe more in their ability to apply reading strategies in different contexts and have better reading performance than students who do not receive this kind of feedback.[80] This is not to say that teachers should prioritize the process over the desired outcome—increased knowledge and skill. On the contrary, teachers should help students engage in a process that achieves stronger outcomes by developing learning rather than performance goals.

How to carry out the recommendation

1. Establish meaningful and engaging content learning goals around the essential ideas of a discipline as well as the specific learning processes students use to access those ideas. Monitor students' progress over time as they read for comprehension and develop more control over their thinking processes relevant to the discipline. Provide explicit feedback to students about their progress. When teachers set goals to reach a certain standard, students are likely to sustain their efforts until they achieve that standard. Learning goals may be set by the teacher or the student. However, if students set their own goals, they are more apt to be fully engaged in the activities required to achieve them.

2. Provide a positive learning environment that promotes students' autonomy in learning. Allowing students some choice of complementary books and types of reading and writing activities has a positive impact on students' engagement and reading comprehension.[81] Empowering students to make decisions about topics, forms of communication, and selections of materials encourages them to assume greater ownership and responsibility for their engagement in learning.[82]

3. Make literacy experiences more relevant to students' interests, everyday life, or important current events.[83] Look for opportunities to bridge the activities outside and inside the classroom. Tune into the lives of students to find out what they think is relevant and why, and then use this information to design instruction and learning opportunities that will be more relevant to students.[84] Consider constructing an integrated approach to instruction that ties a rich conceptual theme to a real-world application. For example, use a science topic in the news or one that students are currently studying, such as adolescent health issues, to build students' reading, writing, and discourse skills.

4. Build in certain instructional conditions, such as student goal setting, self-directed learning, and collaborative learning, to

77. Graham and Golan (1991).

78. Ryan (1982).

79. Henderlong and Lepper (2002); Schunk and Rice (1992).

80. Schunk and Rice (1992).

81. Guthrie et al. (1999).

82. Guthrie and McCann (1997).

83. Guthrie et al. (2000).

84. Biancarosa and Snow (2004).

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increase reading engagement and conceptual learning for students.[85] This type of implementation has several common themes:

- Connections between disciplines, such as science and language arts, taught through conceptual themes.
- Connections among strategies for learning, such as searching, comprehending, interpreting, composing, and teaching content knowledge.
- Connections among classroom activities that support motivation and social and cognitive development.

Potential roadblocks and solutions

1. Some teachers think that motivational activities must entertain students and therefore create fun activities that are not necessarily focused on learning. Rewarding students through contests, competitions, and points might entice them to do homework, complete tasks, and participate in class. Though meaningful goals, these might not result in meaningful learning. Teachers are often exhausted from running contests to get students to read, and the external motivation of such activities often makes students dependent on the teacher or activity to benefit from reading.[86] Teachers should help students become more internally motivated. They should closely connect instructional practice and student performance to learning goals. Teachers should set the bar high and provide informational feedback for depth of learning, complex thinking, risk taking, and teamwork. Students should be encouraged to reflect on how they learn, what they do well, and what they need to improve on. The more students know themselves as learners, the more confident they will become and the better able they will be to set their own goals for learning.

2. Some students may think that textbooks are boring and beyond their ability to understand. Many high school texts do not have enough supplementary explanation that fleshes out disconnected information, which might contribute to difficulty in comprehension. If students cannot comprehend the text that they read and the textbook is the basis of curriculum, their sense of failure grows larger. Complementary materials should be available to students, including a set of reading materials on the same topic that range from very easy to very challenging or supplemental trade materials, to provide resources on various content topics to help students develop deeper background knowledge relevant to course content.

3. Many content-area teachers do not realize the importance of teaching the reading strategies and thinking processes that skilled readers use in different academic disciplines and do not recognize the beneficial effects of such instruction on students' ability to engage with their learning. Too few content-area teachers know how to emphasize the reading and writing practices specific to their disciplines, so students are not encouraged to read and write and reason like historians, scientists, and mathematicians. Literacy coaches should emphasize the role of content-area teachers, especially in secondary schools in promoting literacy skills, and the role of reading skills in promoting performance in various content areas such as history, science and social sciences. This can be accomplished through a coordinated schoolwide approach that provides professional development in content literacy. Many resources available on the Internet provide information about strategic reading in content areas. Content-area teachers should also develop formative assessments that allow students to make their thinking visible and that provide evidence of the problem-solving and critical-thinking strategies students use to comprehend and construct meaning. Teachers can use these assessments to make informed decisions about lesson planning, instructional practices and materials, and

85. Guthrie et al. (1999); Guthrie et al. (2000).

86. Guthrie and Humenick (2004).

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activities that will be more appropriate and engaging for students.

4. Adolescent students who struggle in reading do not expect to do well in class. As these students progress through school, most teachers do not expect them to do well either and often remark that they should have learned the material in earlier grades. Many adolescents do not express confidence in their own ability—they do not trust or value their own thinking. The strengths of students can be identified through interest surveys, interviews, and discussions, and through learning about and understanding students' reading histories. These activities will help teachers get to know their students. For many students, having a personal connection with at least one teacher can make a difference in their response to school. Knowing students' interests makes it easier for teachers to choose materials that will hook students and motivate them to engage in their own learning. Teachers should provide multiple learning opportunities in which students can experience success and can begin to build confidence in their ability to read, write, and think at high levels.

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Recommendation 5. Make available intensive and individualized interventions for struggling readers that can be provided by trained specialists

Some adolescents need more support to increase literacy skills than regular classroom teachers can provide. Students who are unable to meet grade-level standards in literacy often require supplemental, intensive, and individualized reading intervention to improve their skills. Such interventions are most often provided by reading specialists or teachers who have undergone thorough training to help them understand the program or approach they will use and to deepen their understanding of adolescent struggling readers.

The purpose of intensive interventions is to accelerate literacy development so that students are able to make substantial progress toward accomplishing reading tasks appropriate for their current grade level. Placement in interventions is often a two-step process, beginning with an initial screening assessment to identify those students who need extra help. This step should be followed by assessment with diagnostic tests to provide a profile of literacy strengths and weaknesses.

Because the cause of adolescents' difficulties in reading may differ from student to student, interventions may focus on any of the critical elements of knowledge and skill required for the comprehension of complex texts. These elements include: fundamental skills such as phonemic awareness, phonemic decoding, and other word analysis skills that support word reading accuracy; text reading fluency; strategies for building vocabulary; strategies for understanding and using the specific textual features that distinguish different genres; and self-regulated use of reading comprehension strategies. Determining students' skill levels, helping students learn specific reading strategies, and providing intensive and individualized instruction appear to be especially promising methods for improving the outcomes of struggling readers. For example, students who have difficulty using the skills needed to recognize words need different intervention than do students whose primary deficits are figuring out the meaning of unfamiliar words or comprehension of extended prose.

Level of evidence: Strong

The panel considers the level of evidence supporting this recommendation to be *strong*, based on 12 small experimental design studies,[87] 1 well-designed quasi-experimental study,[88] and 1 meta-analysis study.[89] Comparative and correlational research provided additional support. Together, the studies examined various methods for improving literacy outcomes of struggling adolescent readers. In some studies the participants were characterized

87. Allinder et al. (2001); Bos and Anders (1990); DiCecco and Gleason (2002); Johnson, Graham, and Harris (1997); Lovett et al. (1996); Lovett and Steinbach (1997); Peverly and Wood (2001); Rooney (1997); Therrien, Wickstrom, and Jones (2006); Wilder and Williams (2001); Williams et al. (1994); Xin and Reith (2001).

88. Englert and Mariage (1991).

89. Scammacca et al. (2007).

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as students with learning disabilities, while in others the participants struggled in reading for various reasons. The interventions evaluated in the studies took place in different contexts, including urban and suburban schools and clinical treatment facilities, and served struggling readers from a variety of socioeconomic and racial and ethnic backgrounds. Several common strategies and practices emerged from this body of evidence and provide a framework for helping educators carry out the recommendation in practice.

Brief summary of evidence to support the recommendation

On the most recent NAEP reading assessment in 2007, about a third (33 percent) of 4th graders and over a fourth (26 percent) of 8th graders in the United States performed below the basic level, meaning that those students have only partial mastery of the prerequisite knowledge and skills that are fundamental for reading at their grade level.[90] For students who perform below the basic level, the panel recommends intensive supplemental interventions in addition to the reading support they might receive in their regular classrooms. Because failure to read at grade level may be caused by several different factors, including deficiencies in decoding skills, vocabulary, background knowledge, and inefficient use of comprehension strategies,[91] the choice of supplemental interventions needs to be guided by initial formative assessments that gauge the specific learning needs of struggling readers and individualized to meet students' identified needs.

There is accumulating evidence that an inadequate ability to decode printed text accurately and fluently may be one reason for students' failure to meet grade-level standards in reading. A 2002 NAEP special study of oral reading showed that 4th grade students reading below the basic level demonstrated low accuracy when they were asked to read a passage aloud.[92] This suggests that they have not reached the level of word-reading ability typical for their grade. A recent meta-analytic study,[93] which used slightly more lenient criteria for selecting studies than were used for this guide, supports the appropriateness of word-level interventions for middle and high school students. The study demonstrated that interventions focused at the word level resulted in both improved reading accuracy and improved reading comprehension in older struggling students. Further, a small experimental study of students with reading disabilities showed that systematic training in metacognitive decoding skills, such as subsyllabic segmentation, transferred to accurate reading of regular and irregular multisyllabic words.[94]

Descriptive and correlational evidence suggests that struggling adolescent readers tend to use less efficient reading comprehension strategies than do more skillful readers. In light of these observations, it is not surprising that many interventions in the studies that we reviewed tended to include efforts to help struggling readers become more engaged, active, and strategic readers. This body of evidence also suggests that educators can use multiple approaches to help struggling readers become more active and strategic readers. The approaches should involve structured and explicit instruction where teachers model and explain the specific strategies being taught and provide feedback on students' use of the strategies. Instructional activities should provide scaffolding to ensure that students understand the skills they need to acquire.

90. Lee et al. (2007).

91. Riddle Buly and Valencia (2002).

92. Daane et al. (2005).

93. Scammacca et al. (2007).

94. Lovett and Steinbach (1997).

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Research, such as that conducted on reciprocal teaching (dialogue which students and teachers take turns leading; this involves summarizing, generating questions, clarifying, and predicting),[95] suggests that the most effective instructional approach is to provide explicit instruction on strategies proven to help students read and comprehend material more effectively than they had in the past. Student collaboration in comprehension strategies has also shown promise, effectively transferring control of strategy instruction to the students themselves.[96] This approach, like reciprocal teaching, relies on teacher-guided instruction and interaction among students to promote the internalization of reading strategies, development of self-regulation, and transfer of strategy control from teachers to students.

Other experimental studies have also highlighted the promising effects of helping students organize the information presented within the classroom. For instance, two studies demonstrated the promise of intensive instruction and the use of graphic organizers to help students attain relational knowledge from expository text.[97] Creating graphic organizers, which are visual portrayals or maps of the relationships among key concepts represented in texts, can help struggling readers integrate and process information. Other methods for helping struggling readers organize and process written and oral information were demonstrated by another set of researchers, whose experimental work suggested that using themes, messages, or morals attached to a core concept within stories, could help struggling readers improve comprehension.[98]

95. Englert and Mariage (1991); Lovett et al. (1996).

96. Englert and Mariage (1991).

97. DiCecco and Gleason (2002); Lovett et al. (1996).

98. Williams et al. (1994).

As noted in another source, instruction with a focus on the theme of stories and on the potential application of the theme beyond the stories enabled students to learn higher-order comprehension skills and generalize what they had learned to other reading material and to their real-life experiences.[99] Likewise, after adolescents with reading disabilities received specific instruction on text structures, organizational patterns, and linguistic conventions commonly found in expository texts, they were able to transfer these skills to independent reading tasks with unfamiliar expository material.[100]

These strategies, shown to be effective in experimental studies that were often designed to test single interventions and with populations of students who had been diagnosed as learning disabled, present a catalog of possible ways to help adolescents become more active and efficient readers of diverse kinds of text. Integrated into regular classroom instruction and into classes designed to improve students' reading, these strategies can help many students become stronger readers.

Many struggling readers, however, need more intensive, explicit instruction addressing their specific deficiencies, accompanied by extensive guided practice to ensure that they understand and can apply the new strategies. Struggling readers can be identified by initial screening measures or consistently low scores on yearly reading tests. Students falling below a designated threshold are often assigned to an intervention class without further testing. Although it is a costly approach, initial identification of students who are struggling with reading should be followed by a group or individually- administered diagnostic assessment to determine students' specific needs. Intervention

99. Wilder and Williams (2001).

100. Lovett et al. (1996).

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models have been investigated in some experimental studies, but their impacts, while promising, have not been fully confirmed. Programs such as *Talent Development*[101] and the *Enhanced Reading Opportunities*[102] *(ERO)* model have shown promise in increasing students' reading achievement and potentially their academic achievement as well. In *Talent Development* schools half a semester of English is replaced by double blocks of reading instruction, followed by a transition back to regular English instruction. In the *ERO* model a full year of intense reading instruction (approximately 225 minutes per week) is offered as a supplement to regular English or language arts instruction. Models such as these and others are currently being studied in the federally funded *Striving Readers* evaluation as well as in other programs.

How to carry out the recommendation

Supplemental interventions for struggling readers can offer the learning opportunities that student need to make substantial progress toward grade-level standards. However, because adolescents' reading needs are varied and complex, schools should first take steps to understand the learning needs they must address.

1. Although classroom teachers can sometimes pinpoint students' learning needs by using informal assessment tools or even observation, a more reliable method for identifying struggling readers includes use of an initial screening test or a threshold score on a required reading test and subsequent use of a diagnostic reading test that must be administered, scored, and interpreted by a specialist. For some students, formal, individually administered diagnostic assessments are needed; for others with less severe needs group-administered, standardized or criterion-referenced tests can serve as a starting point for determining an appropriate intervention.[103] Individually or group-administered tests provide information that allows the specialist to perform the in-depth diagnosis that is often needed to match intervention approaches to students' needs.

2. The identification of students' learning needs should be followed by the selection of an intervention that provides an explicit instructional focus targeted to meet those needs. Such instruction might include varying areas of need and rely on teaching different strategies to meet them. However, the teaching strategies selected should provide students with explicit strategies, techniques, principles, knowledge, or rules that enable them to solve problems and complete tasks independently.[104]

Central to the effective use of an intervention is working with students to set goals for improvement, followed by a description of the strategy to be mastered, modeling of the strategy verbal, continued practice and feedback, and generalization of the strategy to other tasks.[105] Providing students with learning aids can help them understand the purpose of the lesson, a rationale for the lesson, the learning expectations, and how the content to be taught relates to what they have learned previously and what they may learn in the future.[106] Examples of these include advance organizers to prepare them for reading and activate prior knowledge, graphic organizers or maps to track ideas during reading, and graphic displays that encourage students to make link between what

101. Kemple, Herlihy, and Smith (2005).

102. Kemple et al. (2008).

103. Allinder et al. (2001); Bos and Anders (1990); Englert and Mariage (1991).

104. Allinder et al. (2001); Bos and Anders (1990); Englert and Mariage (1991).

105. Ellis et al. (1991).

106. DiCecco and Gleason (2002); Wilder and Williams (2001); Williams et al. (1994).

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they know and the content about which they are reading.

3. Even though explicit strategy instruction and various forms of structuring effective strategy instruction show promise, it also seems clear that many struggling readers require more intensive efforts than do students who are performing at or near grade level.[107] The intensiveness of the intervention should be matched to the needs of students who struggle—the greater the instructional need, the more intensive the intervention. Two methods for increasing the intensity of instruction are to provide additional instruction time or to work with students individually or in small groups. The most practical method for increasing instructional intensity for smaller numbers of struggling readers is to provide supplemental small group instruction, usually for extended periods of time or as a distinct pull-out class. Within these small groups, teachers can more readily monitor student progress and help students learn the particular strategies that will help them attain grade-level reading skills. All the studies that informed this recommendation offered interventions that provided more intensive instruction for struggling readers through smaller classes, increased time for learning, or both.

4. Additionally, intensive interventions might involve repeated reading, provision of adjunct questions to scaffold comprehension, and questioning for understanding to improve the reading outcomes of adolescents.[108] These strategies can be offered in small group intervention sessions. Although not as interventions per se, these strategies also serve the needs of poorly prepared readers when adopted for use in content-area classrooms.

Potential roadblocks and solutions

1. Some middle and high schools may not have the specialized personnel, time, and resources to conduct efficient screening assessments for students to identify their reading needs. Timely and proper screening, diagnosis, and treatment of the source of struggling readers' difficulties are central to the success of an intervention strategy. Teacher recommendations can be the motivation for initiating assignment to an intervention, but it is more likely that students will be identified through a screening test or data analysis of reading tests to identify scores falling below a specific threshold. In some cases students might have an individualized education plan that contains information about previous testing.

For the most seriously disabled readers, however, it is crucial that the major source of the students' reading difficulties be identified so that interventions can be targeted to the most critical areas. Previous results from standardized tests can be used as a baseline to determine which students are reading below grade level. If such data are unavailable, regular middle and high school teachers can administer group screening tests that will indicate which students may be having reading problems. After students with severe reading difficulties are identified, further testing is usually needed. This testing should be administered and interpreted by reading specialists or special education teachers with advanced knowledge of reading difficulties.

Finding the resources to administer and interpret these various formal and informal assessments can be a challenge. We suggest that educators consider reallocating resources to carry out timely assessments and avoid far more serious future costs to the system, such as retentions in grade, and costs to individual students, including dropping out of school.

107. Gersten et al. (2001).

108. Peverly and Wood (2001); Therrien et al. (2006).

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Acquiring appropriate intervention materials, equipment, and programs; training teachers in use of the interventions; and allocating space for instruction of individuals and small groups also pose challenges in many schools. But the importance of addressing and remediating students' deficits in reading cannot be underestimated. The resources can come from programs such as Title I and other supplemental state and local funding sources, or professional development initiatives can be supported by Title II dollars. Business partnerships, private grants, and other parent and community-based fundraising initiatives may also help augment existing resources. Finally, establishing strong administration and faculty support to make literacy a schoolwide priority will certainly help raise awareness about the importance of supporting these efforts and will garner greater commitment to make the needed alterations to schedules and resources.

2. Many middle and high school content-area teachers, in areas such as science, math, and social studies, do not possess the information or skills needed to teach reading and do not believe that it is their job to teach reading strategies. To compound this problem, the typical departmental structure of secondary schools combined with the lack of regular communication among teachers across departments can lead to a lack of coordination across the curricula. Content-area teachers should not be responsible for carrying out intensive interventions for struggling readers. However, content-area teachers can be taught to use strategies designed to make content-area texts more accessible to all students, including those who struggle with literacy. Professional development sessions that provide clear, easy-to-understand information about the extent of the reading difficulties that students experience and about the steps that all teachers can take to address students' problems emphasize that a school faculty as a whole has responsibilities for meeting the needs of all students. Professional development, which needs to acknowledge the demands of all content areas, can include the modeling and reinforcement of effective strategies to increase students' abilities to comprehend their textbooks and other resource materials. Content-area teachers can use teaching aids and devices that will help struggling readers better understand and remember the content they are teaching. For instance, graphic organizers, organizing themes, and guided discussions can help students understand and master the curriculum content. If schoolwide coordination is achieved through professional development, common planning periods, and informal opportunities for teachers to collaborate and communicate across the content areas, teachers can more easily provide mutually reinforcing reading opportunities to better prepare students to meet identified standards in all areas. Ideally, content-area teachers should work with language arts teachers, literacy specialists, and other content-area teachers to provide coherent and consistent instruction that enables students to succeed in reading across the curriculum.

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Conclusion

This practice guide presents five recommendations that are supported by research. The NAEP data discussed in the overview make it clear that many adolescents lack the robust literacy skills they need for success in school and in the workplace. Many of these students can benefit tremendously when their classroom teachers adjust their instruction in ways that this practice guide recommends. The first four recommendations provide evidence-based strategies that can usually be implemented by regular classroom teachers, those who teach content areas to students. Three of the recommendations—providing explicit vocabulary instruction, direct and explicit comprehension strategy instruction, and opportunities for discussion of text—are relatively easy to implement within English language arts and other content-area classrooms. These strategies help content-area teachers adapt their instruction so that all students, even those who struggle with reading, have easier access to the special language and text structure of content-area materials.

The fourth recommendation concerns the importance of increasing students' motivation for and engagement with literacy learning. Motivation and engagement seem to decline as students enter adolescence. This is especially true for those students who have experienced many years of instruction and often many years of frustration as they try to make sense of literacy activities. When teachers make efforts to build motivation and engagement, students are more likely to establish and act on personally meaningful learning goals, becoming autonomous, self-directed learners.

However, the data also show that there is a cohort of students whose reading skills are so deficient that they need help beyond what classroom teachers alone can provide. It is toward this cohort of struggling readers that the final recommendation in this guide is directed. Strengthening the literacy skills of struggling adolescent readers is not easy, and improvement usually does not come quickly. Assessing students' literacy strengths and weaknesses is often a necessary first step in determining the appropriate interventions to use. Some students' deficiencies are so complex that a diagnostic assessment, administered and interpreted by a specialist, is needed to provide a profile of what these students can and cannot do. The resulting profiles will point toward interventions focused on identified weaknesses. Some adolescent struggling readers might need help with the most basic reading skills required to decode words, whereas others might benefit from explicit and intense work on strategies to increase vocabulary or deepen comprehension. Whatever the needs, it is often necessary for the intervention to be targeted, intense, and provided by a specialist who can monitor students' progress more effectively than a classroom teacher.

For those struggling readers who have less severe deficiencies, interventions of a more general nature—for example, a program designed to strengthen comprehension and vocabulary skills in general—might boost their skills enough to more successfully participate in school. Such programs, often offered as supplementary courses or electives, provide the help students need to build on existing reading skills. When classroom teachers provide complementary instruction because they have adapted their instruction with strategies such as those presented in this practice guide, students benefit even more.

Overall, this practice guide recognizes the needs of all adolescent readers, those whose weak literacy skills require individualized and intense intervention and those remaining students whose skills can be strengthened when content-area teachers make practical alterations to their regular instructional practices.

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Appendix A. Postscript from the Institute of Education Sciences

What is a practice guide?

The health care professions have embraced a mechanism for assembling and communicating evidence-based advice to practitioners about care for specific clinical conditions. Variously called practice guidelines, treatment protocols, critical pathways, best practice guides, or simply practice guides, these documents are systematically developed recommendations about the course of care for frequently encountered problems, ranging from physical conditions, such as foot ulcers, to psychosocial conditions, such as adolescent development.[1]

Practice guides are similar to the products of typical expert consensus panels in reflecting the views of those serving on the panel and the social decisions that come into play as the positions of individual panel members are forged into statements that all panel members are willing to endorse. Practice guides, however, are generated under three constraints that do not typically apply to consensus panels. The first is that a practice guide consists of a list of discrete recommendations that are actionable. The second is that those recommendations taken together are intended to be a coherent approach to a multifaceted problem. The third, which is most important, is that each recommendation is explicitly connected to the level of evidence supporting it, with the level represented by a grade (strong, moderate, low).

The levels of evidence, or grades, are usually constructed around the value of particular types of studies for drawing causal conclusions about what works. Thus, one typically finds that a strong level of evidence is drawn from a body of randomized controlled trials, the moderate level from well designed studies that do not involve randomization, and the low level from the opinions of respected authorities. Levels of evidence can also be constructed around the value of particular types of studies for other goals, such as the reliability and validity of assessments.

Practice guides can also be distinguished from systematic reviews or meta-analyses, which employ statistical methods to summarize the results of studies obtained from a rule-based search of the literature. Authors of practice guides seldom conduct the types of systematic literature searches that are the backbone of a meta-analysis, although they take advantage of such work when it is already published. Instead, authors use their expertise to identify the most important research with respect to their recommendations, augmented by a search of recent publications to assure that the research citations are up-to-date. Furthermore, the characterization of the quality and direction of evidence underlying a recommendation in a practice guide relies less on a tight set of rules and statistical algorithms and more on the judgment of the authors than would be the case in a high-quality meta-analysis. Another distinction is that a practice guide, because it aims for a comprehensive and coherent approach, operates with more numerous and more contextualized statements of what works than does a typical meta-analysis.

Thus practice guides sit somewhere between consensus reports and meta-analyses in the degree to which systematic processes are used for locating relevant research and characterizing its meaning. Practice guides are more like consensus panel reports than meta-analyses in the breadth and complexity of the topic that is addressed. Practice guides are different

1. Field and Lohr (1990).

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from both consensus reports and meta-analyses in providing advice at the level of specific action steps along a pathway that represents a more-or-less coherent and comprehensive approach to a multi-faceted problem.

Practice guides in education at the Institute of Education Sciences

The Institute of Education Sciences (IES) publishes practice guides in education to bring the best available evidence and expertise to bear on the types of systemic challenges that cannot be addressed by single interventions or approaches. Although IES has taken advantage of the history of practice guides in health care to provide models of how to proceed in education, education is different from health care in ways that may require that practice guides in education have somewhat different designs. Even within health care, where practice guides now number in the thousands, there is no single template in use. Rather, one finds descriptions of general design features that permit substantial variation in the realization of practice guides across subspecialties and panels of experts.[2] Accordingly, the templates for IES practice guides may vary across practice guides and change over time and with experience.

The steps involved in producing an IES-sponsored practice guide are first to select a topic, which is informed by formal surveys of practitioners and spontaneous requests from the field. Next, a panel chair is recruited who has a national reputation and up-to-date expertise in the topic. Third, the chair, working in collaboration with IES, selects a small number of panelists to co-author the practice guide. These are people the chair believes can work well together and have the requisite expertise to be a convincing source of recommendations. IES recommends that at least one of the panelists be a practitioner with considerable experience relevant to the topic being addressed. The chair and the panelists are provided a general template for a practice guide along the lines of the information provided in this postscript. They are also provided with examples of practice guides. The practice guide panel works under a short deadline of 6–9 months to produce a draft document. The expert panel interacts with and receives feedback from staff at IES during the development of the practice guide, but they understand that they are the authors and, thus, responsible for the final product.

One unique feature of IES-sponsored practice guides is that they are subjected to rigorous external peer review through the same office that is responsible for independent review of other IES publications. A critical task of the peer reviewers of a practice guide is to determine whether the evidence cited in support of particular recommendations is up-to-date and whether studies of similar or better quality that point in a different direction have not been ignored. Peer reviewers also are asked to evaluate whether the evidence grade assigned to particular recommendations by the practice guide authors is appropriate. A practice guide is revised as necessary to meet the concerns of external peer reviews and gain the approval of the standards and review staff at IES. The process of external peer review is carried out independent of the office and staff within IES that initiated the practice guide.

Because practice guides depend on the expertise of their authors and their group decision-making, the content of a practice guide is not and should not be viewed as a set of recommendations that in every case depends on and flows inevitably from scientific research. It is not only possible but also likely that two teams of recognized experts working independently to produce a practice guide on the same topic would generate products that differ in important

2. American Psychological Association (2002).

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respects. Thus, consumers of practice guides need to understand that they are, in effect, getting the advice of consultants. These consultants should, on average, provide substantially better advice than educators might obtain on their own because the authors are national authorities who have to reach agreement among themselves, justify their recommendations in terms of supporting evidence, and undergo rigorous independent peer review of their product.

Institute of Education Sciences

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Appendix B. About the Authors

Michael L. Kamil is a professor of education at Stanford University. He is a member of the Psychological Studies in Education Committee and is on the faculty of the Learning, Design, and Technology Program. He earned his Ph.D. in psychology from the University of Wisconsin—Madison. His current research focuses on the effects of recreational reading on reading achievement, instruction for English language learners, and the effects of technology on literacy and literacy instruction.

Geoffrey D. Borman is a professor in the Departments of Educational Leadership and Policy Analysis, Educational Psychology, and Educational Policy Studies at the University of Wisconsin—Madison. He earned his Ph.D. in measurement, evaluation, and statistical analysis from the University of Chicago. His main substantive research interests focus on social stratification and the ways in which educational policies and practices can help address and overcome inequality.

Janice Dole is director of the Utah Center for Reading and Literacy and associate professor of education at the University of Utah. She earned her Ph.D. in reading education from the University of Colorado. Her research focuses on comprehension instruction, professional development in reading, and school reform in reading.

Cathleen C. Kral is the instructional leader of literacy and the director of literacy coaching for Boston Public Schools. She earned an M.Ed. in curriculum and instruction from Lesley University and an M.A. in English from Northeastern University. She has written articles and presented widely on Boston's professional development coaching model, Collaborative Coaching and Learning. In addition to her work in Boston Public Schools, she contributes to adolescent literacy and literacy coaching at the national level.

Terry Salinger is a managing director and chief scientist for reading research at the American Institutes for Research. She earned her Ph.D. in reading, with dual emphases on Statistics and Curriculum Design, from New Mexico State University. Her research focuses on reading and literacy instruction and assessment. Dr. Salinger previously held positions as a school teacher, a professor of reading and early childhood education, and a researcher at Educational Testing Service.

Joseph Torgesen is the Morcom Professor of psychology and education at Florida State University and director emeritus of the Florida Center for Reading Research. He also serves as the director of reading for the Center on Instruction K–12 in Reading, Math, and Science. He earned his Ph.D. in developmental and clinical psychology from the University of Michigan. His research has focused on the psychology of reading and interventions for students with reading difficulties.

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Appendix C. Disclosure of potential conflicts of interest

Practice guide panels are composed of individuals who are nationally recognized experts on the topics about which they are rendering recommendations. The Institute of Education Sciences (IES) expects that such experts will be involved professionally in a variety of matters that relate to their work as a panel. Panel members are asked to disclose their professional involvements and to institute deliberative processes that encourage critical examination of the views of panel members as they relate to the content of the practice guide. The potential influence of panel members' professional engagements is further muted by the requirement that they ground their recommendations in evidence that is documented in the practice guide. In addition, the practice guide undergoes independent external peer review prior to publication, with particular focus on whether the evidence related to the recommendations in the practice guide has been appropriately presented.

The professional engagements reported by each panel member that appear most closely associated with the panel recommendations are noted below.

Dr. Dole is a coauthor of a basal reading program for elementary grades (K–6), but this program is not referenced in the practice guide.

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Appendix D. Technical information on the studies

Recommendation 1. Provide explicit vocabulary instruction

Level of evidence: Strong

The panel considers the level of evidence that supports this recommendation to be *strong.* This rating is based on six randomized controlled experiments and three well designed quasi-experiments that demonstrated group equivalence at pretest.[1] An additional six studies provided direct evidence to support this recommendation but were weaker for various reasons, such as quasi-experimental studies that did not show equivalence between intervention and control groups at pretest, a lack of a comparison group, and a teacher-intervention confound.[2] Moreover, a single subject design study with a counter-balanced time-series design also provided evidence about the effect of vocabulary instruction on students' outcomes.[3] Of this body of scientific evidence, nine studies included students in upper elementary schools, and the remaining seven studies focused on students in middle and high schools. The body of evidence supporting explicit vocabulary instruction represents student populations from low, middle, and upper-middle socioeconomic status in urban, suburban, and rural school districts throughout the United States. About 33 percent of the studies showed a positive impact specifically for students reading below grade level.

Several of the studies taught students to become independent learners by analyzing semantic and syntactic features of words and building on relationships between new words and previously acquired vocabulary.[4] In addition, several studies used multiple methods (for example, syntactic and semantic analysis, context clues and semantic analysis, semantic analysis and multiple sensory experiences) to promote vocabulary acquisition.[5] In one study, middle school students with learning disabilities were randomly assigned to one of four conditions: semantic mapping, semantic feature analysis, semantic/syntactic feature analysis, and definition instruction.[6] Immediate posttest and follow-up findings showed that interactive instruction (that is, semantic mapping, semantic feature analysis, semantic/syntactic feature analysis) is more effective than just learning and practicing the meaning of words in helping students understand the context-related meaning of vocabulary presented in a passage. In addition, students in the interactive conditions outperformed students in the definition instruction condition on reading comprehension. In a second study, middle school students were randomly assigned to either a semantic mapping instruction group or a context-clue instruction group.[7] Results favored students in the semantic mapping group over students in the context clue group on a vocabulary test and a researcher-developed definitions test.

1. Barron and Melnik (1973); Baumann et al. (2002); Baumann et al. (2003); Bos and Anders (1990); Brett et al. (1996); Lieberman (1967); Margosein et al. (1982); Nelson and Stage (2007); Xin and Reith (2001).

2. Beck et al. (1982); Jenkins et al. (1989); Koury (1996); Ruddell and Shearer (2002); Stump et al. (1992); Terrill et al. (2004).

3. Malone and McLaughlin (1997). The standards for judging the quality of a single subject design study are currently being developed.

4. For example, Baumann et al. (2002); Baumann et al. (2003); Bos and Anders (1990); Margosein et al. (1982) .

5. Beck et al. (1982); Brett et al. (1996); Lieberman (1967); Xin and Rieth (2001).

6. Bos and Anders (1990).

7. Margosein et al. (1982).

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In another study students in upper elementary school with learning disabilities were randomly assigned to either vocabulary instruction with video technology or vocabulary instruction without video technology.[8] Students who received video-assisted vocabulary instruction outperformed students who received the same instruction without video technology on a word definitions vocabulary test.

Example of an intervention that uses explicit vocabulary instruction

In the example study a research team conducted a randomized controlled trial with 157 5th-grade students in ethnically diverse classrooms from four urban schools in the Southeast.[9] Whole classrooms were assigned to conditions and explicit vocabulary instruction was provided, using morphemic and contextual analysis instruction (MC) or the more traditional textbook vocabulary instruction (TV). For 25 instructional days vocabulary instruction was embedded within 45-minute social studies periods and delivered by regular classroom teachers in both conditions. Within each lesson, in both conditions, teachers focused on the social studies textbook content for 30 minutes and on vocabulary instruction for 15 minutes. Students in the MC group received instruction in morphemic and contextual analysis strategies. Morphemic analysis included looking for word-part clues (root words, prefixes, suffixes). Contextual analysis included looking for different types of context clues (definitions, synonyms, antonyms, examples, general clues) in the sentences around the word. Students in the TV group received the same amount of vocabulary instruction as the MC group. However, instead of teaching students how to derive the meaning of words from context and morphemic clues, teachers directed students to look for definitions in their textbook glossaries or the classroom dictionaries.[10] To motivate students in both conditions to focus on vocabulary, the researchers constructed the lessons around an adaptation of the television series *The X-Files*. The students were asked to be Vocabulary-Files (V-Files) agents. They were part of the Federal Vocabulary Institute (FVI) and their mission was to figure out the meaning of words as they learned about the Civil War.

According to the study authors, the results of this study showed that students in the TV group showed a better acquisition of textbook vocabulary than students in the MC group. This result was statistically significant. However, students in the MC group were better able to figure out the meanings of vocabulary that could be deciphered by using morphemes presented in isolation than students in the TV group. This result was also statistically significant. Other outcomes investigated in this study (effects on students' understanding of words in context, students' comprehension of two chapters from the textbook, and students' comprehension of new social studies text) showed no differences between the different conditions, and the effect sizes were relatively small. In this study explicit vocabulary instruction was used in both conditions and showed a positive impact on different vocabulary outcomes. Because a business as usual control group was not adopted, the study did not directly address the impact of explicit vocabulary instruction on literacy development. Rather, it

8. Xin and Rieth (2001).

9. Baumann et al. (2003).

10. Some of the strategies taught in the intervention condition—engaging in prior knowledge and prediction activities—were taught in the comparison condition as well. For example, students completed a know, want to know, and learned chart (Ogle 1986, as cited in Baumann et al. 2003), responded to questions, constructed a semantic map, and made an entry in their vocabulary logs with illustrations related to the reading.

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demonstrated the relative merits of different types of explicit vocabulary instruction on reading achievement.

Recommendation 2. Provide direct and explicit comprehension strategy instruction

Level of evidence: Strong

The panel considers the level of evidence that supports this recommendation to be *strong.* This rating is based on five experiments,[11] with additional evidence from a single subject design study with multiple probe design across students.[12] Of this body of scientific evidence, two studies included students in upper elementary schools, and the remaining studies focused on students in middle and high schools. The body of evidence supporting explicit comprehension strategy instruction represents student populations in urban, suburban, and rural school districts in the Northeastern, Central, and other regions of the United States. About 67 percent of the studies showed a positive impact specifically for students reading below grade level.

Most of the studies shared common features of implementation: direct and explicit comprehension strategy instruction, question answering, and summarization strategies. In one study the researchers examined the effects of teaching 4th-grade students comprehension strategies—including activating background knowledge, answering questions, and making predictions—on the students' comprehension achievements. The authors asked good and poor readers literal and inferential questions about a story at the students' reading level as well as literal and inferential questions about a common story not at the students' reading level. The literal questions could be answered by using information verbatim from the story. The inferential questions could only be answered by interpreting the text using other knowledge. In addition to being scored "correct" or "incorrect," the inferential questions were also scored using a weighting scheme to incorporate the quality of the students' responses. Results indicated that for the story at the students' reading level, the intervention group significantly outperformed the control group on the literal questions and the inferential questions for the poor readers only. For the common story, the intervention group scored statistically significantly better than the control group on the inferential questions and the weighted inferential questions for both good and poor readers.[13] In a second study the researchers examined the effects of summarizing and paraphrasing on the reading comprehension test scores of low socioeconomic status 7th-grade students and found that the intervention group scored statistically significantly better than a comparison group.[14] In another study the effect of a graphic organizer (semantic mapping) on the comprehension and vocabulary achievements of 7th- and 8th-grade students was examined. The researchers found that students in the intervention group scored statistically significantly better on measures of vocabulary but not comprehension.[15]

Example of an intervention that uses comprehension strategies for expository texts

In the example study a research team conducted a randomized controlled trial

11. Hansen and Pearson (1983); Katims and Harris (1997); Margosein et al. (1982); Peverly and Wood (2001); Raphael and McKinney (1983).

12. Jitendra et al. (1988). The standards for judging the quality of a single subject design study are currently being developed.

13. Hansen and Pearson (1983).

14. Katims and Harris (1997).

15. Margosein et al. (1982).

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with 10 classes of 7th-grade students (N = 207) from a low socioeconomic district.[16] Twelve percent of the students had learning disabilities. Because the intervention was designed to help students who had problematic comprehension strategies for expository texts, 21 students who had a score at or above 90 percent on the comprehension test using passages from *Timed Readings*[17] were excluded from the data analysis. Literacy instruction using summarizing and paraphrasing to promote reading comprehension was provided. As part of the intervention, students in the control group were given the district-mandated *Reading Workshop*,[18] which gave students learning opportunities in reading, writing, and discussion experiences using both fiction and nonfiction reading materials. In addition to *Reading Workshop*, students in the intervention group were taught the cognitive strategy of paraphrasing for 20 minutes every other school day over a course of six weeks. The intervention emphasized summarizing and paraphrasing strategies. Students practiced identifying the main idea and learned how to ask questions in three simple steps: reading a paragraph, asking questions, and putting the information in their own words. During the intervention, the teacher first described and modeled the strategies to be used, followed by students' verbal practice of the strategies using grade-level and advanced grade-level passages. In addition, cue cards and large posters prompted students to use the strategies they had learned. Reading comprehension was measured at the start and end of the intervention with 10 comprehension questions using expository texts.

According to the study authors, the results of this study indicated that students receiving the intervention showed higher comprehension scores than students in the control group. This result was statistically significant.

Recommendation 3. Provide opportunities for extended discussion of text meaning and interpretation

Level of evidence: Moderate

The panel considers the level of evidence that supports this recommendation to be *moderate.* This rating is based on one well designed quasi-experiment[19] that demonstrated group equivalence at pretest and one large correlational study with strong statistical controls.[20] Three additional quasi-experimental studies provided direct evidence to support this recommendation but were not ideal for various reasons involving study design (for example, teacher confound, lack of baseline equivalence).[21] Additionally, a recent meta-analysis[22] and a large descriptive study[23] provided evidence to support this recommendation. Of this body of scientific evidence, four studies included students in late elementary schools, and the remaining studies focused on students in middle and high schools. The body of evidence supporting text discussion represents student populations in urban, suburban, and rural school districts in all five regions of the United States (West, Southwest, Midwest, Northeast, Southeast). About 50 percent of the studies showed a positive impact specifically for students reading below grade level.

Most of the studies shared common features of implementation: training of teachers prior to implementation, collaborative

16. Katims and Harris (1997).

17. Spargo (1989).

18. Atwell (1987), as cited in Katims and Harris (1997).

19. Reznitskaya et al. (2001).

20. Applebee et al. (2003).

21. Bird (1984); Heinl (1988); Yeazell (1982).

22. Murphy et al. (2007).

23. Langer (2001).

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group discussion and learning, a focus on interpretive and logical thinking, summarization, and engaging reading material. In one study, one of the intervention groups participated in shared inquiry and discovery by reading a narrative literature selection and engaging in group interpretation and discussion. Students who participated in these discussions showed greater improvements on a standardized measure of reading comprehension than those who did not, but the effect was statistically significant only for the lower ability students in the group.[24] In a second study students discussed controversial issues in the selections they read and wrote a persuasive essay about a particular story at the end of the intervention. Analysis of the written essays indicated that the intervention group significantly outperformed the comparison group in terms of variables such as number of arguments, counterarguments, rebuttals, formal argument devices, and textual information.[25]

Example of an intervention that uses text discussion

In the example study a research team conducted a quasi-experimental study with selected classrooms from four public schools serving students of diverse ethnic and socioeconomic backgrounds.[26] In this study, literacy instruction to promote the persuasiveness of written arguments used an oral discussion technique known as collaborative reasoning. As part of the intervention, students in the collaborative reasoning group met in small groups twice a week for 15- to 20-minute discussions over five weeks. During these discussion sessions, students openly participated (that is, they did not need to be called on by a teacher) in oral discussions about controversial issues in stories they had read, taking positions on issues and providing supporting evidence from the story for their positions. The teacher's role was to encourage students to think reflectively about what they had read, to expose students to formal argument devices, and to coach students (to challenge others' viewpoints, to provide counterarguments, to respond using rebuttals). In addition to these regular discussion periods, students in the intervention group also participated in twice weekly 15-minute discussions with all other participating classrooms, using web-based technology.

According to the study authors, the results of this study indicated that students engaging in collaborative reasoning showed better persuasive arguments as indicated by the number of arguments, counterarguments, rebuttals, and use of textual information in essays that the students had written. This result was statistically significant.

Recommendation 4. Increase student motivation and engagement in literacy learning

Level of evidence: Moderate

The panel considers the level of evidence that supports this recommendation to be *moderate.* This rating is based on two experiments[27] and one quasi-experimental study that did not show equivalence between intervention and comparison groups at pretest but had no other major flaws threatening its internal validity.[28] Three additional studies provided direct evidence to support this recommendation but were weaker for various reasons, such as lack of an eligible outcome (that is, measured motivation rather than literacy).[29] Six addi-

24. Heinl (1988).

25. Reznitskaya et al. (2001).

26. Reznitskaya et al. (2001).

27. Schunk and Rice (1992), which contains two studies; Mueller and Dweck (1998).

28. Guthrie et al. (1999).

29. Graham and Golan (1991); Grolnick and Ryan (1987); Guthrie et al. (2000). Some of these studies

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tional experimental and quasi-experimental design studies[30] provided indirect evidence for this practice. Although these studies did not focus on literacy skills, they demonstrated a direct link between the quality of a teacher's praise and students' motivation. Finally, two meta-analyses of the research about the general effects of extrinsic rewards on students' motivation were also considered for the purpose of this review.[31] Although the meta-analyses of the literature included secondary school students, all other empirical studies reviewed here focused on students in elementary schools. The body of evidence supporting motivation and engagement represents student populations in urban and suburban school districts in multiple geographical regions of the United States. About 33 percent of the studies that focused on literacy outcomes showed a positive impact specifically for students reading below grade level. In addition to the empirical studies, a literature review and an article summarizing a series of research studies provided direct evidence to support this recommendation.[32]

Some of the studies shared common features of implementation: a yearlong implementation, a focus on interdisciplinary themes, a phased approach to teaching the practice, a focus on extrinsic motivation or intrinsic motivation for the intervention group(s), and the linking of correct responses to comprehension questions to the correct use of a taught strategy. In one study, an interdisciplinary approach called Concept Oriented Reading Instruction (CORI) was used over one year to teach students life and earth science topics using a four-phase teaching framework that provided students with opportunities to generate questions, discuss text meaning and interpretation, and communicate their understandings throughout the process. Results indicated that students using CORI significantly increased their strategy use, conceptual learning, and text comprehension compared with students taught using a traditional approach.[33] In a second study students processed words using one of three levels that ranged from shallow to deep and then participated in one of two conditions that manipulated their motivational state (task-focused or ego-focused). Results indicated that students in the task-focused group had significantly higher cued recall scores than students in the ego-focused group.[34] In another study students' motivation was manipulated by leading students to believe that they would be graded on their performance (controlling directed learning), not graded but asked questions (noncontrolling directed learning), or asked questions to assess their enjoyment and attitudes (nondirected spontaneous learning). The researchers found that students in the controlling and noncontrolling directed learning groups had better rote learning than students in the nondirected group. But students in the noncontrolling directed learning group also had statistically significantly better learning than students in the controlling directed group.[35]

Example of an intervention that uses Concept Oriented Reading Instruction[36]

In our example a research team conducted two quasi-experimental studies[37] with

also failed on duration as defined in the adolescent literacy protocol (that is, at least four weeks) but were deemed to be of sufficient length to provide additional support for the recommendation.

30. Mueller and Dweck (1998).

31. Deci et al. (1999); Tang and Hall (1995).

32. Guthrie and McCann (1997); Schunk (2003).

33. Guthrie et al. (1999).

34. Graham and Golan (1991).

35. Grolnick and Ryan (1987).

36. This nonbranded program is included because it contains many relevant motivation and engagement practices and strategies.

37. One study was initially reported briefly in Guthrie and McCann (1997) and was described in

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3rd- and 5th-grade students from classrooms of mixed races and ethnicities near a large city in a mid-Atlantic state.[38] In this study literacy instruction to promote motivation for literacy, conceptual understanding, strategies for learning, and social interaction was provided using Concept Oriented Reading Instruction (CORI). CORI is based on seven instructional characteristics:

- Conceptual theme: theme about which learning is organized.
- Observation: use of hands-on activities and real-life experiences for learning.
- Self-direction: supports to student in being autonomous in their learning.
- Strategy instruction: supports to student in guided discovery.
- Collaboration: support to help students work together to learn.
- Self-expression: support to assist students describe their understanding to others.
- Coherence: the link between conceptual understanding and real-life experiences.

As part of the intervention, CORI was taught over the course of a year by integrating science and language arts. The CORI teachers participated in a summer workshop for 10 half-day sessions to plan the instruction for the year. Each month, the CORI teachers met to discuss information related to progress, strategies, and challenges. The teachers used a four-phase approach in the instructional units taught over the year: observe and personalize (hands-on activities and student-developed questions), search and retrieve (searching for answers to questions and information from varied sources), comprehend and integrate (direct strategies on how to integrate information learned from each source), and communicate (students communicate what they have learned using various media). In the fall the teachers taught a series of instructional units about the life cycles of plants and animals; in the spring, the units focused on earth science, including the solar system and geological cycles.[39] In the traditional classrooms teachers used the teachers' guides and manuals. Teachers in both the CORI classrooms and the traditional classrooms had the same instructional goals for language arts and science. In one study[40] students were assessed over a weeklong period using a performance assessment that tested them either on familiar or unfamiliar topics to determine their prior knowledge, strategy use, conceptual learning (drawing and writing), conceptual transfer, informational text comprehension, and narrative interpretation abilities. In the other study[41] students were assessed on their intrinsic motivation (curiosity, involvement, and preference for challenge), extrinsic motivation (recognition and competition), and strategy use.

According to the study authors, the results of the first study[42] indicated that students

detail in Guthrie et al. (1999). The other study was described in Guthrie et al. (2000). This section of the technical appendix is based on information from all three articles.

38. Although the studies included 3rd- and 5th-grade students, this practice guide focuses only on the results for the 5th-grade students because of the age range specified in the Adolescent Literacy protocol.

39. This was the content taught in Guthrie et al. (1999). In Guthrie et al. (2000), teachers taught environmental adaptation (life science theme) in the fall and weather (earth science theme) in the spring.

40. Guthrie et al. (1999).

41. Guthrie et al. (2000).

42. Guthrie et al. (1999).

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receiving CORI showed greater conceptual learning, motivated strategy use, informational text comprehension, and narrative comprehension than students in the traditional classrooms. These results were statistically significant. Other outcomes investigated in this study (conceptual transfer) showed no statistically significant differences between the different conditions. Results for the other study[43] demonstrated that students who had participated in CORI scored statistically significantly higher than students from traditional classrooms on measures of curiosity and strategy use. Other outcomes investigated in this study (involvement, recognition, and competition) showed no statistically significant differences between the different conditions.

Recommendation 5. Make intensive and individualized interventions available for struggling readers that can be provided by trained specialists

Level of evidence: Strong

The panel considers the level of evidence that supports this recommendation to be *strong.* This rating is based on 12 experiments and one well designed quasi-experiment that demonstrated group comparability at pretest.[44] Of this body of scientific evidence, 12 studies included students in upper-elementary or middle school; the remaining study focused on students in high school. All the studies included students with learning disabilities including specific reading impairments. Two also included students with other types of disabilities, such as speech-language impairment, and one study included students without disabilities who were deemed at risk for failure in reading. It is often difficult to determine whether adolescent struggling readers are in fact learning disabled because the characteristics of their difficulties are often similar.

The body of evidence supporting intensive and individualized interventions for struggling readers represents student populations located in mostly urban and suburban areas across the United States and in one province in Canada (Ontario). Overall, several studies demonstrated a positive relationship between strategic interventions and student outcomes when compared with business-as-usual approaches, but comparisons among different types of strategic intervention did not lead to any clear conclusions about the superiority of one approach over another.

The interventions implemented in these studies included such diverse approaches as fluency strategies, semantic mapping and semantic feature analysis to show relationships among words, graphic representations of ideas in text, goal setting, self-instruction, question answering, identification of themes, phonological analysis and blending, word identification, text content and structure, and reciprocal teaching. Several interventions combined two or more of these strategies. The most successful approaches used semantic mapping, semantic feature analysis, thematic or graphic organizers appropriate to genre, identification of themes, phonological analysis and blending, word identification, text content and structure, or reciprocal teaching. In one study students[45] using semantic

43. Guthrie et al. (2000).

44. Allinder et al. (2001); Bos and Anders (1990); DiCecco and Gleason (2002); Englert and Mariage (1991); Johnson et al. (1997); Lovett et al. (1996); Lovett and Steinbach (1997); Peverly and Wood (2001); Rooney (1997); Therrien et al. (2006); Wilder and Williams (2001); Williams et al. (1994); Xin and Reith (2001).

45. The students had a discrepancy between their intellectual functioning in one or more academic area and one or more deficits in cognitive processing. Additionally, the students had average intelligence but reading was identified as a focus for remediation.

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mapping or semantic feature analysis approaches outperformed students receiving typical direct instruction on immediate and delayed tests of reading comprehension.[46] In a second study[47] students who used repeated reading and answered factual and inferential comprehension questions made greater gains on a test of basic literacy skills than their peers who did not receive the intervention.[48] In another study students[49] who used an organizing strategy followed by theme identification and generalization of story themes to real life performed better on measures of comprehension than students who received typical instruction.[50] All the successful approaches used the chosen intervention over the course of a month or more, although they varied in intensity from just under an hour a week to two hours a day.

Example of an intervention for struggling readers

In the example study researchers conducted a randomized controlled trial with 61 junior high school students with learning disabilities from two middle- and lower-middle-class school districts in the Southwest United States.[51] Participating students were receiving educational supports for their learning disabilities through either resource or self-contained settings. Individual students were assigned to one of four intervention conditions: Definition Instruction (DI), Semantic Mapping (SM), Semantic Feature Analysis (SFA), or Semantic/Syntactic Feature Analysis (SSFA). Students met in groups of 6–12 for eight 50-minute sessions spread out over approximately seven weeks.

The DI condition involved directly teaching students the meaning of vocabulary words by using a written list of the words with their definitions. The other three interventions were based on interactive instructional models. In the SM condition the teacher worked with students to construct a hierarchical relationship map for the vocabulary words based on their meaning. In the SFA condition the teacher worked with students using a matrix to predict relationships among the concepts represented by the vocabulary words. The matrix was created by placing superordinate vocabulary at the head of the matrix and then subordinate vocabulary below. The SSFA condition was identical to the SFA condition except that students also used the matrix to guide them in predicting the answers for cloze-type sentences.

According to the study authors, students in the SM condition developed better reading comprehension than students in the DI condition by the time of posttest. This effect was statistically significant. In a delayed reading comprehension follow up, students in the SFA and SSFA conditions outperformed those in the DI condition. These effects were statistically significant. For all the outcomes above, there were no significant differences between the performances of the students across the three interactive conditions.

46. Bos and Anders (1990).

47. About half of the students had a reading learning disability and half were at risk for reading failure (that is, reading at least two grade levels below actual grade level).

48. Therrien et al. (2006).

49. All students had identified learning disabilities and discrepancies between actual and expected levels of reading achievement were greater than 1.5 grade levels. Additionally, the students scored at the 11th percentile on the *Degrees of Reading Power Test*, a test of reading comprehension.

50. Wilder and Williams (2001).

51. Bos and Anders (1990); the students had a discrepancy between their intellectual functioning in one or more academic area and one or more deficits in cognitive processing. Additionally, the students had average intelligence but reading was identified as a focus for remediation.

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