



## Opening the Doors to Learning: Technology Research for Students with Learning Disabilities (Reading Skills)

(2003)

### In this article:

- **Robert's Story**
- **Features of the Technology**
- **Making it Work in the Classroom**

The Office of Special Education Programs (OSEP) has primary responsibility for administering programs and projects relating to the free appropriate public education of all children, youth and adults with disabilities, from birth through age 21. For nearly a decade, through its Technology, Development, Demonstration, and Utilization Program, OSEP) has been developing learning tools and instructional practices that help engage the minds and foster the independence of individuals with physical, sensory, intellectual and emotional disabilities.

The Technology Program supports research, development, and dissemination activities that advance the availability, quality, use, and effectiveness of tools in educating children and youth with disabilities. Teachers, parents and administrators will be able to use these materials to incorporate research-based practices and technological tools in the classroom to help students with learning disabilities. The video features positive examples of how students and teachers can benefit for the use of technology in their classrooms. The accompanying text offers in-depth information about the technology applications shown in the video.

### Robert's Story

Robert Smith is an elementary school student at an urban school in Boston. As Robert and his classmates began learning how to read, the teacher noticed that Robert often showed signs of frustration as he struggled with reading tasks. Robert had difficulty sounding out words and recognizing basic sight vocabulary. Typically, Robert relied on others to tell him the words on a page rather than sounding them out for himself. It was clear to the teacher that Robert needed repetitive practice and individualized instruction to strengthen his basic reading skills. It was also clear that with a busy classroom of 20+ other youngsters, there was no way to provide the level of one-on-one support Robert needed on a consistent basis.

The *Wiggleworks* software program, developed by researcher Bart Pisha, proved to be an effective technology solution. Pisha designed *Wiggleworks* for beginning readers like Robert who need repeated practice reading stories. The software program, which helps to expose students to a large number of books, functions as an electronic storybook. Robert can flip through "pages" of the book on the computer screen.

Pisha has also built into the *Wiggleworks* program a variety of student supports--many of which directly address Robert's individual needs. By clicking on individual words or phrases with the mouse, Robert can hear them spoken by a recorded voice, or can see a picture of their meaning. The computer can also read the entire book aloud, highlighting each word so Robert can follow along. These supports enable Robert to practice basic reading skills at his own pace.

Robert and his fellow classmates typically work independently with the computer program each day for twenty minutes. Students move to the three classroom computers in shifts, so that each child has his or her own individualized time with the program. The teacher selects the books for students.

With *Wiggleworks*, Robert has become more confident with reading, seeing reading as a fun activity rather than a chore. As Robert's frustration turns to enjoyment, his teacher has seen a marked improvement in both his reading skills and his overall attitude towards learning.

### Features of the Technology

Print, the primary medium of the classroom, presents barriers for children who are blind, dyslexic, physically challenged, or who speak English as a second language. *Wiggleworks* is a multi-media curriculum that is by its architecture accessible to students with a wide range of abilities. There are several important benefits of *Wiggleworks* for children with reading difficulties. These include:

- The opportunity for children to practice manipulating words and phrases as part of their exposure to the print material.
- A decreased opportunity for error which results in an increased sense of control as emergent readers.
- Pacing that is matched to the student's individual needs.

Seventy-two leveled books are available in print and on CD-ROM. Built into the software program is a rich set of learning activities that includes models of skilled performance and opportunities for supported practice. Students engage in stories through listening, reading, writing, drawing, and performing, as well as manipulating letters and words. Teachers can customize options for information display and program control. Features such as variable text size and color, talking buttons, scanning for single switch access, and read-aloud options support students with varied learning styles, disabilities, and linguistic backgrounds.

The *Wiggleworks* software runs on personal computers equipped with audio and graphic capabilities. Students using the program sit at the computer and flip through pages of the electronic storybook in much the same way as they would with a real book. On each page students see a drawing or illustration accompanying the text. Users can read the text independently, or can request a number of support options. Clicking various option buttons on the screen, students can hear the entire page read to them, or can choose for the computer to identify individual words or phrases that give them difficulty. Users can spend as little or as much time reading and re-reading passages until the text becomes clear to them, and the computer provides the individualized support that students need to complete the story.

(Editor's Note: *Wiggleworks* Beginning Literacy System is available through **Scholastic**)

### **Rationale: Using Technology to Support Effective Instruction**

Young students with learning disabilities who are beginning to read often struggle to develop phonemic and sight word recognition skills. Many spend so much time concentrating on the initial stages of reading that they never fully develop fluency at the word level and grapple with the more complex issue of text comprehension. Research has recently suggested that effective reading instruction for students with learning disabilities must focus on activities that will strengthen their decoding and word reading skills to support, rather than detract from, text comprehension.

*Wiggleworks* software addresses these concerns about the relationship between fluency and comprehension by providing students with practice on basic reading skills within the broader context of text comprehension. Students do not simply learn lists of sight words by rote, but rather encounter new words and phrases within the context of stories read through the computer. Furthermore, because the program provides as much or as little support as a student needs, it ensures that any difficulties with individual sight-word recognition does not hinder students from understanding the text as a whole.

*Wiggleworks* incorporates two important instructional practices for teaching primary reading instruction in its approach. These practices, demonstrated in various ways through the video, include repetitive practice with feedback and individualized instruction.

Repetitive practice with feedback. Emergent readers need numerous opportunities to explore print. For many years, teachers have used repetitive practice to engage emergent readers in print, and have found ways to provide them with feedback. However, for students with reading difficulties, additional support is often needed. For example, for some students with disabilities, exposure to print is sometimes not enough. They often need support in understanding the meaning of print and how it communicates meaning. These students typically benefit from multiple opportunities to manipulate words and phrases, and to hear and see them simultaneously. They also require feedback regarding their own progress.

The *Wiggleworks* program allows students to repeat words, pages, or entire books until they feel like they have mastered the material. Students come to rely on the repetitive capabilities of the program.

Individualized instruction. Emergent readers who experience difficulties often require more individualized instruction--a cornerstone of special education. There is a real danger at this early age that if children repeatedly fail at reading, they will never achieve proficiency in literacy. Thus, content must be appropriate for the individual student, and presented at a rate that encourages mastery. In the *Wiggleworks* program, children develop explicit strategies at their own pace and at a level that they are capable of mastering.

The *Wiggleworks* software program provides individualized instruction only to the extent that students can seek the support they need. The program gives children as much or as little support that they need to navigate through the stories. To ensure success, teachers can pre-program the software to allow students to perform certain activities.

### **Making it Work in the Classroom: Suggestions from Ron Fernandez, Robert's Teacher**

Ron Fernandez teaches first grade. His group of 21 students have diverse learning abilities. Before using *Wiggleworks*, Fernandez admits that he didn't think seriously about using a computer for instructional purposes. Now, after two years of experience and the addition of three computers in his classroom, he has established a clear routine for integrating the software into his reading instruction for all students, including those students who have difficulty reading.

First off, Fernandez arranged his room accordingly. With three computers and 21+ students, he needed a plan whereby 7 children would share each computer. To support the students in following the routine, a large chart with the names of the students assigned to the particular computer was placed on the back of each terminal. Children were instructed to visit the computer one at a time, for a maximum of 20 minutes. Each child is instructed to keep track of the person who is ahead of them in line for the computer, so that they waste little time when assuming their own place at the computer. Although the scheduling of the 20 minute blocks may change each day, no student is ever allowed more than 20 minutes on the computer.

Fernandez found that the children were not afraid to explore the computer. Students rarely needed to be trained in how to use the computer; although, they did need some initial instruction in using the actual software. Students with prior exposure to computers were working independently almost immediately.

To maximize individualization, Fernandez uses a preset three-week program suggested by Pisha. Every three weeks, students are exposed to four different books. Before the students read a new book on the computer, Fernandez introduces the book and explains the activities they will be using to read it. Students are then prepared to work independently on the program. During the three-week period, each child must select a hard copy of one of the electronic books and read it aloud to Fernandez. Besides helping students to feel successful with their reading, it is also a strategy that Fernandez uses to monitor each child's progress.

In the two years that Fernandez has been using the program, he has presented books on the computer that introduce and set up lessons in other subject areas. For example, to support a science unit on dinosaurs, Fernandez had the students read a book on dinosaurs on the computer, and then use the information in that book for group activities.

Office of Special Education Programs U.S. Department of Education

---

<http://www.1donline.org/article>

[/Opening\\_the\\_Doors\\_to\\_Learning%3A\\_Technology\\_Research\\_for\\_Students\\_with\\_Learning\\_Disabilities\\_%28Reading\\_Skills%29?theme=print](http://www.1donline.org/article/Opening_the_Doors_to_Learning%3A_Technology_Research_for_Students_with_Learning_Disabilities_%28Reading_Skills%29?theme=print)

© 2008 WETA. All Rights Reserved.