# Creating Better Readers and Writers

*The Importance of Direct, Systematic Spelling and Handwriting Instruction in Improving Academic Performance*

*By J. Richard Gentry, Ph.D., and Steve Graham, Ed.D.*

SAPERSTEIN ASSOCIATES

**White Paper**
Fall 2010

# White Paper

## Creating Better Readers

*"No subject of study is more important than reading . . . all other intellectual powers depend on it."*

—Jacques Barzun, cultural historian and former Columbia University dean

### *Literacy: The Foundation of Education*

Reading is at the heart of education, the basic skill upon which all others are built. Learning to read and write provides the foundation for both academic and economic success. The vast and ever-expanding array of human knowledge, particularly in the sciences and technologies, means that today's students must master increasingly complex skills throughout their lives to compete effectively in the 21st century global economy.

Learning to write letters and spell words reinforces the letter-naming, phonemic, and word-deciphering skills required in developing literacy.[1] This instruction assists children in developing the pre-reading skills associated with proficient reading by the end of the first or second grade: phonological awareness, letter identification, and vocabulary development.[2] Further, students' reading skills and comprehension are improved by learning the skills and processes that go into creating text.[3]

An extensive and evolving body of research shows that direct and explicit spelling and handwriting instruction is required if all students are to master the mechanics of reading and writing—which is not only a requirement of federal and state legislation, but also a critical goal for a nation whose economy has transitioned from a manufacturing to a knowledge base. As these skills become automatic, students are freer to concentrate on the higher-level thinking and communication skills needed for success in school and life.

### *The Science of Spelling and Literacy*

Today, a catalog of research in education, psychology, and neurology—including brain-scanning studies[4] —supports the central role that spelling plays in learning to read and write proficiently. This research clearly documents that knowledge of spelling is connected to reading, writing, and vocabulary development because they all depend on the same language abilities.[5]

---

[1] Virginia Berninger and others, "Treatment of Handwriting Problems in Beginning Writers: Transfer from Handwriting to Composition." *Journal of Educational Psychology* 89 (1997): 652-666.

[2] Hollie Scarborough, "Predicting the Future of Achievement of Second Graders with Reading Disabilities: Contributions of Phonemic Awareness, Verbal Memory, Rapid Serial Naming, and IQ." *Annals of Dyslexia* 68 (1998): 115-136.

[3] Steve Graham and Michael Hebert, "Writing to Read: Evidence for How Writing Can Improve." *Carnegie Corporation Time to Act Report* (2010), 4.

[4] Gentry, *Breaking the Code*, 7-9; Joshi and others, "How Words Cast Their Spell," 6-16, 42-43.

[5] Snow and others, *Knowledge to Support the Teaching of Reading, 8*5.

## Spelling Must Be Taught—Not Caught

Even though spelling is powerfully connected to reading and writing, it is best taught as a standalone subject. As reported by researcher Linda Allal, a sizable number of spelling studies support direct instruction, while "approaches integrating spelling acquisition in text production (integrated approaches) do not yet constitute a well-recognized instructional option validated by long-term empirical research in the classroom."[6] Although students acquire some spelling knowledge while reading and writing, this process should be augmented by direct instruction that teaches students to examine words in and of themselves.[7] A self-contained basal spelling program that teaches students to spell words from a research-based, grade-by-grade spiraling curriculum based on spelling patterns and words used in student writing is more efficient than learning from context.[8]

Research provides clear evidence that spelling should be taught systematically. The right words and patterns must be presented at the right time in the student's development. Just as a teacher matches "just-right" books to each student for independent reading, he or she must match the right spelling words with each class.[9]

Components of an effective spelling curriculum include[10]:

- Research-based, developmentally appropriate word lists designed specifically for students at each grade level
- A bound print or cohesive electronic student text with a grade-level specific spelling dictionary and thesaurus, with assignments that can be teacher-directed or assigned for independent completion
- Direct, explicit instruction in short, 10- to 15-minute sessions daily or several times a week, using a pretest/study/posttest format
- Strategies and materials to teach children self-correction techniques and how to study unknown words
- Word sorting exercises, spelling games, and board games
- Differentiation and modification to support and challenge students at all proficiency levels, and
- Technology to enhance instruction, practice, and data management.

**A Brief History of U.S. Spelling Instruction and Literacy**

For the first two centuries of American education, spelling was the backbone of reading instruction. At a time when teachers had relatively little formal training and few tools besides a blackboard and a few standard textbooks, Americans became increasingly literate. Between 1870 and 1979, the nation's literacy rate increased from 80 to 99.6 percent.[11]

By the 1980s, however, a trend away from direct, explicit spelling instruction began with the theory that teachers didn't have to teach spelling directly, because this knowledge would ultimately be "caught" as children immersed themselves in reading and writing.[12]

There is considerable evidence that this approach failed to instill literacy in millions of children (now adults). Notably, in school districts in which teachers stopped paying attention to spelling, test scores dropped and schools began to experience failure with literacy education.[13] For example, California led the country in 1987 in adopting a literature-based elementary curriculum. The state went so far as to ban spelling books from the required textbook list.[14] But by 1994 California's fourth grade proficiency scores had slid almost to the bottom of the 41 states and territories that participated in the 1994 National Assessment of Education Progress.[15]

As a result, an increasing number of parents advocate a "back to basics" approach to literacy and strongly desire spelling, phonics, and handwriting instruction for their children.[16]

[6] Allal, "Learning to Spell in the Classroom," 145.
[7] Gentry, *The Science of Spelling,* 7.
[8] Ibid., 55.
[9] Ibid., 59.
[10] Ibid., 56.
[11] Thomas Snyder, ed., *120 Years of Literacy* (Washington, D.C.: National Center for Education Statistics, 1992), 98.
[12] Frank Smith, *Essays into Literacy: Selected Papers and Some Afterthoughts* (Portsmouth, NH: Heinemann, 1983), 121.
[13] Richard L. Colvin, "State Report Urges Return to Basics In Teaching Reading," *LA Times*, September 13, 1995, A1.
[14] Gentry, *The Science of Spelling,* 2.
[15] J.R. Campbell, P.L. Donahue, C.M. Reese, and G.W. Phillips, *NAEP Reading Report Card for the Nation and the States: Findings from the National Assessment of Educational Progress and Trial State Assessment,* (Washington, D.C.: U.S. Department of Education, Office of Educational Research and Improvement, 1996).
[16] Regie Routman and D. Maxim, "Invented Spelling: What It Is and What It Isn't." *School Talk* 1, no. 4 (1996).

Today's spelling textbooks are based on the understanding that spelling is a psycholinguistic, conceptual process involving knowledge of the alphabet, syllables, word meaning, and the history of words in English. Effective spelling instruction explores *patterns* that can be detected in the sound, structure, and meaning of words.[17] It covers understanding the concepts of words, segmenting sounds and syllables, recognizing letters, and learning how letters relate to sounds. It helps students develop insights into how words are spelled based on sound-letter correspondences, meaningful parts of words (such as roots and suffixes), and word origins and history.[18]

Teaching spelling is a brain-building boon for effective reading and writing, creating a "dictionary in the brain" for every reader and writer.[19] The more deeply and thoroughly a student knows a word, the more likely he or she is to recognize it, spell it, define it, and use it appropriately in speech and writing.

### *Handwriting Wires the Brain for Literacy*

Solid familiarity with the visual shapes of individual letters is an absolute prerequisite for learning to read. Writing aids in letter recognition, the most reliable predictor of future reading success.[20]

Learning to write by hand plays a key role in developing literacy, and handwriting skills remain crucial for success throughout school. The mental processes involved in handwriting are connected to other important learning functions, such as storing information in memory, retrieving information, manipulating letters, and linking them to sounds.

The letters of the alphabet are not learned holistically. They are acquired through a "visual system" in the brain that breaks down each letter into its parts.[21] To write a letter, a child must identify the letter by name, memorize the letter's form, and quickly access and retrieve this form from memory.[22]

Manuscript and Cursive Handwriting

Effective handwriting instruction begins with teaching the manuscript alphabet. Forming the vertical and horizontal lines of the manuscript alphabet helps students master the seemingly abstract forms of 26 uppercase and lowercase letters, punctuation marks, and numerals—114 symbols in all—that they must decode while learning to read. These printed uppercase and lowercase letters closely resemble the type used in children's books, which reinforces letter recognition.[23]

**Teachers Committed to Handwriting but Need Support**

Most teachers today understand the need for quality handwriting instruction. In one study, nine out of every 10 teachers indicated that they taught handwriting, averaging 70 minutes of instruction per week. There was considerable variability in reported instructional time, however, as the standard deviation was 55 minutes. For those who taught handwriting, instructional time ranged from two minutes to an hour a day. About one of every two teachers spent ten minutes or less a day teaching handwriting, with one in eight spending five minutes or less.

Only 12 percent of teachers indicated that the education courses taken in college adequately prepared them to teach handwriting. Despite this lack of formal preparation, the majority of teachers used a variety of recommended instructional practices for teaching handwriting. The application of such practices, though, was applied unevenly, raising concerns about the quality of handwriting instruction for all children.[24] Almost three of every five teachers (61 percent) reported using a commercial program to teach handwriting.

When teachers were asked to identify the most common handwriting problems experienced by students in their class, more than half of them noted problems with overall neatness (76 percent), spacing between words (66 percent), letter size (59 percent), letter formation (57 percent), alignment of letters (54 percent), and reversals (52 percent). Of these six common problems, only spacing between words and reversals were mediated by students' grade.

[17] Richard Templeton and Darrell Morris, "Questions Teachers Ask About Spelling." *Reading Research Quarterly* 34 (2009): 102-112.

[18] Linnea C. Ehri, "Grapheme-Phoneme Knowledge Is Essential for Learning to Read Words in English," in *Word Recognition in Beginning Literacy*, ed. Jamie L. Metsala and Linnea C. Ehri. (Mahwah, NJ: Lawrence Erlbaum Associates, 1998): 3-40; Linnea C. Ehri, "Learning to Read and Learning to Spell: Two Sides of a Coin." *Topics in Language Disorders* 20 (2000): 19-49; Louisa C. Moats, "Phonological Spelling Errors." *Reading and Writing: An Interdisciplinary Journal* 8 (1996): 105-119.

[19] Gentry, *Raising Confident Readers*, 16; Gentry, *The Science of Spelling*, 65.

[20] Adams, *Beginning to Read,* 55.

[21] Ibid., 111.

[22] Lana Edwards, "Writing Instruction in Kindergarten: Examining an Emerging Area of Research for Children with Writing and Reading Difficulties." *Journal of Educational Research* 36 (2003): 136-148.

[23] Linda Dobbie and Eunice Askov, "Progress of Handwriting Research in the 1980s and Future Prospects." *Journal of Educational Research* 88 (1995): 339-351.

[24] Steve Graham, Karen R. Harris, Linda Mason, Barbara Fink-Chorzempa, Susan Moran and Bruce Saddler, "How Do Primary Grade Teachers Teach Handwriting? A National Survey." *Reading and Writing* 21, no. 1 (2008): 49-69.

One study of first grade students found that examining a model of the letter marked with numbered arrows indicating the nature, order, and direction of component strokes, combined with reproducing the letter from memory, produced the best handwriting performance.[25]

Most students progress to cursive handwriting by Grade 3. Studies have shown that cursive is important for cognitive development because it "requires fluid movement, eye-hand coordination, and fine motor skill development," according to Frances van Tassell, an associate professor at the University of North Texas.[26]

Components of an Effective Curriculum

An effective handwriting curriculum gives teachers and students the resources to master both manuscript and cursive handwriting through:

- Lesson plans that provide a logical sequence for studying letter formation in developmentally appropriate ways. For example:
  - Letters that are easier for young children to produce are introduced before more difficult ones.
  - Letters that are formed in similar ways or share common characteristics are grouped together.
  - Letters that occur more frequently are introduced earlier than less common letters.
  - Easily confusable or reversible letters, such as *u* and *n* or *d* and *b*, are not included in the same unit.
  - Students master forming each individual letter before proceeding to connect letters into words and words into sentences.[27]
- Textbooks that provide instructions for writing each individual letter, with numbered arrows indicating the nature, order, and direction of component strokes[28] that students can use for tracing and as models for practice.
- Explicit, hands-on instruction by the teacher in how to form the strokes of each letter, how to connect letters into words, and how to make words into sentences. This instruction should occur in short, 10- to 15-minute sessions daily or several times a week.
- Practice pages with printed letters, words, and sentences above blank lines where students can copy them without the distraction of having to look up to a board and then back to their writing.

Through this carefully planned, explicit handwriting instruction, students develop legible and fluent handwriting. As students learn to recognize and reproduce letters in words quickly and effortlessly, their minds are freer to concentrate on meaning when writing. This likely allows them to generate, organize, and express ideas more effectively.

**Creating Better Writers**

*"Writing and learning and thinking are the same process."*

—William Zinsser, American writer, editor and teacher

[25] Berninger and others, "Treatment of Handwriting Problems in Beginning Writers," 652-666.
[26] Thomas B. Fordham Institute, "Cursing Cursive," *The Education Gadfly*. 2009, http://www.edexcellence.net/gadfly/index.cfm?issue=460#a4891 (accessed August 27, 2010).
[27] Graham, "Want to Improve Children's Writing?" 24.
[28] Ibid., 23.

### *Spelling: The Hallmark of Good Writing*

Spelling instruction aids in vocabulary formation, which increases depth and complexity of expression—giving students a ready supply of words needed to tell fictional stories and write essays and research papers.

Good spelling supports speed and fluency in writing. When students struggle to spell a word, they must pause in the writing process, often causing them to lose their train of thought and become frustrated.

Struggling with spelling also limits students' range of expression. As a result, many students will choose to use a much simpler word that they know how to spell rather than use a more sophisticated word that lives in their oral vocabulary but for which they are less sure of the spelling.[29]

### *Handwriting: Entry to a Lifetime of Composition*

Writing skills are critical for both academic and professional success. Handwriting presents the biggest barrier students must overcome in learning to write. The focused thought that young writers must put into how to form letters interferes with other writing processes.[30]

Early, systematic handwriting instruction improves the quality and quantity of writing, not just its legibility. The goal of a handwriting curriculum is to teach children to write letters legibly and efficiently, so that writing becomes fluid and automatic.

The need for handwriting instruction is not limited to the early grades. In Grades 4 to 6, handwriting fluency still accounts for 42 percent of the variability in the quality of children's writing,[31] and students' handwriting speed continues to increase at least until Grade 9.[32]

Recent research has shown that the development of higher-order thinking skills, including problem solving and analytic thinking, is related directly to the student's ability to put thoughts on paper using intelligible language. The medium of expressive language allows students to reflect on ideas and translate knowledge and meaning.[33]

### *Fostering Success for English Language Learners and Bilingual Students*

For English Language Learners (ELLs), it is much more difficult to learn English spelling than spelling in other languages, such as Spanish. Despite the challenges, learning the English spelling system helps ELLs and bilingual students learn letter/sound correspondences, increase vocabulary, and develop greater fluency in reading and writing. Through the systematic study of related words, students begin to see that English, like all languages, is governed by rules.

Vocabulary acquisition has a greater impact on reading than other factors, including oral language, for ELLs.[34] Research points to a relationship between word knowledge and reading achievement.[35] Words learned by spelling patterns and relationships can assist ELLs in developing a rich vocabulary that supports reading and enhances writing.

---

[29] Steve Graham and Karen Harris, "The Role of Self Regulation and Transcription Skills in Writing and Writing Development." *Educational Psychologist* 35 (2000): 3-12.

[30] Virginia Berninger, "Coordinating Transcription and Text Generation in Working Memory during Composing: Automatic and Constructive Processes." *Learning Disability Quarterly* 22, no. 2 (1999): 99-112; Graham and Harris, "The Role of Self Regulation and Transcription Skills in Writing and Writing Development," 3-12.

[31] Graham and others, "The Role of Mechanics," 170-182.

[32] Steve Graham and others, "The Development of Handwriting Fluency and Legibility in Grades 1 through 9." *Journal of Educational Research* 92 (1998): 7-87.

[33] Arthur N. Applebee, "Environments for Language Teaching and Learning: Contemporary Issues and Future Directions," in James Flood, Julie M. Jensen, and Diane Lapp, *Handbook of Research on Teaching the English Language Arts,* ed. James R. Squire (New York: Macmillan Library Reference, 1991), 549-556; Nancy Spivey, "Transforming Texts: Constructive Processes in Reading and Writing." *Written Communication* 7, no. 2 (April 1990): 256-87; Richard Vacca, "Making a Difference in Adolescents' School Lives: Visible and Invisible Aspects of Content Area Reading," in *What Research Has to Say About Reading Instruction*, ed. Alan E. Farstrup and S. Jay Samuels (Newark, DE: International Reading Association, 2002), 190.

[34] Proctor and others, "The Intriguing Role of Spanish Language Vocabulary Knowledge in Predicting English Reading Comprehension," 159-169.

[35] Camille L.Z. Blachowicz, Peter J. Fisher, and Susan Watts-Taffe, *Integrated Vocabulary Instruction: Meeting the Needs of Diverse Learners in Grades 1-5* (Naperville, IL: Learning Point Associates, 2006), 3.

Studies suggest that ELL reading success in Grades K to 1 can be predicted by phonological awareness,[36] development of the alphabetic principle,[37] and word knowledge.[38] In Grades 2 to 6, ELL reading success can be predicted by fluency, the ability to read words automatically,[39] and by vocabulary, which is a major contributor to comprehension.[40]

Students who are literate in their first language can draw upon those literacy concepts and skills as they learn to write English. Even when the writing systems are different, research shows that concepts about the meaning and constancy of letters and symbols, and skills such as alphabet knowledge and phonological awareness, will transfer to another language.[41]

Because handwriting is an important communication skill that reinforces reading, spelling, and writing, it also is critical for ELLs. These students need time and explicit instruction to master proper letter formation.

An effective curriculum assists teachers in demonstrating the academic language needed to teach handwriting (size, shape, spacing and slant) through Total Physical Response (TPR) and other second language approaches. It should provide support for students at multiple levels of English language proficiency.

### *Building Blocks for Succeeding in a Technology-Driven World*

Citing the availability of personal computers, smart phones, and spell-check programs, some discount the importance of spelling and handwriting in the modern world. Yet educators and researchers agree that spelling and handwriting will always be an important part of a student's education. Here's why:

- Knowledge of spelling is connected to reading, writing, and vocabulary development, which all depend on the same language abilities.[42]
- In 80 percent of elementary schools, students rarely, if ever, use word-processing software for writing.[43] Very few classes have enough computers to make regular use of word processors possible.
- While older students use computers to complete lessons, perform research, and write papers, handwriting continues to play a crucial role in note taking and in the creative process.
- The most equitable curriculum standards are based on textbooks, paper, and pencil. Poorer school districts lack access to computers, and fewer students from disadvantaged homes have access to computers and high-speed Internet at home.
- Spell-check programs actually increase the need to teach spelling and precise word usage *more* thoroughly.[44] These programs can identify only words that are misspelled. They ignore words that are correctly spelled but misused.

---

[36] Esther Geva and Zohreh Yaghoub-Zadeh, "Reading Efficiency in Native English-Speaking and English-as-a-Second-Language Children: The Role of Oral Proficiency and Underlying Cognitive-Linguistic Processes." *Scientific Studies of Reading* 10 (2006): 31-57; Adele Lafrance and Alexandra Gottardo, "A Longitudinal Study of Phonological Processing Skills and Reading in Bilingual Children." *Applied Psycholinguistics* 26 (2005): 559-578.

[37] Franklin R. Manis, Kim Lindsey, and Caroline Bailey, "Development of Reading in Grades K-2 in Spanish-Speaking English-Language Learners." *Learning Disabilities Research & Practice* 19 (2004): 214-224.

[38] Diane August and others, "The Critical Role of Vocabulary Development for English Language Learners." *Learning Disabilities Research & Practice* 20 (2005): 50-57.

[39] Scott Baker and Roland H. Good, "Curriculum-based Measurement of English Reading with Bilingual Hispanic Students: A Validation Study with Second-Grade Students." *School Psychology Review* 24 (1995): 561-578.

[40] August and others, "The Critical Role of Vocabulary Development for English Language Learners" 50-57; Nonie K. Lesaux, Orly Lipka, and Linda S. Siegel, "Investigating Cognitive and Linguistic Abilities that Influence the Reading Comprehension Skills of Children from Diverse Linguistic Backgrounds." *Reading and Writing* 19 (2006): 99-131.

[41] Jim Cummins, "Language Proficiency, Bilingualism, and Academic Achievement," in *The Multicultural Classroom: Readings for Content-Area Teachers*, ed. Patricia A. Richard-Amato and Marguerite A. Snow (NY: Longman, 1992); Cheryl A. Cisero and James M. Royer, "The Development and Cross-Language Transfer of Phonological Awareness." *Contemporary Educational Psychology* 20 (1995): 275-303.

[42] Snow and others, *Knowledge to Support the Teaching of Reading*, 85.

[43] Cutler and Graham, "Primary Grade Writing Instruction: A National Survey," 907-919.

[44] Montgomery, Karlan, and Coutinho, "The Effectiveness of Word Processor Spell Checker Programs," 27-41.

- In a society in which texting and word processing are commonplace, handwritten communication is perceived as distinctive and special.
- Documents such as business letters, checks, and legal documents generally require handwritten signatures.
- Many historical documents as well as modern letters and thank-you notes are written in cursive. This puts students who cannot read cursive handwriting at a disadvantage.

Increasing Instructional Effectiveness Through Technology

Today's educators employ a variety of technology platforms to increase the effectiveness of spelling and handwriting instruction:

- Interactive whiteboard (IWB) applications are ideal for presenting word sorts, a research-based technique for helping students recognize and understand common spelling patterns as well as the relationships between and among words demonstrated by spelling patterns.
- In handwriting instruction, IWB applications help teachers demonstrate proper letter formation and encourage students to emulate the correct strokes.
- In addition, research has demonstrated that games are a valuable incentive in spelling practice.[45] Digital games bring this research into the 21st century.

***The Importance of Explicit, Direct, Comprehensive, and Research-Based Instruction***

Because of the role they play in developing literacy and composition skills, spelling and handwriting are critical to overall academic achievement. For example, one study found that handwriting and spelling skills together account for a sizable proportion of the variance in the composition skills of 600 children in Grades 1 to 6 (up to 42 percent of the variance in writing quality and 66 percent of the variance in writing output).[46]

As a result, it is imperative that students receive focused, direct, and explicit instruction in these subjects on a frequent basis beginning in the early grades when lifelong study habits are formed. Although some publishers of integrated and balanced language programs advertise that spelling and handwriting are covered by these programs, it is important to compare these integrated components to research-based methods that have demonstrated effectiveness in teaching children to read, write, and spell fluently.

Spelling

Research provides clear evidence that spelling should be taught systematically. The right words and patterns must be presented at the right time in the student's development. A self-contained basal spelling program teaching students to spell words from lists, based on spelling patterns and words used in student writing, is more efficient than learning them from context.

With a comprehensive spelling series, creating spelling words from frequency lists (rather than content vocabulary) guarantees the usefulness of words for most writing demands. Words learned from the 4,000 most commonly used words (accounting for nearly 98 percent of words used in ordinary writing) provide a "security blanket" leading to greater fluency in writing.

The organization of spelling lists should highlight principles of English spelling (e.g., phoneme-grapheme, sound-to-pattern, and meaning-to-pattern principles) to promote the development of orthographic concepts. In addition, basal spelling programs can control the difficulty of lists by frequency and by word length, successfully differentiating task difficulty.

[45] Gentry, *The Science of Spelling,* 56.
[46] Graham and others, "The Role of Mechanics in Composing of Elementary School Students," 170-182.

Handwriting

There is considerable scientific evidence, collected over a span of almost 100 years, demonstrating that directly teaching handwriting enhances legibility and fluency.[47] Children, especially those who struggle with handwriting, benefit from carefully planned, explicit handwriting instruction.

The quality of handwriting has a marked effect on the writing and academic performance of all children.[48] Even in this age of word processors, children's handwriting can have a profound impact upon their learning and the acceptance of their ideas. Increasingly, standardized tests include a written essay that is holistically scored by trained graders. There is evidence that the quality of handwriting significantly skews the evaluation of these essays.[49]

***A Small Investment Yields Significant and Lasting Results for Students, Schools, and Society***

The fate of state and national economies rests on the ability of U.S. thinkers and workers to compete on a global scale. As governments struggle to balance budgets, they must make difficult decisions about allocating limited funds. Yet, research shows that investments in school quality improvements can, over time, cover the entire costs of primary and secondary schooling.[50]

Because reading and writing are required to master any subject, a small investment in effective spelling and handwriting instruction pays big rewards in increasing student performance across the entire school curriculum.

Textbooks that provide students with the most current, research-based spelling and handwriting instruction are essential to teach these subjects effectively:

- In handwriting, students must be able to trace over and write directly beneath the appropriate letter and word models.
- In spelling, a bound textbook contains a dictionary and thesaurus for listed words and keeps the word lists together for the periodic review and assessment that is essential for mastery.
- Authorship by leading handwriting and spelling researchers ensures that lesson plans, word lists, letter formation, and other covered materials are developmentally appropriate for students in each grade level.
- Textbooks allow students to easily practice independently at school and home using their printed copies or accompanying electronic components.
- Textbooks provide tangible guidance to parents about the learning material their children must master, making it easier for parents to take an active role in homework.

Handwriting and spelling textbooks are among the least expensive materials in the entire reading and language arts curriculum. The cost per pupil can be up to 75 percent less than the cost of implementing a reading program on an average per pupil cost basis. Such a small investment yields considerable returns, as students' reading, vocabulary, sentence-writing skills, the amount they write, and the quality of their writing all improve along with their spelling and handwriting.[51]

---

[47] Eunice Askov, Wayne Otto, and Warren Askov, "A Review of Handwriting Research." *Journal of Educational Research* 64 (1970): 100-111; Graham and Miller, "Handwriting Research and Practice," 1-16; Steve Graham and Naomi Weintraub, "A Review of Handwriting Research." *Journal of Educational Research* 73 (1980): 7-87; Michaeleen Peck, Eunice N. Askov, and Steven H. Fairchild, "Another Decade of Research in Handwriting: Progress and Prospect in the 1970s." *Journal of Educational Research* 73 (1980): 282-298.

[48] Berninger and others, "Treatment of Writing in Beginning Writers," 620-623; Graham and others, "Is Handwriting Causally Related to Learning to Write?" 620-633; Diane Jones and Carol A. Christensen, "Relationship Between Automaticity in Handwriting and Students' Ability to Generate Written Text." *Journal of Educational Psychology* 91 (1991): 44-49.

[49] Charles Sloan and Iris McGinnis, "The Effect of Handwriting on Teachers' Grading of High School Essays." *Journal of the Association for the Study of Perception* 17, no. 2 (1978): 15-21.

[50] Hanushek, "Why Quality Matters," 17.

[51] Steve Graham, Karen Harris, and Barbara Fink-Chorzempa, "Is Handwriting Causally Related to Learning to Write? Treatment of Handwriting Problems in Beginning Writers." *Journal of Educational Psychology* 92 (2000): 44-49.

Spelling and handwriting should be explicitly taught in short, 10- to 15-minute sessions daily or several times a week, with appropriate materials for additional independent practice.[52] Such a small investment yields considerable returns, as students' reading, vocabulary, sentence-writing skills, the amount they write, and the quality of their writing all improve along with their spelling and handwriting.[53]

Boosting Cross-Curricular Achievement and Test Performance

Good spelling and handwriting skills increase speed and fluency in both reading and writing. Becoming proficient at spelling and handwriting gives students the confidence to tackle more challenging work and the skills they need to succeed across the full academic spectrum. These skills play key roles in mastering academic subjects, in developing critical thinking skills, and in demonstrating mastery to teachers and degree-granting institutions. And, with the increasing importance of state proficiency tests and the addition of a written component to both the ACT and SAT—the two most popular college entrance exams—good spelling and handwriting skills offer a competitive edge to college-bound students.

When writing, students with poor spelling skills often pause, which disrupts their train of thought, causes frustration, and limits their range of expression.[54] Struggling with handwriting can lead to a self-fulfilling prophecy in which students avoid writing, think of themselves as not being able to write, and fall further and further behind their peers.

Fast, legible handwriting improves note-taking and test performance. Students must be able to quickly record notes to capture contents of lectures, must be able to read their notes to study for tests, and must be able to write quickly and legibly to complete timed tests.[55]

Neatness counts. Illegible or poor handwriting can hinder students in getting fair and objective grades.[56] Studies show that teachers give better scores to legible assignments and tests even when the content is the same.[57] Yet, when students have to write quickly, such as when taking notes or working on a timed test, the legibility of their text declines.[58]

From elementary school through postsecondary education, the majority of high-stakes tests include the timed, impromptu essay, nearly always handwritten, as a measure of writing performance. Components of state proficiency tests, essays on the College Board SAT and ACT, and the majority of Advanced Placement tests require handwritten responses, emphasizing the importance of handwriting in high-stakes testing. To score well:

- Students must be able to quickly organize their thoughts and fluently record them in a short time. On the ACT writing test, for example, students have 25 minutes to write a two-page essay that graders must read and score in four minutes.
- Essay readers must be able to decipher a student's handwriting to provide an evaluation. A paper that is illegible cannot be scored.[59]

---

[52] Steve Graham and Lamoine Miller, "Handwriting Research and Practice: A Unified Approach." *Focus on Exceptional Children* 13 (1980): 1-16.

[53] Graham and others, "Is Handwriting Casually Related to Learning to Write?" 620-633; Jones and Christensen, "Relationship between Automaticity in Handwriting and Students' Ability to Generate Written Text," 44-49.

[54] Jones and Christensen, "Relationship between Automaticity in Handwriting and Students' Ability to Generate Written Text," 44-49.

[55] Peverly and others, "What Predicts Skill in Lecture Note Taking?" 69.

[56] Pamela Farris, *Language Arts: A Process Approach* (Madison, WI: Brown & Benchmark, 1991), 233.

[57] Clinton I. Chase, "Essay Test Scoring: Interaction of Relevant Variables." *Journal of Educational Measurement* 23, no. 1 (1986): 33-41; Jon C. Marshall and Jerry M. Powers, "Writing Neatness, Composition Errors, and Essay Grades." *Journal of Educational Measurement* 6, no. 2 (1969): 97-101.

[58] Steve Graham and Naomi Weintraub, "A Review of Handwriting Research: Progress and Prospects from 1980 to 1994." *Educational Psychology* 8 (1996): 7-87.

[59] College Board 2010, "New SAT® for the Press: Frequently Asked Questions," http://www.collegeboard.com/about/news_info/sat/faqs.html#grammar (accessed Aug. 27, 2010).

- According to recent research, written tests taken on paper severely underestimate the performance of students accustomed to working on computer. This underscores the need for fluent, legible handwriting by even the most technology-savvy students.[60]

Saving Time and Money

A small investment in direct, explicit spelling and handwriting instruction can save countless hours of frustration by students who are struggling in school and produce considerable cost savings by reducing the need for later intervention.

Students who enter college not fully prepared in English or mathematics must take non-credit preparatory courses before beginning coursework leading to a degree. Costs of this remedial education are borne by students, parents, institutions, and taxpayers. About one third of all college freshmen take at least one remedial course. A 1995 study using data from the National Center for Educational Statistics estimated that remedial courses consumed more than $1 billion, or about one percent, of public education budgets nationally.[61]

With so much at stake, the investment of instructional time and purchase of current textbooks needed to help students become proficient at reading, spelling, and writing appears small by comparison.

### *About the Authors*

**J. Richard Gentry, Ph.D.**, is an internationally acclaimed author and researcher and is recognized for groundbreaking work in spelling and Pre-K through second grade emergent literacy. His breakthrough insights on the early connections of reading, writing, and spelling are unraveling the mysteries of how teachers should teach and how children learn to read and write. His new book for parents, *Raising Confident Readers*, is the culmination of more than 30 years of experience in childhood education. He is also the author of *Breakthrough in Beginning Reading and Writing*, *Step-by-Step Assessment Guide to Code Breaking*, *Breaking the Code,* and *The Science of Spelling*. His blog posts for *Psychology Today* offer advice to parents on raising readers, writers, and spellers.

**Steve Graham, Ed.D.**, is a Currey Ingram Professor of Special Education and Literacy at Vanderbilt University. Dr. Graham is the editor of *Exceptional Children* and the former editor of *Contemporary Educational Psychology.* He is the author of numerous scholarly articles and coauthor of several books, including *Handbook of Writing Research, Handbook of Learning Disabilities, Writing Better,* and *Making the Writing Process Work.*

### *About Saperstein Associates*

**Saperstein Associates** is a research firm based in Columbus, Ohio. Using time-honored and innovative research methodologies, its veteran staff transforms data into information, and information into intelligence. Saperstein Associates provides clients with a valuable tool for making data-driven decisions. To learn more, visit sapersteinassociates.com.

[60] Michael Russell, "Testing Writing on Computers: A Follow-up Study Comparing Performance on Computer and Paper." *Educational Policy Analysis Archives* 7, no 20 (1999) http://epaa.asu.edu/epaa/v7n20l (accessed August 27, 2010); Michael Russell and Walt Haney, "Testing Writing on Computers: An Experiment Comparing Student Performance on Tests Conducted Via Computer and Via Paper-and-Pencil." *Educational Policy Analysis Archives* 5, no. 3 (1997), http://epaa.asu.edu/epaa/ (accessed August 27, 2010).

[61] Merisotis and Phipps, "Remedial Education in Colleges and Universities," 67-85.

## Bibliography


Adams, Marilyn Jager. *Beginning to Read: Thinking and Learning About Print - A Summary*. Urbana-Champaign, IL: University of Illinois at Urbana-Champaign, 1990.

Allal, Linda. "Learning to Spell in the Classroom." *Learning to Spell: Research, Theory, and Practice Across Languages*, ed. Charles A. Perfetti, Laurence Rieben, and Michel Fayol. Mahwah, N.J.: Routledge, 1997.

Applebee, Arthur N. "Environments for Language Teaching and Learning: Contemporary Issues and Future Directions." In James Flood, Julie M. Jensen, and Diane Lapp, *Handbook of Research on Teaching the English Language Arts,* ed. James R. Squire. New York: Macmillan Library Reference, 1991.

Askov, Eunice, Wayne Otto, and Warren Askov. "A Decade of Research in Handwriting: Progress and Prospect." *Journal of Educational Research* 64 (1970): 100-111.

August, Diane, Maria Carlo, Cheryl Dressler, and Catherine Snow. "The Critical Role of Vocabulary Development for English Language Learners." *Learning Disabilities Research & Practice* 20, no. 1 (2005): 50-57.

Baker, Scott K. and Roland H. Good. "Curriculum-Based Measurement of English Reading With Bilingual Hispanic Students: A Validation Study with Second-Grade Students." *School Psychology Review* 24 (1995): 561-578.

Berninger, Virginia W. "Coordinating Transcription and Text Generation in Working Memory During Composing: Automatic and Constructive Processes." *Learning Disability Quarterly* 22, no. 2 (1999): 99-112.

Berninger, Virginia W., Katherine B. Vaughn, Robert D. Abbott, Sylvia P. Abbott, Laura Woodruff Rogan, Allison Brooks, Elizabeth Reed, and Steve Graham. "Treatment of Handwriting Problems in Beginning Writers: Transfer from Handwriting to Composition." *Journal of Educational Psychology* 89, no. 4 (1997): 652-666.

Blachowicz, Camille L.Z., Peter J. Fisher, and Susan Watts-Taffe. *Integrated Vocabulary Instruction: Meeting the Needs of Diverse Learners in Grades 1—5*. Naperville, IL: Learning Point Associates (2006).

Campbell, J.R., P.L. Donahue, C.M. Reese, and G.W. Phillips. *NAEP Reading Report Card for the Nation and the States: Findings from the National Assessment of Educational Progress and Trial State Assessment*. Washington, DC: Office of Educational Research and Improvement, U.S. Department of Education (1996*).*

Chase, Clinton I. "Essay Test Scoring: Interaction of Relevant Variables." *Journal of Educational Measurement* 23, no. 1 (1986): 33-41.

Cisero, Cheryl A. and James M. Royer. "The Development and Cross-Language Transfer of Phonological Awareness." *Contemporary Educational Psychology* 20 (1995): 275-303.

College Board 2010. "New SAT® for the Press: Frequently Asked Questions." http://www.collegeboard.com/about/news_info/sat/faqs.html#grammar (accessed August 27, 2010).

Colvin, Richard L. "State Report Urges Return to Basics In Teaching Reading." *Los Angeles Times*, September 13, 1995, Local Section, Regional edition.

Cummins, Jim. "Language Proficiency, Bilingualism, and Academic Achievement." In *The Multicultural Classroom: Readings For Content-Area Teachers,* ed. Patricia A. Richard-Amato and Marguerite A. Snow,16-26. New York: Longman (1992).

Thomas B. Fordham Institute. "Cursing Cursive." *The Education Gadfly*. 2009, http://www.edexcellence.net/gadfly/index.cfm?issue=460#a4891 (accessed August 27, 2010).

Cutler, Laura and Steve Graham. “Primary Grade Writing Instruction: A National Survey.” *Journal of Educational Psychology* 100 (2008): 907-919.

Dobbie, Linda and Eunice Askov. “Progress of Handwriting Research In The 1980s And Future Prospects.” *Journal of Educational Research* 88 (1995): 339-351.

Edwards, Lana. “Writing Instruction In Kindergarten: Examining An Emerging Area of Research For Children With Writing And Reading Difficulties.” *Journal of Learning Disabilities* 36 (2003): 136-148.

Ehri, Linnea C. “Grapheme-Phoneme Knowledge Is Essential For Learning to Read Words In English.” In *Word Recognition in Beginning Literacy*, ed. Jamie L. Metsala and Linnea C. Ehri. Mahwah, 3-40. NJ: Lawrence Erlbaum Associates, (1998).

Ehri, Linnea C. “Learning to Read and Learning to Spell: Two Sides of a Coin.” *Topics in Language Disorders* 20 (2000): 19-49.

Ehri, Linnea C. “Learning to Read And Learning to Spell Are One And The Same, Almost.” In *Learning to Spell: Research, Theory, and Practice across Languages,* edited by Charles A. Perfetti, Laurence Rieben, and Michael F. Maywah, 237-269. NJ: Lawrence Erlbaum Associates, 1997.

Farris, Pamela. *Language Arts: A Process Approach*. Madison, WI: Brown & Benchmark Publishers, 1991.

Gentry, J. Richard, Ph.D. *Breaking the Code: The New Science of Beginning Reading and Writing*. Portsmouth, N.H.: Heinemann, 2006.

Gentry, J. Richard, Ph.D. *The Science of Spelling*. Portsmouth, NY: Heinemann Publishing, 2004.

Gentry, J. Richard, Ph.D. *Raising Confident Readers: How to Teach Your Child to Read and Write—from Baby to Age 7*. Cambridge, MA: Da Capo Lifelong Books, 2010.

Geva, Esther and Zohreh Y Zadeh. “Reading Efficiency in Native English-Speaking and English-as-a-Second-Language Children: The Role of Oral Proficiency and Underlying Cognitive-Linguistic Processes.” *Scientific Studies of Reading*, 10 (2006): 31-57.

Graham, Steve. “Want to Improve Children’s Writing? Don’t Neglect their Handwriting.” *American Educator* 33, no. 4 (Winter 2009-Spring 2010): 20-40.

Graham, Steve and Karen R. Harris. “The Role of Self Regulation and Transcription Skills in Writing and Writing Development.” *Educational Psychologist* 35, no. 1 (2000): 3-12.

Graham, Steve, Karen R. Harris, and Barbara Fink-Chorzempa. “Contribution of Spelling Instruction to the Spelling, Writing, and Reading of Poor Spellers.” *Journal of Educational Psychology,* 94 (2002): 669-686.

Graham, Steve, Karen R. Harris, and Barbara Fink-Chorzempa. “Is Handwriting Causally Related to Learning to Write? Treatment of Handwriting Problems in Beginning Writers.” *Journal of Educational Psychology* 92, no. 4 (2000): 620-633.

Graham, Steve, Karen R. Harris, Linda Mason, Barbara Fink-Chorzempa, Susan Moran, and Bruce Saddler. “How Do Primary Grade Teachers Teach Handwriting? A National Survey.” *Reading and Writing* 21, no.1 (2008): 46-69.

Graham, Steve and Lamoine Miller. “Handwriting Research and Practice: A Unified Approach.” *Focus on Exceptional Children* 13 (1980): 1-16.

Graham, Steve and Michael Hebert. “Writing to Read: Evidence for How Writing Can Improve Reading.” *Carnegie Corporation Time to Act Report.* Washington, DC: Alliance for Education, (2010).

Graham, Steve and Naomi Weintraub. “A Review of Handwriting Research.” *Journal of Educational Research* 73 (1980): 282-298.

Graham, Steve and Naomi Weintraub. “A Review of Handwriting Research: Progress and Prospects from 1980 to 1994.” *Educational Psychology Review* 8, no. 1 (1996): 7-87.

Graham, Steve, Virginia Berninger, Naomi Weintraub, and William Shafer. “The Development of Handwriting Fluency and Legibility in Grades 1 through 9.” *Journal of Educational Research* 92 (1998): 42-52.

Graham, Steve, Virginia Berninger, Robert Abbott, Sylvia Abbott, and Dianne Whitaker. “The Role of Mechanics in Composing of Elementary School Students: A New Methodological Approach.” *Journal of Educational Psychology* 89, no.1 (1997): 170-182.

Hanushek, Eric. “Why Quality Matters in Education.” *Finance and Development*, June 2005. http://www.imf.org/external/pubs/ft/fandd/2005/06/hanushek.htm (accessed August 27, 2010).

Jones, Diane and Carol A. Christensen. “Relationship between Automaticity in Handwriting and Students’ Ability to Generate Written Text.” *Journal of Educational Psychology* 91, no. 1 (1999): 44-49.

Joshi, R. Malatesha, Rebecca Treiman, Suzanne Carreker, and Louisa C. Moats. “How Words Cast Their Spell: Spelling is an Integral Part of Learning the Language, Not a Matter of Memorization.” *American Educator* 32, no. 4 (Winter 2008-Spring 2009): 6-16, 42-43.

Joshi, R. Malatesha and P.G. Aaron. “A New Way of Assessing Spelling and Its Classroom Applications.” In *Literacy Acquisition, Assessment, and Instruction: The Role of Phonology, Orthography, and Morphology.* Ed. R. Malatesha Joshi, Bozydar Kacqmarek, and Che Kan Leong. Amsterdam: IOS Press, 2003, 153-161.

Joshi, R. Malatesha and P.G. Aaron. “Specific Spelling Disability: Factual or Artifactual?” *Reading and Writing: An Interdisciplinary Journal* 2 (1990): 107-125.

Klein, Joseph and David Taub. "The Effect of Variations In Handwriting and Print on Evaluation of Student Essays." *Assessing Writing,* 10, no. 2 (2005):134-148.

Lafrance, Adèle and Alexandra Gottardo. "A Longitudinal Study of Phonological Processing Skills And Reading In Bilingual Children." *Applied Psycholinguistics,* 26 (2005): 559-578.

Lesaux, Nonie K., Orly Lipka and Linda S. Siegel. "Investigating Cognitive and Linguistic Abilities that Influence the Reading Comprehension Skills of Children from Diverse Linguistic Backgrounds." *Reading and Writing*, 19, no. 1 (2006): 99-131.

Manis, Franklin R., Kim A. Lindsey, and Caroline E. Bailey. "Development of Reading in Grades K-2 in Spanish-Speaking English-Language Learners." *Learning Disabilities Research & Practice*, 19 (2004): 214-224.

Marshall, Jon C. and Jerry M. Powers. “Writing Neatness, Composition Errors, and Essay Grades.” *Journal of Educational Measurement* 6, no. 2 (1969): 97-101.

Merisotis, Jamie P. and Ronald A. Phipps. “Remedial Education in Colleges and Universities: What’s Really Going On?” *The Review of Higher Education* 24, no. 1 (2000): 67-85.

Moats, Louisa C. “How Spelling Supports Reading: And Why It Is More Regular and Predictable Than You May Think.” *American Educator,* 29 no. 4 (2005-2006): 12-22, 42-43.

Moats, Louisa C. “Phonological Spelling Errors in the Writing of Dyslexic Adolescents.” *Reading and Writing: An Interdisciplinary Journal* 8 (1996): 105-19.

Moats, Louisa C. *Spelling: Development, Disability, and Instruction*. Baltimore, MD: York Press. 1995

Montgomery, Donna J., George R. Karlan, and Martha Coutinho. “The Effectiveness of Word Processor Spell Checker Programs to Produce Target Words for Misspellings Generated by Students with Learning Disabilities.” *Journal of Special Education Technology* 16 (2001): 27-41.

O'Connor, Rollanda E. and Joseph R. Jenkins. “Improving The Generalization of Sound/Symbol Knowledge: Teaching Spelling to Kindergarten Children With Disabilities." *Journal of Special Education* 29 (1995): 255-275.

Paulesu, Eraldo, Jean-François Demonet, Ferruccio Fazio, Eamon McCrory, Valerie Chanoine, Nicky Brunswick, Stefano F. Cappa, Giulio Cossu, Michael Habib, Christopher Frith, and Uta Frith. “Dyslexia: Cultural Diversity and Biological Unity.” *Science* 291, no. 5511 (2001): 2165-2167.

Peck, Michaeleen, Eunice N. Askov, and Steven H. Fairchild. “Another Decade of Research in Handwriting: Progress and Prospect in the 1970s.” *Journal of Educational Research* 73 (1980): 282-298.

Peverly, Stephen T., Vivek Ramaswamy, Cindy Brown, James Sumowski, Moona Alidoost, and Joanna Garner. “What Predicts Skill in Lecture Note Taking?” *Journal of Educational Psychology,* 99 no. 1 (2007): 167-180.

Proctor, C. Patrick, Diane August, Maria S. Carlo, and Catherine Snow. "The Intriguing Role of Spanish Language Vocabulary Knowledge in Predicting English Reading Comprehension." *Journal of Educational Psychology*, 98, no.1 (2006): 159-169.

Routman, Regie and D. Maxim, "Invented Spelling: What It Is And What It Isn't." *School Talk* 1, no. 4*,* (Urbana, IL: National Council of Teachers of English, 1996).

Russell, Michael. “Testing Writing on Computers: A Follow-up Study Comparing Performance on Computer and on Paper.” *Educational Policy Analysis Archives,* 7, no. 20 (1999). http://epaa.asu.edu/epaa/v7n20/ (accessed August 27, 2010)

Russell, Michael and Walt Haney. “Testing Writing on Computers: An Experiment Comparing Student Performance on Tests Conducted via Computer and via Paper-and-Pencil.” *Educational Policy Analysis Archives,* 5, no. 3 (1997), http://epaa.asu.edu/epaa/v5n3/ (accessed August 27, 2010).

Scarborough, Hollie S. “Predicting The Future Achievement of Second Graders With Reading Disabilities: Contributions of Phonemic Awareness, Verbal Memory, Rapid Serial Naming, and IQ.” *Annals of Dyslexia* 68 (1998): 115-136.

Smith, Frank. *Essays into Literacy: Selected papers and some afterthoughts*. Portsmouth, NH: Heinemann, 1983.

Snow, Catherine E., Peg Griffin, and Susan M. Burns, eds. *Knowledge to Support the Teaching of Reading: Preparing Teachers for a Changing World.* San Francisco: Jossey-Bass, 2005.

Snyder, Thomas, ed. *120 Years of Literacy*. Washington, D.C.: National Center for Education Statistics, 1992.

Spivey, Nancy, Transforming Tests: Constructive Processes in Reading and Writing. *Written Communication,* 7, no. 2 (April 1990): 256-287.

Templeton, Shane and Darrell Morris. “Questions Teachers Ask About Spelling.” *Reading Research Quarterly,* 34, no. 1 (2009): 102-112.

Vacca, Richard. “Making a Difference In Adolescents' School Lives: Visible and Invisible Aspects of Content Area Reading.” In *What Research Has to Say About Reading Instruction*, 3rd ed., ed. Alan E. Farstrup. Newark, DE: International Reading Association, 2002.