RAND Research Brief
EDUCATION

Developing an R&D Program to Improve Reading Comprehension

In 1999, the Office of Educational Research and Improvement (OERI, now the Institute of Education Sciences) of the U.S. Department of Education charged the RAND Reading Study Group (RRSG) with developing a research agenda to address the most pressing issues in literacy. The decision to focus this research agenda proposal on reading comprehension in particular was motivated by a number of factors:

- All high school graduates are facing an increased need for a high degree of literacy, but reading comprehension outcomes are not improving.
- Students in the United States are performing increasingly poorly in comparison with students in other countries as they enter the later years of schooling.
- Unacceptable gaps in reading performance persist between children in different demographic groups.
- Little direct attention has been devoted to helping teachers develop the skills they need to promote reading comprehension, ensure content learning through reading, and deal with the differences in comprehension skills that their students display.
- Many current programs that are intended to improve reading comprehension are neither based on empirical evidence nor adequately evaluated.

The RRSG believes that a vigorous and cumulative research and development (R&D) program focused on reading comprehension is essential if the nation is to address these education problems successfully.

The Interagency Education Research Initiative—funded jointly by the National Science Foundation, OERI, and the National Institute of Child Health and Human Development—is sponsoring efforts that bring early research to scale with some emphasis on the use of technology. The reading research program proposed by the RRSG in its report (RAND Reading Study Group, Catherine Snow, Chair, *Reading for Understanding: Toward an R&D Program in Reading Comprehension*, RAND, MR-1465-OERI, 2002) seeks to fill the gaps left by existing research efforts while being organized around a central set of issues facing practitioners.

The program of reading research that the RRSG proposes fits into the overall context of research on reading in the United States and is part of a larger RAND effort to suggest ways that education R&D can be made more rigorous, cumulative, and usable. (For a report on R&D in mathematics education, see RAND Mathematics Study Panel, Deborah Loewenberg Ball, Chair, *Mathematical Proficiency for All Students: Toward a Strategic Research and Development Program in Mathematics Education*, RAND, MR-1643-OERI, 2003.)

A HEURISTIC FOR THINKING ABOUT READING COMPREHENSION

The RRSG defined *reading comprehension* as the process of simultaneously extracting and constructing meaning through interaction and involvement with written language. Reading comprehension consists of three elements: the *reader*, the *text*, and the *activity* of reading. The RRSG developed a heuristic to show how these elements interrelate in reading comprehension. This three-way interrelationship occurs within a larger sociocultural context that shapes and is shaped by the reader and that interacts with each of the elements iteratively throughout the process of reading (see the figure on the next page).

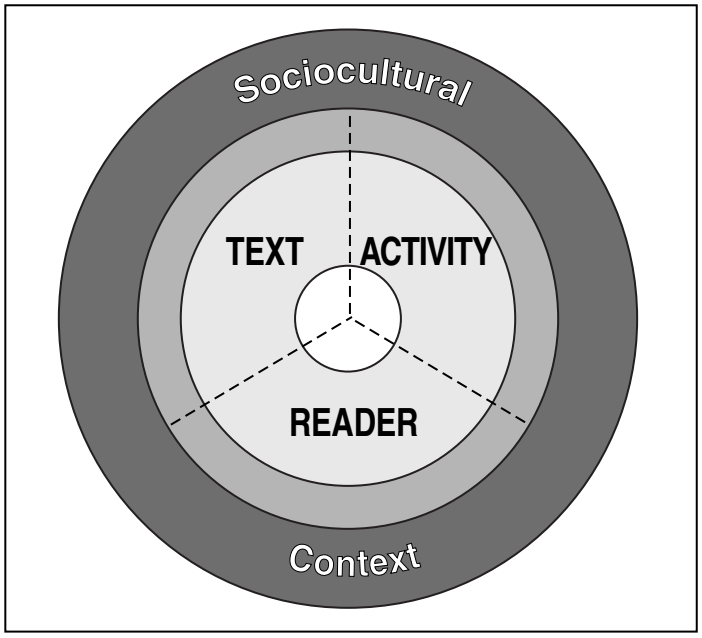
The Reader

The reader brings to the act of reading his or her cognitive capabilities (attention, memory, critical analytic abil-

ity, the process of inferring, visualization); motivation (a purpose for reading, interest in the content, self-efficacy as a reader); knowledge (vocabulary and topic knowledge, linguistic and discourse knowledge, knowledge of comprehension strategies); and experiences. These attributes vary considerably among readers and even within an individual reader as a function of the particular text being read and the reading activity.

The Text

The features of any written text have a large impact on comprehension. In the course of reading, the reader constructs various representations of the text that are important for comprehension. Those representations include the surface code (the exact wording of the text), the text base (idea units representing the meaning of the text), and the mental models (the way in which information is processed for meaning) that are embedded in the text. Electronic text presents particular challenges to comprehension (e.g., challenges stemming from the nonlinear nature of hypertext), but it also offers the potential to support comprehension by providing links to definitions of unknown words or to other supplementary material.



A Heuristic for Thinking About Reading Comprehension

The Activity

The reading activity includes one or more purposes or tasks, some operations to process the text, and the outcomes of performing the activity, all of which occur within some specific context. Processing the text involves decoding the text, some higher-level linguistic and semantic processing, and self-monitoring for comprehension—all of which depend on the reader's capabilities as well as on the various features of the text. Each element of text processing has varying degrees of importance depending on the type of reading being done, such as skimming (getting just the gist of the text) or studying (reading the text with the intent of retaining the information for a period of time). Finally, the outcomes of reading are part of the activity. The outcomes can include an increase in knowledge, a solution to some real-world problem, and/or engagement with the text. The long-term outcomes of reading—improved reading comprehension ability, increased knowledge, and engagement with the text—are of the greatest direct relevance to educators.

The Context

When one thinks of the context in which reading is taught, the first thing that comes to mind is the classroom setting. But the learning process for reading takes place within a context that extends far beyond the classroom. In fact, differences among readers can, to some extent, be traced to the varying sociocultural environments within which children live and learn to read. Learning and literacy are viewed partly as cultural activities, not just because they are acquired through social interactions but also because they are an indication of how a specific cultural group or discourse community interprets the world and transmits information. Sociocultural differences are often correlated with group differences. Groups may be identified by income, race, ethnicity, native language, or neighborhood.

AN AGENDA FOR RESEARCH ON READING COMPREHENSION

Research has shown that many children who read at the third-grade level in Grade 3 will not automatically become proficient comprehenders in later grades. Therefore, teachers must teach comprehension explicitly, beginning in the primary grades and continuing through high school. Research has also shown that a teacher's expertise makes a big difference in this effort; yet few teachers receive adequate pre-service preparation or ongoing professional development focused on reading comprehension. Finally, research has also shown that improving reading comprehension and preventing poor reading outcomes require measuring outcomes at every stage of learning. Therefore, the RRSG proposes three specific domains as having the highest priority for further research: instruction, teacher preparation, and assessment. In making this proposal, the RRSG emphasizes the need for research that (1) builds on previous research findings on reading comprehension, (2) contributes to better theories of reading development, and (3) produces knowledge that is usable in both classrooms and policymaking arenas.

Research on Reading Instruction

Good instruction is the most powerful means of promoting the development of proficient comprehenders and preventing reading comprehension problems. A good teacher makes use of practices that employ his or her knowledge about the complex and fluid interrelationships among readers, texts, purposeful activities, and contexts to advance students' thoughtful, competent, and motivated reading. Instructional research must acknowledge the complexity of these interrelationships if it is to generate knowledge that is usable in real-life classrooms. Given what is already known about how students learn to read and reading instruction, the RRSG identified some urgent questions related to reading instruction that need to be answered, such as:

- Would simply increasing the amount of time devoted to comprehension instruction while continuing to use practices that are currently in place improve outcomes?
- How does the teaching community ensure that all children have the vocabulary and background knowledge they need to comprehend certain content areas and advanced texts?
- How can excellent, direct comprehension instruction be embedded into content instruction that uses inquiry-based methods and authentic reading materials?
- How do national, state, and local policies and practices facilitate or impede the efforts of teachers to implement effective comprehension instruction?

Teacher Preparation and Professional Development in Reading Comprehension

Past research has highlighted the importance of teacher quality as a critical variable in student achievement. Research has also shown that well-designed teacher preparation programs have a positive effect on reading outcomes. But some critical questions have not been answered by that research:

- What knowledge base (e.g., regarding language development, sociolinguistics, multiculturalism, reading development) do teachers need to provide effective reading comprehension instruction?
- What is the relative power of various instructional delivery systems (e.g., field-based experiences, video-based cases, demonstration teaching, microteaching) for helping teachers acquire the knowledge and skills they need to successfully teach comprehension to students of different ages and in different contexts?

We know that the expertise of the teacher is an important component of reading instruction outcomes, but some questions on teacher expertise still need to be addressed:

- What content (i.e., knowledge about readers, text, tasks, and contexts) and sequencing of content are present in effective professional development programs?
- What are the critical components of professional development that lead to effective instruction and sustained change in teachers' practices?

Assessment of Reading Comprehension

The RRSG proposes an approach to assessment of reading comprehension that differs from current approaches in that it is based on an appropriately rich and elaborate theory of reading comprehension. The assessment procedures in this approach will be fluid, and they will change as more is learned from the research. And because comprehensive assessment systems can place significant time demands on students and teachers, the education community has an obligation to develop assessments that are an integral part of and supportive of instruction, rather than limited to serving the needs of researchers.

Teachers who are interested in improving their instruction need reliable and valid assessments that are closely tied to their curricula so that they can identify those students who are learning and those who need extra help. Knowledge, application, and engagement are all critical outcomes of reading with comprehension; assessments that reflect all three of these outcomes are needed.

Given this analysis, two important questions about assessment need to be answered:

- What would it take to design valid and reliable measures that teachers can administer in the classroom to inform their instructional decisions and to identify children who may need additional instruction?
- What would it take to design measures of reading comprehension for all readers that are sensitive to instructional interventions as well as to specific forms of reading instruction?

RECOMMENDED IMPROVEMENTS TO MAKE THE PROPOSED RESEARCH PROGRAM FEASIBLE

For the RRSG's proposed research program to develop to the point that it can actually improve comprehension outcomes, the research program infrastructure will need to be bolstered in a number of ways and be provided with substantial, long-term funding. The program will require a cadre of well-trained investigators. Research solicitations must be thoughtful, scholarly, and responsive to the intellectual resources available within the research community. The rigor and quality of the research review must be sustained, a process that will require training reviewers and maintaining a systematic review system.

Current expenditures on education R&D are only 0.3 percent of the total national expenditures for K–12 education, a percentage far less than that devoted to R&D in other fields, such as health. The RRSG believes that the investment in education R&D should be expanded to 2 to 3 percent of the total expenditures for K–12 education, a figure more comparable to the R&D expenditures in other fields. The additional R&D dollars would enormously enhance the value of the funds that are already being expended on school improvement, special education, bilingual education, professional development, and curriculum development. As such, the additional dollars spent on R&D will represent a productive investment in the education of the nation's schoolchildren.

RAND research briefs summarize research that has been more fully documented elsewhere. This research brief summarizes work done within RAND Education and RAND Science and Technology Policy Institute for the U.S. Department of Education's Office of Educational Research and Improvement. The work is documented in Reading for Understanding: Toward an R&D Program in Reading Comprehension *by the RAND Reading Study Group, Catherine Snow, Chair, MR-1465-OERI, 2002, 182 pp., $20.00, ISBN: 0-8330-3105-8, available from RAND Distribution Services (Telephone: 310-451-7002; toll free 877-584-8642; FAX: 310-451-6915; or email: order@rand.org). Building on more than 25 years of research and evaluation work, RAND Education has as its mission the improvement of educational policy and practice in formal and informal settings from early childhood on. A profile of RAND Education, abstracts of RAND documents, and ordering information may be viewed at www.rand.org. Publications are distributed to the trade by NBN. RAND® is a registered trademark. RAND is a nonprofit institution that helps improve policy and decisionmaking through research and analysis; its publications do not necessarily reflect the opinions or policies of its research sponsors.*

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RB-8024-OERI (2003)