

## **Summary of Research**

### **Scientificallly-Based Research Validating Kurzweil 3000**

An Annotated Review of Current Research Supporting the Use of  
Kurzweil 3000 in the Classroom



**Kurzweil** Educational Systems



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## Introduction

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No Child Left Behind (NCLB), signed into law in January 2002, is considered one of the most significant federal education policy initiatives in a generation. Its purpose is to ensure that every student becomes proficient in reading and mathematics by 2013-2014. An important aspect of this legislation is to encourage schools to adopt programs, strategies and materials that have been researched using rigorous scientific methodology and have proven to be effective.

Fortunately, the fruits of over 30 years of research on reading, most of it sponsored by the federal government, are now available. While much of the research focuses on the mechanics of reading, the picture that has emerged makes a strong case for the use of assistive technology tools such as Kurzweil 3000, or other accommodations, to provide access to content while students are receiving explicit instruction in decoding, spelling, and writing. In fact, without this type of accommodation, it becomes almost impossible for struggling readers to catch up academically.

This report provides research validation for the use of assistive technology like Kurzweil 3000 as an important accommodation for struggling students.

The main research findings are summarized below and are followed by a detailed review of the research presented in two parts.

- **Part I** cites research studies that support the use of tools such as Kurzweil 3000 in the classroom.
- **Part II** cites research studies that show how specific features of Kurzweil 3000 support important aspects of the reading and learning process.

## Synopsis

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- Brain research, using sophisticated imaging technology, has shown that struggling readers actually use different parts of the brain when reading. As a result, their brains are less efficient in learning the mechanics of reading. These differences are not related to intelligence. Many struggling readers are highly intelligent and have strong cognitive abilities. However, because they are unable to master decoding as it's traditionally taught, they gradually become locked out of much of what is happening in the classroom.
- Research has shown that accurate and automatic decoding frees the competent reader to focus on content. Because reading is difficult, struggling readers spend most of their energy trying to decode words with little left to ponder their meaning. Over time, their limited exposure to meaningful print impacts the development of vocabulary and background knowledge essential for comprehending more advanced subject matter.
- The middle school curriculum assumes that students can read and write efficiently. However, since struggling readers have not yet mastered decoding, spelling, or writing, they are unable to read grade-level materials or express their thoughts in writing independently. As a result, they fall further and further behind in their class work.
- Intensive remediation over time can help these students become better readers, however, unless their vocabulary development, background knowledge, and mastery of subject matter keep pace with their peers, they will continue their downward spiral.

Tools like Kurzweil 3000 can make a significant difference in supporting the development of decoding and fluency skills as well as providing meaningful access to curriculum materials. In addition, Kurzweil 3000 helps struggling readers actively engage in the reading process, participate more fully in class and keep up with their assignments. Many schools also use Kurzweil 3000 as an accommodation for test taking, so students can be evaluated on what they know and not how well they can read and write.

A comprehensive overview of the government-sponsored research cited in this document can be found in:

<b>Author</b>	<b>Title</b>	<b>Source</b>
National Reading Panel	<i>Teaching Children to Read: An Evidenced-based Assessment of the Scientific Research Literature and its Implications for Reading Instruction</i>	National Institute of Child Health and Human Development, National Institutes of Health, 2000

## Part I

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### Why Kurzweil 3000 provides essential support to students who are reading significantly below grade level

Some educators are concerned that text readers such as Kurzweil 3000 might become a crutch that prevents struggling students from learning how to read and write on their own. Research findings have shown quite the reverse. Assistive technology like Kurzweil 3000, for example, not only allows struggling students to read more advanced grade-level material; it also helps improve word recognition and decoding. As students using the program become more active readers, they are developing the skills that support independent reading without the assistive technology. The research cited below clearly demonstrates why providing access to grade-level curriculum content via accommodation is critical to struggling readers' academic success.

#### I. Learning differences reflect differences in how the brain processes information

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
S. Shaywitz	<i>Overcoming Dyslexia</i>	Knopf, New York, 2003	Real differences in the way good readers and struggling readers process information make it difficult for struggling readers to master decoding, spelling, and writing as they are traditionally taught. These students learn best with instructional methods that simultaneously activate different parts of the brain.

#### II. Poor reading skills affect all academic areas

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
S. Chall V.A. Jacobs L.E. Baldwin	<i>The Reading Crisis: Why Poor Children Fall Behind</i>	Harvard University Press, MA, 1990	Although many struggling readers are of average, or even above average intelligence, poor reading skills isolate them from their peers as well as impact their vocabulary development and exposure to relevant background knowledge. Repeated failure naturally impacts motivation and self esteem.

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
J. Torgesen	<i>The Prevention and Remediation of Reading Disabilities: Evaluating What We Know from Research</i>	Journal of Academic Language Therapy, 1, 11-47, 1987	Delays in reading ability negatively effect comprehension by limiting students' meaningful exposure to grade-level material.
K.E. Stanovich	<i>Matthew Effects in Reading</i>	Reading Research Quarterly, 21, 360-407, 1986	Students who fall behind in reading early in their school careers tend to read less, have more limited vocabularies and lack essential background information. Conversely, good readers read more and as a result, continue to expand their knowledge.

### III. The ability to decode every word is essential to comprehension

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
K.E. Stanovich R.F. West D.H. Friedman A.E. Cunningham	<i>The Effect of Sentence Context on Word Recognition in Second and Sixth Grade Children</i>	Reading Research Quarterly, 19, 1-15, 1983	Despite commonly held beliefs, good readers read every word. They do not skim or rely on context for decoding. Poor readers, however, rely heavily on context or memory for decoding. As text becomes more content specific, these strategies become less and less reliable.
M.J. Adams	<i>Beginning to Read: Thinking about Print</i>	MIT Press, MA, 1990	In order to benefit from reading independently, students should be able to decode text with 95% accuracy. For students reading well below grade level, this precludes access to most of their text materials.

### IV. Comprehension, the ultimate goal of reading, is equally dependent on vocabulary development and background information as on accurate decoding

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
K.E. Stanovich A.E. Cunningham	<i>What Reading Does to the Mind</i>	American Educator, 8-15, Spring/Summer, 1998	Habitual exposure to print of any kind, whether at home or school, has a profound influence on a student's vocabulary development and acquisition of background knowledge. Students lacking this type of exposure are at a serious disadvantage in dealing with more complex subject matter.

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
E.D. Hirsch	<i>Reading Comprehension Requires Knowledge of Words and the World</i>	American Educator, Spring 2003	Exposure to interesting print plays a critical role in vocabulary acquisition and the development of background knowledge. Both are essential to fully comprehending what is read.
T.G. White M.F. Graves W.H. Slater	<i>Growth of Reading Vocabulary in Decoding and Word Meaning in Diverse Elementary Schools</i>	Journal of Educational Psychology, 82, 281-290, 1990	The vocabulary gap between good and poor readers widens significantly over time. In first grade, the gap was about 1500 words. By 4th grade, the gap had increased to over 5,000 words.

**V. The right accommodations allow students to demonstrate what they know and not how well they can read.**

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
R. Calfee M. Chambliss M. Beretz	<i>Organizing for Comprehension and Composition</i>	All Language and the Creation of Literacy, W. Ellis (Ed), International Dyslexia Association, 79-93, 1991	In the case of struggling readers, reading for content and information should not be limited by decoding ability. When there is a divergence in these skill levels, efforts should be made to provide access to grade-level content.
L.G. Fielding P.D. Pearson	<i>Reading Comprehension: What Works</i>	Educational Leadership, 62-68, 1994	Reading materials should be selected based on speaking and listening ability to allow students to function at their cognitive rather than their reading levels. This may mean providing accommodations to make these materials accessible.
M. Gehrman J. Marci Kinas	<i>Assistive Technology for Students with Mild Disabilities</i>	ERIC Clearinghouse, 2002	Technology can help struggling readers overcome barriers that prevent them from doing their best work. These include: 1) overcoming the mechanics of spelling, grammar and punctuation, 2) organizing, editing and revising their work, and 3) staying motivated.

## In Conclusion

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- For students to benefit from independent reading, they must be able to decode 95% of the text they read with speed and accuracy. This precludes most struggling readers from actively reading grade-level texts.
- Struggling readers will not develop the vocabulary and background knowledge necessary for subject matter mastery unless they have timely access to grade-level materials.
- Along with remediation in decoding, spelling and writing, accommodations such as Kurzweil 3000 providing access to grade-level text, offer struggling readers their best chance to succeed.

## Part II

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### Kurzweil 3000 – The ideal classroom accommodation

While Kurzweil 3000 is a sophisticated text reader, the program also offers a rich array of features to reinforce the core reading skills research has shown to be important. These include decoding, fluency, comprehension and writing. Each of the sections below highlights a core skill, lists the Kurzweil 3000 features that reinforce the skill, and then cites relevant research that validates the importance of the skill.

#### I. Struggling readers require a multi-sensory approach to reading instruction

Struggling readers using computer-based remediation providing auditory, visual, and kinesthetic feedback, outperform control groups receiving regular classroom instruction. Multi-sensory support in learning targeted words as well as opportunities for consistent, meaningful practice, have been shown to help struggling students become more accurate and fluent readers.

Kurzweil 3000 features that develop accuracy and fluency include:

- The ability to read scanned text, digital files or Internet pages
- Visual tracking of words as text is read
- The ability to insert recorded or printed notes anywhere in a document
- Auditory support when typing
- The ability to highlight and hear targeted words
- The ability to divide targeted words into syllables
- The ability to playback a targeted word as often as necessary to facilitate learning

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
J. Montali, L. Lewandowski	<i>Bimodal Reading: Benefits of a Talking Computer for Average and Less Skilled Readers</i>	Journal of Learning Disabilities, 29 (3): 271-279, 1996	Average readers and readers with LD in eighth and ninth grades were presented with reading passages in three different formats: visual only, auditory only, and combined visual and auditory (bimodal). Not only did LD students perform better when text was presented bimodally, their comprehension was similar to average readers.

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
B.W. Wise J. Ring R.K. Olson	<i>Individual Differences in gains from computer-assisted Remedial Reading with more emphasis on Phonological Analysis or Accurate Reading in Context</i>	Journal of Experimental Child Psychology, 77: 197-235, 2000	For children with reading disabilities, reading stories with computer speech support for difficult words can lead to substantial growth in phonological decoding, word reading, spelling, and reading comprehension that transfers to improved independent reading without computer support. All poor readers in the 2 <sup>nd</sup> -5 <sup>th</sup> grades benefited from accurate reading of text on the computer, and it appears that the addition of explicit computer-supported decoding instruction has additional benefits for the youngest and weakest readers.

## II. Pre-Reading skills improve comprehension

Some of the ways Kurzweil 3000 supports pre-reading include allowing students:

- To use the Read feature to quickly read through a document
- To use notes to jot down questions or comments
- To highlight critical information or unfamiliar vocabulary for further review

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
J. Cibrowski	<i>Using Textbooks with Children who Cannot Read Them</i>	Remedial and Special Education, 16: 90-101, 1995	Pre-reading is the most important phase of instruction for poor readers. It enables them to anticipate the information covered in the text, provides a purpose for reading, and serves as a stimulus for recalling previously learned information.

## III. Vocabulary instruction improves comprehension

Kurzweil 3000 is ideal for teaching vocabulary. Students can look up unfamiliar words as they read or highlight unfamiliar words to define and study. For example, they can use:

- The online dictionary for instant definitions
- The thesaurus to generate a list of synonyms
- The syllable tool to more easily identify roots, prefixes and suffixes
- Quick access to the Internet with Kurzweil 3000 for additional background information

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
J.A. Dole C. Sloan W. Trathen	<i>Teaching Vocabulary within the Context of Literature</i>	Journal of Reading, 38(6), 452-460, 1995	Being able to use a variety of sources helped students learn words on a deeper level.

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
K. A. Koury	<i>The Impact of Pre-teaching Science Content Vocabulary Using Integrated Media for Knowledge Acquisition in a Collaborative Classroom</i>	Journal of Computing in Childhood Education, 7(3-4), 179-197, 1996	Pre-teaching specialized vocabulary using a variety of media, helped students learn content-related vocabulary.
D. Reinking S.S. Rickman	<i>The Effects of Computer-Mediated Texts on the Vocabulary Learning and Comprehension of Intermediate Grade Readers</i>	Journal of Reading Behavior, 22(4), 395-411, 1990	6 <sup>th</sup> grade students receiving computer instruction of difficult text words scored higher on vocabulary measures than students reading printed pages with dictionaries or glossaries.
R. J. Ryder M. F. Graves	<i>Vocabulary Instruction Presented Prior to Reading in Two Basal Readers</i>	Elementary School Journal, 95(2), 139-153, 1994	Pre-teaching vocabulary by paying attention to the meanings of common roots, prefixes, and affixes, helped students define and learn new words.
G. Johnson R. Gersten D. Carnine	<i>Effects of Instructional Design Variables on Vocabulary Acquisition of LD Students: A Study of Computer Assisted Instruction</i>	Journal of Learning Disabilities, 20, 206-212, 1987	Computer assisted instruction proved to be an effective way for struggling readers to learn new vocabulary words.

#### **IV. Enhanced concentration improves reading fluency**

Many students with learning disabilities also have attentional issues. Studies done with college students with an attention disorder showed that the use of Kurzweil 3000 enabled them to concentrate on their reading for longer periods of time, experience less fatigue and stress, as well as significantly increase their rate of reading. Kurzweil 3000 helps students stay focused by:

- Preventing students from skipping or missing parts of words
- Transforming reading into an interactive rather than passive process
- Providing timely feedback so students need not interrupt their flow of reading

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
L. Hecker L. Burns J. Elkind K. Elkind L. Katz	<i>Benefits of Assistive Reading Software for Students with Attention Disorders</i>	Annals of Dyslexia, Vol. 52, 2002	The use of Kurzweil 3000 allowed post-secondary students with an attention disorder to read longer, faster and with less fatigue than students not using assistive software. Because students were able to complete assignment in less time, they experienced less stress and developed a more positive attitude toward their studies.

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
J. Elkind	<i>Computer Reading Machines for Poor Readers</i>	Perspectives, International Dyslexia Association, Vol. 24, No. 2, Spring 1998	The use of Kurzweil 3000 enabled struggling readers with good oral language capabilities to improve their reading rate and comprehension as well as increase the length of time they were able to read without tiring.

## V. Comprehension

By providing auditory and visual access to text, Kurzweil 3000 allows struggling readers to focus on understanding the text while supporting their accurate decoding of difficult words. A number of Kurzweil 3000 features further facilitate comprehension. For example, students can:

- Take notes in the margin to restate an idea or to insert additional information
- Drag and drop text from other documents into margin notes or footnotes
- Generate questions in the form of notes which can be extracted into a separate outline
- Highlight critical information using up to four colors
- Create outlines or flash cards from highlighted text
- Instantly locate specific sections of the text
- Make multiple passes through a document to check for different things
- Open both the original document and a text document at the same time, so they can refer to the original while answering questions or summarizing

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
J.B. Schumaker D.D. Deshler G.R. Alley M.M. Warner P.H. Denton	<i>MULTIPASS: A Learning Strategy for Improving Reading Comprehension</i>	Learning Disability Quarterly, 5:295-304, 1982	MULTIPASS - a comprehension strategy where students are taught to make several passes over a textbook, improved comprehension and memory.
J.K. Torgesen	<i>Issues in the Assessment of Executive Function: An Information Processing Perspective</i>	Frames of Reference for the Assessment of Learning Disabilities, G. Reid Lyon (Ed), 143-162, 1994	Good readers internalize a variety of strategies to monitor their comprehension while poor readers do not. Useful strategies such as pre-reading or identifying and re-reading confusing material can be successfully taught.
E. Marzola	<i>Interrogating the Text: Questioning Strategies Designed to Improve Reading Comprehension</i>	Reading, Writing, and Learning Disabilities, 243-258, 1988	Several questioning techniques have proven to be successful in teaching comprehension strategies before, during and after reading.
L.K.S. Chan	<i>The Relationship of Motivation, Strategic Learning and Reading Achievement in Grades 5,7,and 9</i>	Journal of Experimental Education, 62, 319-339, 1994	Diverse learners benefited from the use of a variety of comprehension strategies rather than any one strategy alone.

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
B.S. Billingsley T.M. Wildman	<i>Facilitating Reading Comprehension in Learning Disabled Students: Metacognitive Goals and Instructional Strategies</i>	Remedial and Special Education, 11(2), 18-31, 1990	Explicit strategy instruction was more effective than strategies used by the teacher but not directly taught.

## VI. Fluency

Fluency is the ability to read independently with ease and accuracy. Struggling readers often read haltingly, without attention to punctuation, and have difficulty grouping words into meaningful grammatical units. Even when they can decode individual words, they still read connected text inaccurately. Like other skills, fluency can be improved through practice. Some of the ways students can use Kurzweil 3000 to build fluency include:

- Focusing on chunks of words by breaking text into segments
- Improving focus and accuracy by increasing font size or decreasing number of words on the screen
- Training the eye to move more quickly across the page by gradually increasing reading speed
- Reinforcing the flow and cadence of the words by listening to a passage multiple times

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
C.E. Snow M.S. Burns P. Griffin	<i>Preventing Reading Difficulties in Young Children</i>	National Academy Press, Washington, D.C., 1998	Children who do not develop reading fluency, no matter how bright they are, will continue to read slowly and with great effort.
L. Moats	<i>Spelling: Development, Disabilities and Instruction</i>	York Press, MD, 1995	Recognizing meaningful chunks of text helps develop fluency. Most readers chunk automatically, however, struggling readers need to be taught chunking strategies.
L. Moats	<i>Spelling: Development, Disabilities and Instruction</i>	York Press, MD, 1995	Repeated reading of phrases and longer chunks of text helps students become more fluent readers by increasing their awareness of the functional role phrases play in sentences.
K. Rayner	<i>Eye Movements in Reading and Information Processing: 20 Years of Research</i>	Psychological Bulletin, 124, 372-422, 1998	Skilled readers learn to take in more information about words in a single fixation. This ability is critical to fluent reading and can be taught.
J.E. Hasbrouck G. Tindal	<i>Curriculum-based Oral Reading Fluency Norms for Students in Grades 2 through 5</i>	Teaching Exceptional Children, 24(3), 41-44, 1992	Listening to text orally several times before reading independently was shown to aid fluency development.

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
W.H.J. Van Bon L.M. Bokeseveld T.A.M. Font Freide A.J.M. van den Hurk	<i>A Comparison of Three Methods of Reading-while-Listening</i>	Journal of Learning Disabilities, 24, 471-476, 1991	Simultaneous oral reading while listening to text promoted fluency in struggling readers.

## VII. Writing and proofreading

Readers struggling with decoding and spelling naturally have difficulty with written expression. Some of the ways Kurzweil 3000 can help students write more effectively include:

- Brainstorming ideas
- Highlighting important information and turning it into an outline
- Using the spelling tool, dictionary, or word prediction tool as needed
- Using the thesaurus to embellish language
- Listening to what they've written to proofread for content and spelling

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
R. Gersten S. Baker	<i>Teaching Expressive Writing to Students with Learning Disabilities: A Meta-analysis</i>	Elementary School Journal, 101(3), 251-72, 2001	A review of the research shows that students with disabilities can be taught to write better if given proper instruction and using the right tools.
S. Graham K. Harris G. Troia	<i>Self-regulated Strategy Development Revisited: Teaching Writing Strategies to Struggling Writers</i>	Topics in Language Disorders, 20(4), 1-14, 2000	Students can be taught to self regulate their writing by learning strategies for planning, producing, revising and editing their written work.
C. MacArthur	<i>Using Technology to Enhance the Writing Process of Students with Learning Disabilities</i>	Journal of Learning Disabilities, 29(4), 344-354, 1996	Students with Learning Disabilities produced better essays when using some type of assistive technology than when they wrote by hand.
T.L. Bright	<i>Integrating Computers into the Language Arts Curriculum</i>	Paper presented at the Indiana Fall Language Arts Conference, 1990	With instruction and support, most students can experience success with writing through the use of the word processor.
J. Newman	<i>Language Learning and Computers</i>	Language Arts, 61(5), 494-97, 1984	Word processing allows writers to focus on the ideas they are trying to capture instead of adhering to the mechanics of writing and revision.

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
J. Newman	<i>Language Learning and Computers</i>	Language Arts, 61(5), 494-97, 1984	With drill and practice software the computer is in control – but with word processing, the learner exerts control both in using the computer and in learning.
M. Cochran-Smith	<i>Word Processing and Writing in Elementary Classrooms: A Critical Review of Related Literature</i>	Review of Educational Research, 61(1), 107-55, 1991	The role of computers is changing from drill and practice to a tool for handling information. A word processor can become the centerpiece of an effective writing curriculum, encouraging early language production and providing students with opportunities to connect reading and writing.
B. Pisha	<i>Rates of Development of Keyboarding Skills in Elementary School-Aged Children With and Without Identified Learning Disability</i>	Doctoral Thesis, Harvard University School of Education, 1999	Word processing enables students to produce assignments that are both legible and neat, and a great help to students whose handwriting cannot be read easily. Students were able to learn rapidly with the use of keyboarding tutorial.
C.A. MacArthur	<i>Word Processing with Speech Synthesis and Word Prediction: Effects on the Dialogue Journal Writing of Students with Learning Disabilities</i>	Learning Disability Quarterly, 21(2), 151-166, 1998	Studies suggest that word prediction may actually improve writing and spelling accuracy for students with learning disabilities.
J.A. Wong-Kam K. Au	<i>Improving a 4<sup>th</sup> Grader's Reading and Writing</i>	Reading Teacher, 41(8), 768-72, 1988	Notetaking during reading helps students gain a deeper understanding of word meanings, deduce logical relationships among ideas, and infer probable conclusions based upon textual cues.

### VIII. Study skills and test taking skills

Struggling readers have a great deal of difficulty both studying for and taking tests. Kurzweil 3000 can help students study more effectively for tests. It can also be used as an accommodation for test taking. Some of the benefits students derive from using Kurzweil 3000 to study or take tests include:

- Learning information more effectively through the use of strategies such as pre-reading, highlighting, taking notes, and summarizing
- Creating outlines by extracting key information to facilitate review
- Accessing the text being studied while answering sample questions on a separate document

- Answering fill-in-the-blank, multiple choice, true/false, short answer and essay questions electronically
- Practicing using different test formats
- Reading the question and answer aloud to check answers
- Providing access to supports such as dictionary and thesaurus as the testing situation allows

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
S. De La Paz B. Owen K. Harris S. Graham	<i>Riding Elvis's Motorcycle; Using Self-regulated Strategy Development to PLAN and Write for a State Writing Exam</i>	Learning Disabilities Research and Practice, 15(2), 101-109, 2000	The mnemonics PLAN and WRITE were successfully used to help students prepare for a state exam. Students used the mnemonics to remind them of strategy steps to use before starting to write and while composing.
J.E. Wall	<i>Technology-Delivered Assessment: Diamonds or Rocks?</i>	ERIC, 2000	When used properly, technology plays an important role in assessment in providing access as well as individual adaptations.
G. Tindal B. Heath K. Hollenbeck P. Almond M. Harniss	<i>Accommodating Students with Disabilities on Large-scale Tests: An Experimental Study</i>	Exceptional Children, 64: 439-450, 1998	Reading math questions aloud to students improved the scores on a statewide math test of students with reading disabilities, but not those of students without disabilities.
L.S. Fuchs D. Fuchs S. Eaton C.L. Hamlett K. Karns	<i>Supplementing Teachers' Judgments of Mathematics Test Accommodations with Objective Data Sources</i>	School Psychology Review: 29, 65-86, 2000	When students were read the text surrounding math problems, their math scores were more valid indicators of their math skills.

## IX. Internet access

Student can easily access the Internet with Kurzweil 3000 and use the reading and many of the study skills tools with Internet pages. Struggling readers now have the ability to:

- Access unlimited resources
- Research any topic
- Communicate with subject matter experts
- Communicate with students around the world

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
D. Rose A. Meyer	<i>Universal Design for Individual Differences</i>	Educational Leadership, 58(3), 39-43, 2000	Many struggling readers have difficulty gathering and synthesizing information for their academic work. Internet communications, multimedia and universal design can provide new learning tools.

<b>Author</b>	<b>Title</b>	<b>Source</b>	<b>Summary</b>
The Children's Partnership	<i>Online Content for Low-income and Underserved Americans: The Digital Divide's new Frontier/ A Strategic Audit of Activities and Opportunities</i>	The Children's Partnership, 2000	Much of the information on the Internet is written for audiences with an advanced literacy level. A wealth of content is therefore inaccessible to struggling readers without some type of accommodation.
F. Sosenke	<i>World Tours</i>	Learning and Leading with Technology, 27(5), 32-5, 2000	Teachers cited many educational benefits of the Internet including: the development of research skills, integrated learning, interactivity, handling difficult topics, multicultural learning, and collaborative problem solving.

## **In Conclusion**

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In his address to the 2003 International Dyslexia Conference, Reid Lyon, Director of the National Institute of Child Health and Human Development, commented with both concern and dismay that national reading scores have not improved despite the widespread adoption of phonics based reading materials. Other speakers picked up on this theme suggesting that both researchers and educators have to pay more attention to the other parts of reading: vocabulary development, reading for comprehension and information and fluency. Text to speech software such as Kurzweil 3000 has proven to be one of the most successful ways of exposing struggling readers to subject matter content at their grade level while helping them become more accurate and fluent readers. Given the high stakes set by NCLB, making assistive technology like Kurzweil 3000 available to needy students may be one of the wisest investments a school can make.





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Professor of Psychology at University of Colorado and an expert on the etiology and remediation of reading disabilities.

## **About Kurzweil Educational Systems**

Kurzweil Educational Systems, Inc. founded in 1996, is the industry leader and innovator of scanning, reading and learning solutions for people with learning difficulties, and people who are blind or visually impaired. Ray Kurzweil, a co-founder of the original company, invented computer-based reading machine technology 25 years ago to provide access to printed text for the blind. With a pioneering history in developing assistive technology, the company has received worldwide recognition for enabling people with disabilities to lead more independent lives through improved reading and writing abilities.

## **About Kurzweil 3000**

Kurzweil 3000 is reading, writing and learning software for struggling students, and is widely recognized as the most comprehensive and integrated solution for addressing language and literacy difficulties. The software uses a multi-sensory approach – presenting printed or electronic text on the computer screen with added visual and audible accessibility. The award-winning product incorporates a host of dynamic features including powerful decoding, study skills, writing and test taking tools all designed to adapt to each individual's learning style and to promote active learning.

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