



Big Leap™

Special Education Program

El Cerrito, CA and Pinole, CA
Spring 2006



ABSTRACT

Over a 12-week period using the *Big Leap* program, preschool students with autism and other disabilities gained nearly 35% in letter sound identification and 9% in knowledge of letter names. Kindergarten and first-grade students with severe disabilities grew 29% in letter name recognition and 107% in letter sound identification using the same materials.

These findings indicate that the explicit, multisensory instruction provided through the *Big Leap* program is effective in supporting early literacy development in young children with special needs.

INTRODUCTION

Congress's 2004 reauthorization of the Individuals with Disabilities Act Education Improvement (IDEA) called attention to the nation's commitment to provide children with special needs an appropriate education in the least restrictive environment possible. Among both policy makers and practitioners, there is growing recognition that with appropriate

support, even students with severe disabilities can access many elements of the general education curriculum.

When it comes to building a foundation for literacy, students with special needs benefit from the same best practices in reading instruction that help all students. The 2000 report of the National Reading Panel concluded that effective teaching includes direct, explicit instruction in areas such as phonemic awareness, phonics, and the alphabetic principle. Research also supports the importance of these prereading skills. Knowledge of letter names has been identified as a strong predictor of kindergarten reading achievement (Share, Jorm, Maclean, & Matthews, 1984), while letter sound knowledge is recognized as a key to understanding the alphabetic principle and to making the connection between letters in print and spoken sounds (Foulin, 2005). And students' facility in tasks related to the manipulation of phonemes, such as rhyming, blending, and segmentation, has long been tied to later success in reading acquisition (Bradley & Bryant, 1983; Gough & Tunmer, 1986; Snider, 1997). Furthermore, research indicates that explicit instruction in these early literacy skills is most effective, particularly for at-risk students and children

with special needs (Cunningham & Stanovich, 1990; Foorman, Francis, Fletcher, Mehta, & Schatschneider, 1998).



LeapFrog SchoolHouse's *Big Leap*[™] program was developed specifically to support early literacy development in students with special needs. The program uses interactive, technology-based components to teach print concepts, phonemic awareness, phonics, vocabulary, listening, and comprehension. Children receive direct, repetitive practice with these skills through individual components such as the *LeapDesk*[™] workstation, the *LeapMat*[™] learning surface, and *LeapPad*[®] personal learning tools (PLTs) with interactive books. The program includes easy-to-use teaching strategy cards that outline activities for teachers and paraprofessionals to implement using specific components. By providing targeted instruction along with embedded corrective feedback, the *Big Leap* materials give students with disabilities the added support they need to develop literacy skills that their general education

peers acquire more easily during early reading instruction.

This 12-week study investigated the effectiveness of the *Big Leap* program across two special education classrooms within the West Contra Costa Unified School District in the San Francisco Bay Area: a half-day preschool classroom at Castro Elementary and a K–1 severely handicapped (SH) transitional classroom at Ellerhorst Elementary.

METHOD

Sample

Located northeast of San Francisco, West Contra Costa Unified is an urban school district serving more than 32,000 students across five diverse cities. The classrooms in this study come from two schools in different cities within the district.

Castro Elementary in the suburb of El Cerrito enrolls just more than 300 students, 82% of whom are ethnic minorities and 36% of whom participate in the free or reduced-pricelunch program. The preschool classroom at this school is one of several half-day programs throughout the district for three- to five-year-old children with special needs. The class is cotaught by two experienced teachers who alternate days in the classroom; they are supported by two regular paraprofessionals, as well as by parent volunteers who often attend with their nondisabled children as part of a reverse-mainstream program three days per week.¹ Eight special needs students were given parental consent to participate in the study, representing a range of disabilities, including autism, Down syndrome, cerebral palsy, and speech and language impairment. Students' cognitive abilities ranged from less than two years of age to six years of age. Some students had little or no functional speech. Of the five students who were able to be assessed for purposes of this study, three were high-functioning students with autism and the other two were diagnosed with speech and language disabilities.²

¹ These nondisabled children were not assessed or followed with respect to this study.

² The other three students were cognitively unable to participate in the testing at either pre-test or post-test.

Ellerhorst Elementary is located in the suburban city of Pinole and serves more than 450 students, 54% of whom are ethnic minorities and 21% of whom participate in the free or reduced-price lunch program. The K–1 SH transitional classroom at Ellerhorst is one of three self-contained special education classrooms at the school. The class is led by a single teacher with support from two paraprofessionals. Like the preschool students, children in this group also had a range of diagnosed disabilities, including autism, mental retardation, and speech and language impairments. Though their chronological ages ranged from five to eight years of age, their cognitive abilities covered a span from three to five years of age. Of the nine students who were enrolled throughout the pilot from March to June, one was not testable and another was not given parental consent to participate, leaving seven study participants.

Treatment

In late February, both preschool teachers attended a two-hour professional development session introducing the *Big Leap*[™] program. They also received in-classroom coaching throughout the 12-week pilot. The K–1 teacher, who was already familiar with both the technology and some components of the program, received only coaching visits. Students in both classrooms regularly used the *Big Leap* materials from early



March 2006 through early June 2006, for an implementation period of approximately 12 weeks. Students in the K–1 classroom had access to select components of the program beginning in August 2005. Results related to their extended exposure to these materials will be discussed following the analysis of results from the *Big Leap* implementation.

Preschool Classroom

The teachers in the preschool classroom incorporated elements of the *Big Leap* program into an existing routine that included open play, circle time, and guided work on art and other projects related to the current classroom theme (transportation, dinosaurs, etc.). Items such as the *Fridge Phonics*[™] magnetic letter set, *LeapPad*[®] PLTs with books and puzzles, and plush interactive learning aids were accessible to students at all times. Materials such as the *LeapMat*[™] learning surface and the *LeapDesk*[™] workstation were the focus of more targeted group instruction during circle time. One teacher also used the Leap A-Z plush learning aid extensively during circle time, having students sing along with the phonics song while making a physical movement associated with each letter. Depending on their cognitive levels, some students were exposed to certain components more than others. While most children needed the support of a paraprofessional to access the *LeapPad* PLTs with books, higher-functioning students could navigate materials such as these and the *Imagination Desk*[™] learning center independently. Other children spent more time with the *Fridge Phonics* magnetic letter set and the plush aids.

K–1 Classroom

The K–1 teacher used the *Big Leap* components as a supplement to the district's basal reading program, Open Court Reading (OCR), and a supplemental writing program, Handwriting Without Tears[®]. Students used the *Big Leap* materials daily, both for individualized practice

and as a part of whole-group or small-group instruction. The *LeapDesk*™ workstation and *Imagination Desk*™ learning center were set up as learning stations within the classroom, with students working through prescribed activities related to current lessons. Materials such as the *LeapMat*™ learning surface and the plush interactive learning aids were frequently used with pairs or small groups of students, and all students worked on books or puzzles on the *LeapPad*® PLTs almost daily. This teacher also regularly showed the *Letter Factory*™ video to the whole group, pausing after the introduction of each new letter to help students write the letter on their personal dry-erase tablets.

Students in both classrooms were individually assessed by LeapFrog SchoolHouse staff over a two-week period in early March on an untimed measure of letter name identification, as well as on an untimed measure of letter sound identification.³ Where possible, students were also assessed on the DIBELS® Initial Sound Fluency (ISF) subtest⁴ and/or the Woodcock-Johnson® III Test of Sound Awareness subtest⁵ in rhyming. The same assessments were administered as a post-test over a one-week period at the end of the study.

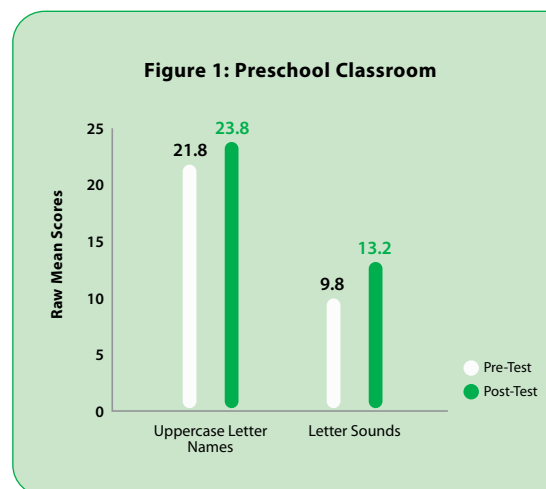
RESULTS

After using the *Big Leap*™ materials for 12 weeks, students in both groups showed statistically significant growth in uppercase letter naming, as well as impressive growth in letter sound identification. Select students who could be tested in rhyming and initial sound fluency demonstrated gains in those key phonological processing skills as well.

Preschool Students

Students in the preschool classroom made a statistically significant 9% improvement in letter naming ($t = 3.651$, $p = 0.022$), as well as an almost 35% improvement in letter sound

identification (Figure 1). Both preschool teachers noted that students benefited from the frequent repetition of the song connecting letter names and sounds that is featured across several *Big Leap* components.



Although most children in the preschool classroom were not yet testable in the higher-level phonemic awareness skills at either pre- or post-test, two students were assessed and showed remarkable growth in initial sound fluency. These two five-year-olds, the only students from the group who will attend a general education kindergarten program in the fall, more than doubled their initial sound fluency over the course of the intervention (from 2.59 to 5.64 sounds per minute).

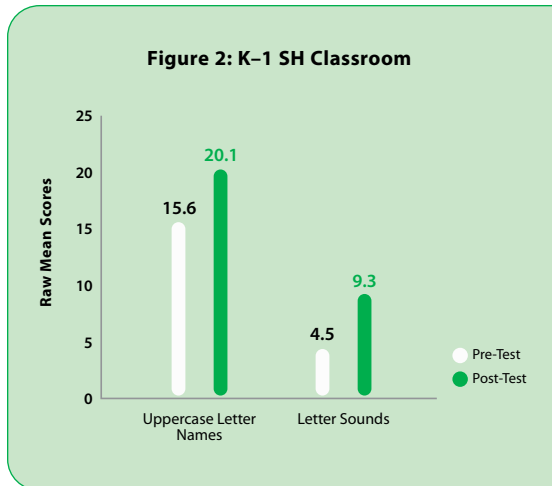
K-1 Students

The seven students in the combined K-1 SH classroom also made significant gains in uppercase letter identification, growing 29% from pre-test to post-test ($t = 3.548$, $p = 0.012$). Six of those children were also assessed in letter sound identification, their scores more than doubling over the same time period (Figure 2). One boy in particular could produce only two letter sounds in March but knew 18 sounds by June; another child knew no sounds at pre-test but 10 sounds at post-test.

³ In both cases, the stimulus consisted of a series of randomly ordered uppercase letters representing the entire alphabet. For letter naming, students were asked to produce as many letter names as possible. For letter sound identification, students were asked to produce as many sounds as possible, including short and long vowel sounds and alternate sounds for the letters *c* and *g* (for a total of 33 sounds).

⁴ Dynamic Indicators of Basic Early Literacy Skills (DIBELS) is produced by the University of Oregon.

⁵ The Woodcock-Johnson III is produced by Riverside Publishing, a Houghton Mifflin company.

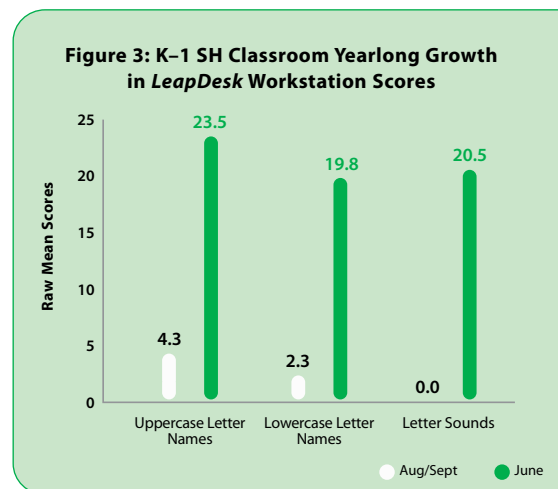


Valid pre- and post-test data in rhyming and initial sound fluency were available for only a subset of students in the K-1 SH classroom, but results suggest progress in these key early literacy skills as well. Four students doubled their average score on the test of rhyming (from 1.5 to 3). The three students for whom initial sound fluency data were available grew 157% from pre-test to post-test (from 2.9 to 7.4 sounds per minute). According to established DIBELS benchmarks, this growth took these students from what is considered an “at risk” score (ISF < 4) to a score approaching the category of “low risk” (ISF >= 8) for children in beginning kindergarten. Although the group of students tested included end-of-year kindergarten and first-grade students, their progress with respect to these benchmarks is nonetheless encouraging given the severity of their disabilities.

K-1 LeapDesk™ Workstation Results

Prior to the pilot study of the *Big Leap™* materials that began in March, students in the K-1 classroom had access to select LeapFrog SchoolHouse® components, including the *LeapDesk™* workstation, an interactive tool for both assessment and instruction in letter names, letter sounds, and phonemic awareness. The teacher administered the *LeapDesk* assessments at the beginning of the school year to provide a baseline for students’ knowledge of upper-

and lowercase letter names and letter sounds. Four children from this original group were still enrolled in her class by June, at which time a post-test on the *LeapDesk* workstation showed dramatic growth over the course of the school year (Figure 3). These children, who knew very few or no letter names and sounds at the beginning of the year, clearly benefited from having a full year’s exposure to LeapFrog SchoolHouse tools such as the *LeapDesk* workstation. By comparison, their classmates who came to the group halfway through the year (in time for the *Big Leap* pilot) were by June beginning to show progress toward catching up to this initial cohort. Given additional exposure to the *LeapDesk* workstation and other *Big Leap* materials, they would likely follow the same growth trajectory of their peers.



Teacher Responses

All of the teachers felt that the *Big Leap* materials were a valuable addition to the classroom, complementing and enhancing concepts that they were already teaching. While the lack of comparable control classrooms makes it difficult to isolate effects of the *Big Leap* program, all three believed that the interactive nature of the *Big Leap* components helped to accelerate both academic and social learning among many students. One teacher commented:

The multisensory components are highly motivational and can be adapted to the individual needs of a wide range of children. Students are especially drawn to materials that they can manipulate—they show greater interest and stay on task longer when they have input into making something happen.

The teachers also said that they appreciated the variety of materials included in the *Big Leap*™ program, ranging from simple components that teach cause and effect to more complicated elements such as the *LeapDesk*™ workstation. Both preschool teachers noted that the *Big Leap* components facilitated social interaction among children of varying cognitive abilities, a benefit that they esteemed as highly as the preacademic skills that children were learning. Several children who were unable to independently access materials such as the *LeapPad*® PLTs benefited from the *Fridge Phonics*™ magnetic letter set, learning to place a letter in the magnetic console and push it to hear its name and sound. As one teacher explained:

[Fridge Phonics] could be used independently by all the children, even if it simply meant their being able to put a piece into the console without understanding the significance of learning the letters of the alphabet. This tool really encouraged socialization. The refrigerator became a gathering place for students with a range of abilities who would not usually gravitate toward one another.

The teacher in the K-1 SH classroom echoed these sentiments about the accessibility of the materials, noting:

My students love the materials, many of which give them a greater sense of independence. They feel like they are in control of their own learning. Several of the components encourage them to “teach” each other when they are paired up. This kind of peer tutoring gives them a sense of importance and develops their social skills.

Furthermore, this teacher noted that she values the measurable progress her students made using the *Big Leap* program. She appreciates the built-in assessment component of the *LeapDesk* workstation, using the results in her individual education plan (IEP) preparations and meetings.

The assessment component is wonderful. It gives a good snapshot of where each child is at that point in time, letting me know what they know and allowing me to map their progress. One of my students was initially designated as “below-average intellectual functioning.” During my fall pre-testing, this student was untestable. He couldn’t follow the basic directions. This same child now knows almost all of his letters and their phonemes. I will advocate at his next IEP meeting to have his status changed to “speech/language impairment” rather than “mentally retarded.”

DISCUSSION

Despite a short window for implementation, results from this study indicate that students with a range of disabilities across two classrooms made significant increases in letter naming ability, as well as notable gains in letter sound identification. Select students who had valid pre- and post-tests in rhyming and initial sound fluency also demonstrated impressive growth on those key tests of phonemic awareness.

In order to become successful, fluent readers, students must first build a foundation consisting of specific early literacy skills. In acquiring that foundation, children with special needs face even greater challenges than their regular education peers. The interactive technologies of the *Big Leap* program deliver the explicit, multisensory instruction that students with learning difficulties need to develop letter knowledge and phonemic awareness. Furthermore, the



diverse components included in the program provide engaging, appropriate content for classrooms serving students with a range of cognitive abilities. Students at all levels benefit from being able to access the materials autonomously, which allows them to experience independent achievement at new levels. Through use of the *Big Leap™* program, these children are making important progress toward accessing a core reading curriculum that they might not otherwise be prepared to experience.

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REFERENCES

- Bradley, L., & Bryant, P. E. (1983). Categorizing sounds and learning to read. *Nature*, *301*, 419–421.
- Cunningham, A. E., & Stanovich, K. E. (1990). Assessing print exposure and orthographic processing skill in children: A quick measure of reading experience. *Journal of Educational Psychology*, *82*(4), 733–740.
- Foorman, B. R., Francis, D. J., Fletcher, J. M., Mehta, P., & Schatschneider, C. (1998). The role of instruction in learning to read: Preventing reading failure in at-risk children. *Journal of Educational Psychology*, *90*(1), 37–55.
- Foulin, J. N. (2005). Why is letter-name knowledge such a good predictor of learning to read? *Reading and Writing: An Interdisciplinary Journal*, *18*, 129–155.
- Good, R. H., & Kaminski, R. A. (Eds.). (2002). *Dynamic indicators of basic early literacy skills* (6th ed.). Eugene, OR: Institute for the Development of Educational Achievement. Available: <http://dibels.uoregon.edu>
- Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, *7*(1), 6–10.
- Individuals with Disabilities Education Improvement Act of 2004.*
- Share, D., Jorm, A. F., Maclean, R., & Matthews, R. (1984). Sources of individual differences in reading acquisition. *Journal of Educational Psychology*, *76*, 1309–1324.
- Snider, V. E. (1997). The relationship between phonemic awareness and later reading achievement. *Journal of Educational Research*, *90*(4), 203–211.
- Woodcock, R. W., McGrew, K. S., Mather, N., & Schrank, F.A. (2001). *Woodcock-Johnson III tests of achievement*. Itasca, IL: Riverside Publishing.

Big Leap™ Special Education Program

El Cerrito, California and Pinole, California

Design: Qualitative

Sample: 2 schools; 12 students

Hispanic: 40%; African-Am: 26%; White: 12%; Asian: 10%; Other: 12%*

ELL: 33%; IEP: 100%

Special Education

*Districtwide ethnic breakdown

ABOUT US: LeapFrog SchoolHouse offers research-based programs designed specifically for the classroom. We publish PreK–grade 8 curriculum and assessment content that is correlated to state standards and enhanced by our proprietary technology-based personal learning tools (PLTs).

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