Summary of the (U.S.) National Reading Panel Report
Teaching Children to Read

Prepared by the Division of Research and Policy, International Reading Association

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Background

Panel member selection:
In 1997, the U.S. Congress requested that the Director of the National Institute of Child Health and Human Development (NICHD), in consultation with the Secretary of Education, appoint a panel of experts to determine the effectiveness of various approaches to teaching reading. They selected 14 panel members from 300 applicants. No federal government employees, persons who had taken set stands on particular approaches to reading methods, or persons with financial or commercial ties to reading-material production were considered. The group included scientists engaged in reading research, psychologists, a pediatrician, a teacher, administrators, a principal, and a parent.

Studies reviewed:
The panel identified 100,000 reading research studies, and narrowed the selection by sorting for those with well-defined instructional procedures, those that were experimental in design, those that showed causality between practice and outcomes, and those including a large sample size. Qualitative research and studies that were descriptive, observational, or correlational were not chosen. However, the panel recommended that future reviews look at qualitative and descriptive research.

Public comments:
At five regional meetings, the panel elicited input from teachers, administrators, researchers, teacher educators, and parents. More than 400 people attended the hearings and offered direction to the panel.

Panel findings:
In April 2000, the NICHD released the report of the National Reading Panel, under the title *Teaching Children to Read* (see www.nichd.nih.gov/publications/pubskey.cfm?from=nrp). The panel determined that effective reading instruction includes teaching children to break apart and manipulate the sounds in words (phonemic awareness), teaching them that these sounds are represented by letters that can be blended together to form words (phonics), having them practice what they've learned by reading aloud with guidance and feedback (guided oral reading), and teaching them to apply strategies to guide and improve reading comprehension.

Chapter 1 of *Teaching Children to Read*: Phonemic Awareness (PA) Skills

- Understanding that spoken words are composed of tiny sound segments or phonemes

Skills studied (p. 10):
phoneme isolation (recognizing individual sounds in a word: /g/ in "go");
phoneme identification (common sound in different words: /b/ in boy, bike, bell);
phoneme categorization (recognizing sounds in sequence: bus, bun, rug);
phoneme blending (listening to series of separate spoken sounds and blending them: /g/ /o/ = go);
phoneme segmentation (tapping out/counting the sounds in a word: /g/ /o/ = go, which is two sounds);
phoneme deletion (recognizing what word remains when a specified phoneme is deleted: smile is "mile" without the /s/).

Designation of students studied (p. 14):
children at risk (below 2nd grade with low PA or reading ability);
disabled readers (mostly 2nd-6th graders who read below grade level despite average cognitive ability); and
children progressing normally (not identified as having reading problems).

PA Findings (based on 96 treatment-control group comparisons)

Panel conclusion (p. 5):
PA can be taught, and it is effective in improving reading with all types of children under a variety of teaching conditions.

Group size (pp. 22, 42, 44):
Teaching small groups produces better results than teaching individuals or who classes.

Best PA methods (p. 41):
PA taught with letters is more effective than PA taught without letters. Letters help children grasp and manipulate sounds that are ephemeral. Letters also help children transfer their PA skills to reading and writing tasks.

Teaching one or two skills was effective and both were more effective than teaching three skills.

Length of sessions (pp. 22, 31, 42):
Teaching sessions of about 30 minutes and a total of no more than about 20 hours appeared to be most effective. However, the panel cautions against declaring how long instruction needs to last based on these observations, and recommends tailoring training time to student learning by assessing who has and who has not acquired the skills being taught as training proceeds.

Who teaches (p. 19):
Classroom teachers, researchers, and computers delivered PA instruction effectively.

Computers/parents (pp. 44-45):
Use of computers yielded significant effects for teaching PA and its transfer to reading. However, effects were smaller than those produced by teachers or researchers. More research is needed on computer use. The panel also recommends more research on parents as PA trainers.

Training teachers to use PA (p. 44):
With training, teachers can and do teach PA effectively. The panel raised questions that researchers need to answer regarding specifics of teacher training.

Dialects (p. 31):
Teachers implementing PA instruction need to be aware of regional dialects and their effects on phonemes. E.g., vowels in *marry*, *Mary*, and *merry* are pronounced identically in some areas of the West but differently in some areas of the East.

English as a second language (p. 32):
Children's minds are programmed to categorize phonemes in their first language, which may conflict with English phonemes. E.g., Spanish-speaking children may select *ch* when they should use *sh*, because in Spanish these two-letter combinations produce the same phoneme.

Who Benefits

Age of most benefit (pp. 24, 40):
Preschoolers and kindergartners benefited more than first to sixth graders in acquiring phonological awareness. Kindergartners benefited more in reading; the other groups did not differ from one another.

At-risk readers (pp. 18, 23, 33, 41):
PA skills resulted in the biggest boost in reading for at-risk students. PA instruction had positive effects for all learners and transferred to reading across all conditions and characteristics studied. At-risk readers gained as much from PA training as normally-developing readers.

Reading-disabled students (pp. 23, 41):
Although all students gained from PA, it appears harder to improve PA in reading-disabled students — perhaps because disabled readers were older and relatively more advanced in PA skills, with less room for gains than the younger beginners. Also, disabled readers were taught more advanced forms of PA than were younger students.

Helping disabled readers (pp. 35-36):

The panel found some programs to be highly effective in teaching decoding skills to disabled readers. In one, children ages 7-12 were taught to segment and blend phonemes first in speech, and then using letters. Children progressed from a set of seven consonants and two vowels to using additional letters, consonant clusters, and two-syllable words.

Normally progressing students (pp. 19, 23-24):
PA training improves spelling and boosts reading skills.

Which Skills Improved

Reading-PA connection (pp. 33, 41):
Teaching children PA skills of segmenting and blending along with letter identification and how to apply PA skills in reading words produces better outcomes on reading comprehension as well as word and pseudoword reading.

Spelling (pp. 24-26, 30, 40-41):
Phonemic awareness training improved spelling more than alternative forms of training, except outcomes were insignificant for 2nd- to 6th-grade disabled readers, perhaps due to their processing difficulties. Improvements in reading and spelling lasted beyond the immediate training period.

Adding PA instruction to a whole language program enhanced students' decoding and spelling skills but not their other reading skills.

Chapter 2 of *Teaching Children to Read*: Phonics Skills

- The process of linking sounds to letter symbols and combining them to make words

Skills studied (pp. 92, 110):
decoding regularly spelled real words;
reading novel words in the form of pseudowords;
reading miscellaneous words, some of which were irregularly spelled;
spelling words;
comprehending text read silently or orally;
reading text accurately aloud.

Designation of students studied (pp. 90, 106):
normally developing (not identified as having reading problems);
children at risk (below 2nd grade with low PA or reading ability);
disabled readers (2nd-6th graders who read below grade level despite average or better intelligence); and
low-achieving readers (older children with poor reading progress, varying in intelligence, at least some of whom achieved poorly in other academic areas).

Systematic phonics definition (pp. 89, 99, 102, 106-107):
This report examined research on **systematic phonics** instruction. Systematic phonics is teaching a planned sequence of phonics elements, rather than highlighting elements as they happen to appear in a text. Approaches to systematic phonics instruction include

- synthetic phonics (convert letters into phonemes, and then blend the phonemes to form words);
- analytic phonics (analyze letter-sound relations once the word is identified);
- phonics through spelling (transform sounds into letters to write words);
- phonics in context (use sound-letter correspondences along with context cues to identify unfamiliar words); and
- analogy phonics (use parts of already known written words to identify new words).

Phonics Skills Findings (based on 66 treatment-control group comparisons)

Panel conclusion (pp. 93, 103-104, 113, 118, 132):
The panel concluded that systematic phonics instruction makes a bigger contribution to children's growth in reading than nonsystematic alternative programs or no phonics. Effects last beyond the period of training. The most effective types of instruction are

- synthetic phonics, which teaches students to convert letters (graphemes) into sounds (phonemes) and then to blend the sounds to form recognizable words;

- larger unit phonics which emphasizes the analysis and blending of larger subparts of words (onsets, rimes, phonograms, spelling patterns) as well as phonemes;
- miscellaneous phonics programs that teach phonics systematically but do this in other ways not covered by the synthetic or larger unit categories.

Group size (pp. 93, 120, 132):
Systematic phonics instruction is effective when taught through tutoring, small groups, or whole classes.

Duration of teaching (pp. 118, 126-127):
The findings suggest that when phonics instruction is taught to children at the beginning of learning to read, and continued for two to three years, the children experience significantly greater growth in reading at the end of training than do children who receive phonics instruction for only one year after first grade.

One effective phonics program that the panel looked at began with kindergartners and lasted for 2.5 years. It began with PA training, included regular teacher in-service professional development, and regular assessments to enable flexible instruction.

Control groups (pp. 90, 95, 102, 121, 124, 133-134):
In studies that investigated phonics effectiveness in treatment groups where phonics was taught as compared to control groups following other approaches, systematic phonics produced better results than programs that did not provide systematic phonics instruction. The control groups used approaches including basals (focusing on whole-word activities with limited attention to letters and sounds and letter-blending skills), regular curriculum, whole language (meaning-based reading and writing with phonics taught incidentally), whole word (50-100 reading word vocabulary built first, then lessons on alphabetic system), and miscellaneous programs.

As for the weaker effect of phonics on older readers, the panel noted that it is possible that in many of the control groups, more phonics instruction was actually taking place, and they were thus comparing "more" systematic phonics instruction to "less" systematic phonics instruction.

Motivational factors (p. 125):
The motivational value of associating letters with interesting characters or hand motions and incorporating this into activities and games that are fun is important for promoting young children's learning.

Training teachers to use phonics instruction (pp. 123, 135-136):
Teachers should note that early instruction in systematic phonics is especially beneficial to growth in reading. Phonics is not an end in itself, but should be taught with the goal of applying phonics knowledge in daily reading and writing. Training for teachers will enable them to evaluate various programs and to match those programs to the needs of their students.

Who Benefits

Age that benefits most (pp. 93, 113, 115, 118, 133):
The biggest impact on reading growth occurs when phonics instruction begins before children begin to learn to read independently. Thus, phonics instruction should begin in kindergarten or first grade. When taught in kindergarten, it must be appropriately designed and must begin with foundational knowledge involving letters and phonemic awareness.

At-risk beginning readers (below 2nd grade with low reading ability; pp. 94, 110, 117, 133):
Systematic phonics is significantly more effective than non-phonics in preventing reading difficulties among at-risk readers.

Disabled readers (2nd to 6th graders with average IQs but poor reading; pp. 94, 106, 110, 114, 116, 133):
Systematic phonics is more effective than non-phonics in remediating disabled readers and helping these students comprehend text more successfully. However, when the 17 reading-disabled comparisons were analyzed separately, there was a small positive effect. The panel concluded that systematic phonics is more effective than non-phonics in remediating disabled readers and helping these students comprehend text more successfully.

Socioeconomic levels (pp. 95, 118, 133):
The panel found systematic phonics instruction was helpful to children at all socioeconomic levels.

No Demonstrated Benefits

Older, normally progressing readers (pp. 115-116):
The impact of phonics instruction was less than for the younger readers, but data were insufficient to draw any conclusions. (The panel reviewed only seven comparisons, four of which used a program designed for disabled readers.)

Low-achieving readers (2nd to 6th graders with reading difficulties and possibly other cognitive difficulties that explained their low achievement; pp. 94, 106, 110, 114, 117, 133):
There was low impact of systematic phonics on low achievers' growth in reading, but the panel drew no firm conclusions from its review of these studies because they numbered only eight and all were case studies.

Which Skills Improved
Decoding and word reading (pp. 94, 113, 116, 133):
Systematic phonics was most effective in improving ability to decode regularly spelled

words, and was also effective in helping with decoding of irregularly spelled words for kindergartners and first graders, as well as for older struggling readers.

Comprehension (pp. 94, 106-107, 113, 115-116, 123, 133):
These skills were boosted substantially for younger students (K-1, but not the older group (2-6) in general. Phonics appears to help older poor readers improve decoding but had a weak effect on their ability to apply these skills to reading text and spelling words.

Oral reading (p. 115):
Among beginning readers phonics skills had a larger impact on reading comprehension than on oral reading. (This may have been because the comprehension tests given to this younger group generally favored short passages of phonetically regular words. Oral reading passages were longer.)

Spelling (pp. 95, 115, 116, 133):
Much growth was seen in spelling for kindergartners and 1st graders, but not among those in 2nd grade and above.

Additional studies needed on classroom applications (pp. 97-98, 117, 135, 137-138):
Teachers must keep the end goal in mind: the purpose of learning letter sounds is to apply these skills in daily reading and writing. The panel emphasizes that phonics should be integrated with other reading instruction to create a balanced reading program.

In relation to older readers, it is likely that phonics programs that emphasize decoding exclusively and ignore the other processes involved in learning to read will not succeed in making every child a skilled reader.

Topics requiring more study include optimal length of programs and optimal number of years; teachers' depth of phonics knowledge; use of scripted programs vs. assessment of individual needs; flexible instruction groups and phonics programs; teacher and student motivational factors; phonics program ingredients that yield the best results; contribution of decodable books to phonics effectiveness; effectiveness of phonics beyond 2nd grade; best phonics methods for poor readers above 1st grade; phonics instruction and addressing needs of older students with bad reading habits; and systematic instruction in fluency and automaticity for older students' phonics instruction.

Chapter 3 of *Teaching Children to Read*: Fluency

- Reading with speed, accuracy, and proper expression without conscious attention; performing multiple reading tasks (e.g., word recognition and comprehension) at the same time

Skills studied:
guided repeated oral reading, including repeated reading, neurological impress, paired reading, shared reading, and assisted reading;
independent silent reading, including sustained silent reading, Drop Everything and Read, Accelerated Reader, and various incentive programs.

Designation of students:
All ability levels, kindergarten through grade 12

Guided oral reading's effect on fluency (pp. 2, 18):
Although many studies were located, only 14 met the panel's criteria for inclusion. Twelve additional studies were also examined that considered the impact of guided oral reading on one to three students, and another 12 studies evaluated the practicality of various guided oral reading procedures.

Panel conclusion (pp. 3-5, 20):
Guided oral reading with feedback has a significant positive impact on word recognition, reading fluency, and comprehension. Guided oral reading is more effective than silent reading. The greatest impact was on reading accuracy; next was on reading fluency. Still impressive, but with less impact, was on reading comprehension. There is a close relationship between fluency and comprehension.

Teachers should assess fluency regularly.

Repeated reading and other procedures that have students read passages orally multiple times, while receiving guidance or feedback from peers, parents, or teachers, are effective in improving a variety of reading skills.

Peers, parents, or teachers were all about equally effective in their ability to provide effective feedback on oral reading. However, the studies that examined the lowest achieving readers all used teachers as the reading partner. Children who are struggling the most might benefit from more skilled guidance.

Age that benefits most (p. 17):
Attention to fluency is appropriate for all ages. There is a clear impact on the reading ability of nonimpaired readers through at least grade four, as well as on students with various kinds of reading problems throughout high school.

Effect on poor readers and good readers (p. 17):

Effects are similar for both poor and good readers.

Which Skills Improved

Decoding and word reading (p. 20):
Guiding oral reading practice exerted its greatest effect on children's ability to recognize or decode words. Words seem to be a big part of the learning that occurs during repeated reading.

Guided oral reading (p. 20):
Fluency allows children to read text more quickly and more accurately when they are asked to read aloud. Guided oral reading leads to improvement with the texts that children practice with, and skills transfer to other texts as well.

Comprehension (p. 20):
Guided oral reading improved children's ability to understand what they read. Students do better at answering questions about the stories and articles that they read, to a degree sufficient to improve standardized test performance even when texts on assessments are read silently.

Additional Studies Needed (pp. 24, 28)

Longitudinal studies are needed to examine the impact of guided oral reading on different levels of students over longer periods.

None of the studies examined extended for more than one school year. How much instruction is needed and what materials lead to the biggest gains?

The panel was unable to determine if silent reading improves fluency, as research on this is insufficient. Studies do show that the best readers read silently more frequently than do poor readers, but this may simply be because they are better at it.

Chapter 4 of *Teaching Children to Read*: Comprehension

Part I: Vocabulary Instruction

The panel found few research studies that met all its criteria for inclusion. It did a detailed review of the evidence presented in 47 studies.

Vocabulary teaching methods (pp. 1, 3, 17-18):
Explicit instruction (definitions instruction including preteaching and analysis of root words), implicit instruction (exposure to words during reading), multimedia methods (pictures, hypertext, American Sign Language), practicing to increase capacity, association (connecting what one knows to the new word).

Age, ability, and vocabulary instruction (p. 18):
As students begin to read content material, they need more instruction in vocabulary that is specific to the new material.

Computer instruction (p. 4, 19, 26):
Increases vocabulary better than traditional instruction.

Effect on comprehension (pp. 4, 20):
Vocabulary instruction leads to gains in comprehension. Preteaching of vocabulary words and repeated exposure in different contexts were found to improve vocabulary and comprehension.

Vocabulary assessments (pp. 26-27):
No single standard of vocabulary assessment emerged from the studies reviewed. However the panel concluded that appropriate conclusions about instruction are derived when the assessments match the instruction. This will provide better information about the specific learning of the students related directly to that instruction.

Effective vocabulary instruction strategies: Recommendations for teachers (pp. 4-6, 20-23, 25-27)

The panel is reluctant to name a single method of vocabulary instruction that is most effective because the studies seemed to indicate that using a variety of methods leads to increased vocabulary learning. The following concepts/methods were found to be effective:

- **Keyword method:** Children learn new words by learning a keyword "word clue" for each vocabulary word. Findings were positive. However, some studies showed gains fading after one week, and low-ability students had more difficulty with keywords than did high-ability students.
- **Incidental learning:** Most vocabulary is learned through reading or listening to others read. Some studies showed that adverbs, verbs, and adjectives that create

vivid images were most memorable. Active, student-initiated analytic talk and participation also helped motivate students and increase vocabulary learning.

- **Repeated exposure:** Using new vocabulary across the curriculum increases learning gains. Children who learned American Sign Language did better than control subjects on the Peabody Picture Vocabulary Test.
- **Preteaching of vocabulary** increases both vocabulary and comprehension gains.
- **Restructuring reading materials,** such as substituting an easier synonym for a harder word, yielded significant vocabulary gains. Making sure children not only understand the vocabulary but also the task (for instance, by restructuring through use of group learning or revised learning materials) can also lead to increased vocabulary learning. This is especially effective for low-achieving or at-risk students.
- **Context method:** Children use clues in the text to help decipher new words. Several studies indicate that a blend of direct-definition instruction and vocabulary learning through context clues is more effective than one method alone. Another group of studies, however, found that one method sometimes produces the highest gains.

Further research (pp. 4-5, 27, 96-97, 115):
Further research is needed to determine the optimal use of multimedia learning, computer use in vocabulary instruction, the vocabulary instructional needs of different age and ability levels, and the best professional development to help teachers become proficient in vocabulary instruction.

There is a high correlation between vocabulary instruction and reading comprehension. More experimental studies are needed in this promising area because it bridges early reading skill development and later comprehension training.

Part II: Text Comprehension

- Text comprehension assists in recall of information by encompassing a variety of techniques and systematic strategies such as question generation, question answering, and summarizing information. The teacher demonstrates models or guides the reader until the reader can use these skills without the assistance of the teacher. The panel reviewed 203 studies in this area.

Panel conclusion (pp. 40, 47-48, 52):
When readers are given cognitive-strategies instruction, they make significant gains on measures of reading comprehension over students trained with conventional instruction. Teaching a variety of reading comprehension strategies in natural settings and content areas leads to increased learning of the strategies, to transfer of learning, to increased memory and understanding of new passages, and, in some cases, to general improvements in comprehension. Students show noticeable improvement on standardized tests. More intensive instruction and modeling are more successful in improving reading and standardized test scores.

The panel is concerned that when comprehension skill instruction is present, teachers appear to be "mentioning" a skill to students and "assigning" it to them rather than employing the effective instruction, modeling, and transactional practices that research supports.

Effects of strategy instruction (p. 48):
When conscientious, diligent, and highly professional teachers apply strategy instruction in the classroom, even if imperfectly, their students improve in reading comprehension.

Most effective comprehension strategies (pp. 5-6, 42-47, 69-72, 75, 80, 82-83, 87-89, 91-93, 100-101, 103, 107, 110-113):

The panel identified 16 distinct areas of instruction; 8 were deemed most effective.

- **Comprehension monitoring:** Students learn to be aware of their understanding of the text and to use specific strategies when needed. Comprehension monitoring is "thinking about thinking." Comprehension monitoring instruction has positive effects on standardized reading comprehension test performance.
- **Cooperative learning:** Students work together to learn comprehension strategies. This leads to an increase in the learning of the strategies, promotes intellectual discussion, and increases reading comprehension including on standardized test performance.
- **Graphic organizers:** Students write or draw meanings and relationships of underlying ideas. Main effect appears to be in the improvement of the readers' memory for the content that has been read. Improvement is also found in social studies and science content areas.
- **Story structure:** Students ask and answer who, what, when, where, why, and how questions. They map timelines, characters, and story events. Success is more frequent with poor or below-average readers; good readers do not seem to need this kind of instruction, although there are positive results for all readers.
- **Question answering:** Teachers pose questions and guide students to correct answers, enabling them to learn more from the text. Evidence shows improvement in grades 3 through 8, although the effects were small.
- **Question generating:** Students ask themselves what, where, when, why, what will happen, how, and who questions.
- **Summarization:** Students identify and write the main ideas of a story. Studies were mostly at grades 5-6, because summarization often presupposes writing as well as reading skill. Readers improved on the quality of text summaries, identifying the main idea, and leaving out irrelevant detail. They improved in including ideas related to the main idea, generalizing, and removing redundancy. Instruction in summarizing improves recall.
- **Multiple strategies** (a blend of individual strategies used flexibly and in natural contexts): The teacher models an approach by showing how she or he would try to understand the text, using combinations of strategies. Evidence shows that actively involved, motivated readers read more text as a result of multiple strategy instruction. The panel found that in studies involving even a few hours of

preparation, instructors taught students who were poor readers but adequate decoders to apply various strategies to expository texts in reading groups, with a teacher demonstrating, guiding, modeling, and scaffolding the strategies. Even limited use of these strategies produced noticeable improvement in their use by students, although with only modest improvement on standardized test scores.

Recommendations for teachers (pp. 6, 94-95, 114):
These strategies are teachable and do improve children's comprehension and gains on comprehension tests.

Research shows that trained teachers, teaching these comprehension strategies in combination, with flexibility, and in natural settings, do improve student reading comprehension.

Some studies showed that teaching comprehension in content areas benefits readers in their social studies achievement.

Further research (pp. 6-7, 42, 52, 94, 114):
The panel found only four appropriate studies on teacher preparation for teaching comprehension strategies. The panel believes that this is an area ripe for more research.

More research is needed on teaching comprehension in the content areas, as this looks promising. Which strategies in what combination are best for various grade levels and ability levels? What are the most effective ways to train teachers, both preservice and inservice?

Part III: Teacher Preparation

- Interest in this topic is rather new, as evidenced by the few studies the panel found (four, dealing with normal readers) that met its criteria.

Direct explanation (DE; p. 122):
Teachers explain specific strategies and model them for students. Instead of teaching individual strategies, teachers help students view reading as a problem-solving task and help them think strategically to solve comprehension problems. For instance, a teacher would help a student to find the main idea of a story by casting it as a problem-solving task and reasoning about it strategically.

Transactional strategy instruction (TSI; p. 123):
This approach is similar to DE, with the difference being that the teacher acts as a facilitator. The students collaborate to interpret text and discuss explicit strategies used in comprehending text.

Panel findings (pp. 123-126):
Results of all the studies show clearly that teachers can learn to teach comprehension

strategies effectively and that the use of these strategies improves students' reading comprehension. With TSI, significantly more students of trained teachers (80%) made gains on a reading comprehension subtest than did students of other teachers (50%). This suggests that preparation given the teachers was effective in improving reading comprehension performance. The amount of gain was not reported.

In a TSI program called SAIL, teachers learned to use direct explanation, teacher modeling, coaching, and scaffolding practices, with an emphasis on collaborative discussion among teacher and students. Students did better on literal recall of story content, and their recall was more interpretive. They used more strategies on their own on think-aloud tasks, and showed overall greater improvement than the students of the other teachers, outperforming the control groups at posttest.

In general, the studies indicate that instructional methods that generate high levels of student involvement and engagement during reading can have positive effects on reading comprehension. Teaching comprehension strategies effectively involves substantial and intensive teacher preparation. Intensive instruction of teachers can prepare them to teach reading comprehension strategically. Such teaching can lead students to greater awareness of what it means to be a strategic reader, and to the goal of improved comprehension.

Teachers help students by (p. 125):

- Explaining fully what it is they are teaching—what to do, why, how, and when
- Modeling their own thinking processes
- Encouraging students to ask questions and discuss possible answers among themselves
- Keeping students engaged in their reading via providing tasks that demand active involvement.

The appropriate comprehension assessment (p. 125):

- Is of the students' reading achievement and
- Shows how interested students are in reading
- Indicates how satisfied the teachers are with their instructional methods

Need for further research (p. 126):
Further research in this area could focus on effective components of teacher preparation; whether comprehension instruction can be successfully incorporated into content instruction; and how best to assess strategy instruction—through reading achievement assessments, or subject matter achievement?

Chapter 5 of *Teaching Children to Read*: Teacher Education and Reading Instruction

Preservice studies (p. 5):
The focus of the 11 reviewed preservice studies was almost entirely on changing teacher behavior, with little focus on the outcomes of students who are eventually instructed by those teachers. Preparation of teachers for comprehension instruction at the preservice level requires extended training with ongoing support.

Inservice studies (pp. 6, 12):
For the 21 inservice studies reviewed, the ultimate test of success was whether students benefit from instruction delivered by teachers as a result of that intervention. One clear trend of inservice instruction was that where teacher outcomes showed significant improvement, so did student achievement. One can conclude that inservice professional development does lead to improved teacher knowledge and practice, and improved student achievement.

Positive outcomes of teacher education and reading instruction (p. 14):
The panel found that improvement in teaching leads directly to higher achievement on the part of students. Most of the research that measured attitudes demonstrated that teacher attitudes did change as a result of the interventions. Teacher practices improved as a result of teacher education. Student achievement outcomes can be improved as a result of teacher development. However, sustainability of the student improvement was not addressed.

Technology and teacher education (p. 16):
The panel found seven studies that used various forms of technology to improve teacher education. Computers have made video modeling and simulation more available.

Need for further research (pp. 2, 13):
Little research exists in this area. More needs to be done to pinpoint what makes training most effective, but research indicates that training both new and established teachers yields higher student achievement. The panel found a need for more interactions between teachers and researchers. The panel found no research in the sample that addresses the question of the relationship between the development of standards and teacher education or professional development.

Chapter 6 of *Teaching Children to Read*: Computer Technology and Reading Instruction

Need for more research (pp. 2, 9):
More research needs to be done in this relatively new area. From the 21 studies reviewed, however, it appears that teachers can use computers to successfully deliver a variety of types of reading instruction.

Areas showing initial positive effects (p. 2):
Since reading instruction is most effective when combined with writing instruction, word processing software can be helpful. Also, hypertext (highlighted text that links to definitions or related text) may be useful. All studies in the analysis reported positive results.

Motivation (p. 7):
Reading instruction can make good use of the motivational aspects of computers and software.

Additional Resources

Find publications from the National Reading Panel at the website of the National Institutes of Health: www.nichd.nih.gov/publications/pubskey.cfm?from=nrp

Visit IRA's website at www.reading.org to find these resources on the work of the National Reading Panel and on specific topics covered in the panel's report:

- *Evidence-Based Reading Instruction: Putting the National Reading Panel Report Into Practice*, a collection of readings from The Reading Teacher
- *What Is Evidence-Based Reading Instruction?* (position statement)
- "The National Reading Panel: Using Research to Create More Literate Students," by Timothy Shanahan (in *Reading Online*)
- "The National Reading Panel Report" [essay book review], by James W. Cunningham (in *Reading Research Quarterly*)

- Focus on Beginning Readers
- *Phonemic Awareness and the Teaching of Reading* (position statement)
- *The Role of Phonics in Reading Instruction* (position statement)
- "Phonemic Awareness Instruction Helps Children Learn to Read: Evidence from the National Reading Panel's Meta-Analysis," by Linnea C. Ehri et al. (in *Reading Research Quarterly*)
- "Oral Reading in the School Literacy Curriculum" [Theory and Research Into Practice], by Timothy V. Rasinski and James V. Hoffman (in *Reading Research Quarterly*)
- Focus on Reading Comprehension
- Focus on Teacher Education
- *Prepared to Make a Difference* (report of the National Commission on Excellence in Elementary Teacher Preparation for Reading Instruction)
- *Standards for Reading Professionals*
- Focus on Technology
- *Integrating Literacy and Technology in the Curriculum* (position statement)