Beyond Comprehension
We Have Yet to Adopt a Common Core Curriculum That Builds Knowledge Grade by Grade—but We Need To

By E. D. Hirsch, Jr.

The prevailing view of the American educational community is that no specific background knowledge is needed for reading. Any general background knowledge will do. This innocent-sounding idea, so liberating to the teacher and the student, frees schools from any requirement to teach a specific body of knowledge. This purported liberation from “mere” information and rote learning is one of the most precious principles of American educational thought, and lies at its very core. Its proponents disparage those who favor a definite, cumulative course of study for children as “traditional,” “hidebound,” and “reactionary,” to mention only the more polite terms.

Yet the supposedly liberating and humane idea that any general background knowledge will serve to educate children and make them proficient readers is not only incorrect, it is also very old and tired; it has had its day for at least half a century, during which time American reading proficiency and verbal SAT scores have declined drastically.1 (For a detailed explanation of the drop in SAT scores, see Marilyn Jager Adams’s article on page 3.) Scapegoats for the decline, such as television and social forces, have been invoked to explain it, but they cannot fully explain why other nations, equally addicted to television but not to American educational theories that disparage “mere” information, have not suffered a similarly drastic decline in reading proficiency.2

It is true that given a good start in decoding, a child will develop fluency and accuracy in decoding with practice. And it is also true that decoding is a skill that can be transferred from

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one text to another. But the progress of a child’s reading comprehension is different. That progress does not follow a reliable course of development. Because comprehension is knowledge dependent, someone who reads well about the Civil War may not necessarily read well about molecular interactions.

One particularly elegant experiment was conducted to find out how important domain-specific knowledge is in actual reading tasks. In two of the groups of students studied, one had good decoding skills but little knowledge of the subject, baseball, while another had poor decoding skills but knew a lot about baseball. As predicted, the reading comprehension of the low-skills, baseball-knowing group proved superior to the reading comprehension of the high-skills, baseball-ignorant group. These results have been replicated in other situations and knowledge domains; they show the powerful effect of prior knowledge on actual reading ability.

**Faulty Ideas**

Most current reading programs talk about “activating” the reader’s background knowledge so she can comprehend a text. But in practice, they are only paying lip service to the finding that background knowledge is essential to reading comprehension. Little attempt is made to enlarge children’s background knowledge—and, as a direct result, little is accomplished in terms of expanding children’s ability to comprehend more complex and varied texts. The disjointed topics and stories that one finds in current reading programs, such as “Going to School” and “Jenny at the Supermarket,” seem designed mainly to appeal to the knowledge that young readers probably already have.

For decades, most professional educators have believed that reading is an all-purpose skill that, once learned, can be applied to all subjects and problems. A specific, fact-filled, knowledge-building curriculum, they hold, is not needed for gaining all-purpose cognitive skills and strategies. Instead of burdening our minds with a lot of supposedly dead facts, they call for us to become expert in solving problems, in thinking critically—in reading fluently—and then we will be able to learn anything we need.

This idea sounds plausible. (If it did not, it could not have so thoroughly captured the American mind.) Its surface plausibility derives from the fact that a good education can indeed create very able readers and critical thinkers. The mistake is to think that these achievements are the result of acquiring all-purpose skills rather than broad factual knowledge. As the study of students’ abilities to comprehend a text about baseball demonstrated, reading and critical thinking are always based on concrete, relevant knowledge and cannot be exercised apart from what psychologists call “domain-specific” knowledge.

The idea that reading with comprehension is largely a set of general-purpose skills and strategies that can be applied to any and all texts is one of the main barriers to our students’ achievement in reading. It leads to activities (like endless drilling in finding the main idea) that are deadening for agile and eager minds, and it carries big opportunity costs. These activities actually slow down the acquisition of true reading ability; they take up time that could be devoted to gaining general knowledge, which is the central requisite for high reading ability.

Most current reading programs do not prepare students for high school, higher education, the workplace, or citizenship because they do not make a systematic effort to convey coherently, grade by grade, the knowledge that books (including high school textbooks), newspapers, magazines, and serious radio and TV programs assume American readers and listeners possess. (Every newspaper, book, and magazine editor, and every producer for radio and TV is conscious of the need to distinguish what can be taken for granted from what must be explained. The general reader or listener that every journalist or TV newscaster must imagine is somebody whose relevant knowledge is assumed to lie between the total ignorance of a complete novice and the detailed knowledge of an expert.)

**How Much Knowledge Do We Need?**

Here is the first paragraph of an article by Janet Maslin, taken at random from the books section of the New York Times on February 6, 2003. It is an example of writing addressed to a general reader that a literate American high school graduate would be expected to understand.

When Luca Turin was a boy growing up in Paris, according to Chandler Burr’s ebullient new book about him, “he was famous for boring everyone to death with useless, disconnected facts, like the distance between the earth and the moon in Egyptian cubits.” Mr. Burr sets out to explain how such obsessive curiosity turned Mr. Turin into a pioneering scientist who, in the author’s estimation, deserves a Nobel Prize.

This example shows that the background knowledge required to understand the general sections of the New York Times, such as the book review section, is not deep. It is not that of an expert—of course not, for we cannot all be experts on the diverse subjects that are treated by books. If authors want their books to be sold and read, they must not assume that their readers are experts. They may take for granted only the relevant background knowledge that a literate audience can be expected to possess.

What do readers need to know in order to comprehend this passage? We need to know first that this is a book review, which aims to tell us what the book is about and whether it is worth reading. We need to understand that the reviewer is favorably disposed to the book, calling it “ebullient,” and that it is a nonfiction work about a scientist named Luca Turin. We need to have at least a vague semantic grasp of key words like ebullient, boring,
Effectively teaching reading requires schools to systematically teach the diverse, enabling knowledge that reading with comprehension requires.

implications for education, and for democracy as well. A universal ability of citizens to read newspapers or their equivalent with understanding is the essence of democracy. Thomas Jefferson put the issue unforgottably: “The basis of our government being the opinion of the people, the very first object should be to keep that right; and were it left to me to decide whether we should have a government without newspapers or newspapers without a government, I should not hesitate a moment to prefer the latter. But I should mean that every man should receive those papers and be capable of reading them.” The last phrase, “be capable of reading them,” is often omitted from the quotation, but it is the crucial one. Reading achievement will not advance significantly until schools recognize and act on the fact that it depends on the possession of a broad but definable range of diverse knowledge. Effectively teaching reading requires schools to systematically teach the diverse, enabling knowledge that reading with comprehension requires.

What Knowledge Do We Need?

But what exactly does that enabling knowledge comprise? That is the nuts-and-bolts question. The practical problem of helping all students achieve adequate reading comprehension depends on our schools being able to narrow down what seems at first glance to be vast amounts of heterogeneous information into a teachable repertory that will enable students to understand the diverse texts addressed to the average citizen. Our sketch of the background knowledge needed to understand Maslin’s short passage offers clues to the kind of instruction needed to advance general reading comprehension ability. It will be broad instruction in the worlds of nature and culture as a necessary platform for gaining deeper knowledge through listening and reading. But what, exactly, should that broad general knowledge be?

My colleagues Joseph Kett and James Treffil and I set out to answer that question back in the 1980s. We asked ourselves, “In the American context, what knowledge is taken for granted in the classroom, in public orations, in serious radio and TV, in books and magazines and newspapers addressed to a general audience?” We considered various scholarly approaches to this problem. One was to look at word frequencies. If a word appeared in print quite often, then its meaning was probably not going to be explained by the writer. We looked at a frequency analysis of the Brown Corpus, a collection of passages from very diverse kinds of publications that was lodged at Brown University, but we found that this purely mechanical approach, while partially valid, did not yield altogether accurate or intelligent results. For example, because the Brown Corpus was compiled in the 1950s, “Nikita Khrushchev” was a more frequent vocabulary item than “George Washington.”

A much better way of finding out what knowledge speakers and writers take for granted is to ask them whether they assume specific items of knowledge in what they read and write. This direct approach proved to be a sounder way of determining the tacit knowledge, because what we must teach students is the knowledge that proficient readers and writers actually use. From people in every region of the country we found a reassuring amount of agreement on the substance of this taken-for-granted knowledge.

We had predicted this agreement. The very nature of communicative competence, a skill that successful teachers, reporters, doctors, lawyers, book club members, and writers have already shown themselves to have, requires that it be widely shared within the speech community. Shared, taken-for-granted background knowledge is what makes successful communication possible. Several years after our compilation of such knowledge was published, independent researchers investigated whether reading comprehension ability did in fact depend on knowledge of the topics we had set forth. The studies showed an unambiguous correlation between knowledge of these topics and reading comprehension scores, school grades, and other measures of reading ability. One researcher investigated whether the topics we set forth as taken-for-granted knowledge are in fact taken for granted in newspaper texts addressed to a general reader. He examined the New York Times by computer over a period of 101 months and found that “any given day’s issue of the Times contained approximately 2,700 occurrences” of these unexplained terms, which “play a part in the daily commerce of the published language.”

An inventory of the tacit knowledge shared by good readers and writers cannot, of course, be fixed at a single point in time. The knowledge that writers and radio and TV personalities take for granted is constantly changing at the edges, especially on issues of the moment. But inside the edges, at the core, the body of assumed knowledge in American public discourse has remained stable for many decades. This core of knowledge changes very slowly, as sociolinguists have pointed out. If we
want to bring all students to reading proficiency, this stable core is the enabling knowledge that we must teach.

That’s more easily said than done. One essential, preliminary question that we faced was this: how can this necessary knowledge be sequenced in a practical way for use in schools? We asked teachers how to present these topics grade by grade and created working groups of experienced teachers in every region of the country to produce a sequence independently of the others. There proved to be less agreement on how to present the material grade by grade than there had been in identifying what the critical topics are. That difficulty too was predicted, since the sequencing of many topics is inherently arbitrary. While it’s plausible that in math, addition needs to come before multiplication, and that in history, Greece probably ought to come before Rome, maybe it’s not plausible that Greece should come before George Washington.

We collected the accumulated wisdom of these independent groups of teachers, made a provisional draft sequence, and in 1990 held a conference where 145 people from every region, scholarly discipline, and racial and ethnic group got together to work extremely hard for two and a half days to agree on an intelligent way to teach this knowledge sequentially. Over time, this Core Knowledge Sequence has been refined and adjusted, based on actual classroom experience. It is now used in several hundred schools (with positive effects on reading scores), and it is distinguished among content standards not only for its interest, richness, and specificity, but also because of the carefully thought-out scientific foundations that underlie the selection of topics. (The Core Knowledge Sequence is available online at www.coreknowledge.org.)

Today, in response to requests from educators, the Core Knowledge Foundation offers a range of instructional supports, including detailed teacher guides, a day-by-day planner, and an anthology of African American literature, music, and art. And, as shown over pages 37 to 43, we are now offering a complete language arts program for kindergarten through second grade. This program, which was pilot tested in 17 urban, suburban, and rural schools, addresses both the skills and the knowledge that young children need to become strong readers and writers. This new program is our attempt to reconceive language arts as a school subject. In trying to make all students proficient readers and writers, there is no avoiding the responsibility of imparting the specific knowledge they will need to understand newspapers, magazines, and serious books. There is no successful shortcut to teaching and learning this specific knowledge—and there is nothing more interesting than acquiring broad knowledge of the world. The happy consequence is a reading program that is much more absorbing, enjoyable, and interesting than the disjointed, pedestrian programs offered to students today.

Most current programs assume that language arts is predominantly about “literature,” which is conceived as poems and fictional stories, often trivial ones meant to be inoffensive vehicles for teaching reading skills. Stories are indeed the best vehicles for teaching young children—an idea that was ancient when Plato reasserted it in The Republic. But stories are not necessarily the same things as ephemeral fictions. Many an excellent story is told about real people and events, and even stories that are fictional take much of their worth from the nonfictional truths about the world that they convey.

The new Core Knowledge language arts program contains not only fiction and poetry, but also narratives about the real worlds of nature and history. Since word learning occurs much faster in a familiar context, the program stays on each selected subject-matter domain long enough to make it familiar. Such integration of subject-matter content in reading classes enriches background knowledge and enlarges vocabulary in an optimal way.

**Constantly Changing Schools—A Critical Issue**

Thus far, I’ve mostly been explaining the need for a fact-filled, knowledge-building curriculum. But the critical issue of student mobility demands more than just each school adopting or adapting such a curriculum. If we are really to serve all of our children to the best of our ability, then nothing short of a common curriculum—one shared by all schools—will do.

Mobility is a term to denote students’ moving from one school to another in the middle of the year. The percentage of economically disadvantaged students who migrate during the school year is appallingly high, and the effects are dishearteningly severe. One study has analyzed those effects on 9,915 children. With this large group, the researchers were able to factor out the influences of poverty, race, single-parent status, and lack of parental education in order to isolate just the effects of changing schools.
Mathematical Ability Relies on Knowledge, Too

BY JOHN SWELLER, RICHARD E. CLARK, AND PAUL A. KIRSCHNER

Problem solving is central to mathematics. Yet problem-solving skill is not what it seems. Indeed, the field of problem solving has recently undergone a surge in research interest and insight, but many of the results of this research are both counterintuitive and contrary to many widely held views. For example, many educators assume that general problem-solving strategies are not only learnable and teachable but are a critical adjunct to mathematical knowledge. The best-known exposition of this view was provided by the mathematician George Pólya. He discussed a range of general problem-solving strategies, such as encouraging mathematics students to think of a related problem and then solve the current problem by analogy, or to think of a simpler problem and then extrapolate to the current problem. The examples Pólya used to demonstrate his problem-solving strategies are fascinating, and his influence probably can be sourced, at least in part, to those examples. Nevertheless, in over a half century, no systematic body of evidence demonstrating the effectiveness of any general problem-solving strategies has emerged. It is possible to teach learners to use general strategies such as those suggested by Pólya, but that is insufficient. There is no body of research based on randomized, controlled experiments indicating that such teaching leads to better problem solving.

Recent “reform” curricula both ignore the absence of supporting data and completely misunderstand the role of problem solving in cognition. If, the argument goes, we are not really teaching people mathematics but rather are teaching them some form of general problem solving, then mathematical content can be reduced in importance. According to this argument, we can teach students how to solve problems in general, and that will make them good mathematicians able to discover novel solutions irrespective of the content.

We believe this argument ignores all the empirical evidence about mathematics learning. Although some mathematicians, in the absence of adequate instruction, may have learned to solve mathematics problems by discovering solutions without explicit guidance, this approach has never been the most effective or efficient way to learn mathematics.

The alternative route to acquiring problem-solving skill in mathematics derives from the work of a Dutch psychologist, Adriaan de Groot, investigating the source of skill in chess. Researching why chess masters always defeated weekend players, de Groot managed to find only one difference. He showed masters and weekend players a board configuration from a real game, removed it after five seconds, and asked them to reproduce the board. Masters could do so with an accuracy rate of about 70 percent compared with 30 percent for weekend players. Other researchers replicated these results and additionally demonstrated that when the experiment was repeated with random configurations, rather than real-game configurations, masters and weekend players had equal accuracy (roughly 30 percent). Masters were superior only for configurations taken from real games.

Chess is a problem-solving game whose rules can be learned in about 30 minutes. Yet it takes at least 10 years to become a chess master. What occurs during this period? When studying previous games, chess masters learn to recognize tens of thousands of board configurations and the best moves associated with each configuration. The superiority of chess masters comes not from having acquired clever, sophisticated, general problem-solving strategies, but rather from having...
Long-term memory is not used to store isolated facts, but to store huge complexes of integrated information that results in problem-solving skill. That skill is knowledge domain-specific, not domain-general.

Endnotes

the spring—a mobility rate of 50 percent.12 Given the curricular incoherence in a typical American school (in which two fourth-grade classrooms may cover completely different content), the education provided to frequently moving students is tragically fragmented. The high mobility of low-income parents guarantees that disadvantaged children will be most severely affected by the educational handicaps of changing schools, and that they will be the ones who are most adversely affected by lack of commonality across schools.

The finding that our mobile students (who are preponderantly from low-income families) perform worse than stable ones does not mean that their lower performance is a consequence of poverty. That is to commit the fallacy of social determinism. Where there is greater commonality of the curriculum, the effects of mobility are less severe. In a summary of research on student mobility, Herbert Walberg states that "common learning goals,
The chief cause of our schools’ inefficiency is curricular incoherence. At the beginning of the year, the teacher cannot be sure what the entering students know.