

Technical Report

Unique Reader: Efficacy Study

Conducted by Learning Today, Inc.

August 2003



Overview

In the United States, there exists a staggering number of students performing well below proficiency level. According to the National Assessment of Educational Progress (2001), only 24% of fourth graders in the United States are at “proficient level” for reading skills. Many different reading approaches attempt to address the needs of these struggling readers. Some programs offer more print exposure through independent reading or offer whole-class fluency work, while others offer controlled texts. Another approach which research suggests is effective in addressing the needs of struggling readers is one-on-one instruction guided by regular assessment of the student’s strategic reading behaviors (Wasik & Slavin, 1998). Let’s Go Learn’s Unique Reader is a novel program which provides this type of individualized reading instruction, similar in logic to on-the-fly decisions made by reading specialists who work with students in one-on-one tutorial intervention models. Unique Reader is guided by an initial comprehensive assessment administered on line which attempts to characterize students’ strengths and weakness in eight sub-areas while it analyzes students’ strategic attention to various letter and sound, semantic, and language structure cues. The results of the initial assessment drive the individualized online lessons designed specifically to a particular student’s needs as defined by that assessment. The instructional component of the program scaffolds students’ learning through an approach which first introduces concepts to students and then invites them to participate in various activities that help them practice those reading concepts in various contexts. It ends by administering a short assessment to determine whether or not students need further practice in a particular skill.

The purpose of this study was to examine the efficacy of the Unique Reader program (branded, in this study, under the name Learning Today Effective Reader Program) with a cohort of students from the Boys and Girls of Belle Glade, Florida. Results of the study demonstrated that students who used the Unique Reader Program showed significant grade-level gains in their sight words, phonics, vocabulary, and reading comprehension skills after 12 weeks in the program when compared to the grade-level gains of students in a control group. It was concluded that a computer-assisted reading instruction program that combines a comprehensive diagnostic assessment with individualized prescriptive instruction can have a positive impact on students’ reading skills.

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The Effects of Computer-Assisted Reading Instruction on Disadvantaged/Limited English Proficient (LEP) Students

**Study Performed by
Learning Today, Inc. of Florida**

Abstract

This study examined the effects of an online diagnostic/prescriptive reading program on the reading achievement levels of Title 1/Limited English Proficient (LEP) students in Belle Glade, Florida. Students showed significant grade-level gains in their sight words, phonics, vocabulary, and reading comprehension skills after 12 weeks in the program when compared to the grade-level gains of students in a control group. It was concluded that a computer-assisted reading instruction program that combines a comprehensive diagnostic assessment with individualized prescriptive instruction can have a positive impact on students' reading skills.

Introduction

Many children in America are considered to be educationally at risk because their reading skills are below national standards. According to the National Center for Education Statistics, 40 percent of all nine-year-olds in the U.S. score below the “basic” level on the National Assessment of Educational Progress (NCES, 1999). Many programs have been created to support such children and provide them with the tools they need to improve their reading skills.

A curriculum that integrates the use of computer instruction in addition to traditional teacher-directed and textbook-based methods has been at the center of many reading programs. Computer-assisted instruction (CAI) has come a long way since it was first introduced in the 1950s. CAI has been greatly developed since those early years and has been scrutinized by educators and researchers as to its practicality and viability as an educational tool. Today, programs are able to assess and diagnose students, offer tutorial and practice activities, and monitor student progress. Research on CAI has repeatedly demonstrated that when using CAI in addition to regular classroom instruction, students show significantly higher gains in academic achievement across all content areas (Kinzie, Sullivan, & Berdel, 1992).

Some of the benefits of CAI are that students are able to receive individualized instruction that is customized to their specific needs; they are able to learn at their own pace; they receive immediate corrective feedback; and they have the opportunity to work with more sophisticated material and problems due to the additional visual and auditory information presented.

Previous studies that examined the effects of CAI on reading instruction have shown CAI to be beneficial. One meta-analysis that looked at over 17 studies based on students K-12 found that CAI reading instruction did have a positive effect on reading achievement (Soe, Koki, & Chang, 2000).

The current study sought to examine the effects of an online diagnostic/prescriptive model of reading instruction on disadvantaged, limited English proficient (LEP) students. Some questions of interest were whether this particular population of students would show improvement in reading skills after a short (12-week) period; what types of gains students would show, given that this was a much more informal setting (students had the freedom to choose either to attend or leave the after-school program); and how the students’ scores would compare with those of a similar group that did not receive instruction.

Methods

Students were selected to participate in the Learning Today Effective Learning Program from four 21st Century Boys & Girls Clubs of Palm Beach County after-school program sites. The sites were Canal Point, Glade View, Pioneer Park, & Rosenwald Elementary. Most students were Limited English Proficient (LEP), Title I students.

A total of 125 students were initially selected to participate in the study. However, only 99 students completed the program. Students ranged from 1st through 5th grade. Sixty-six students received the online reading instruction. The control group consisted of 33 students who received online instruction in other subjects, such as math and social studies. The program ran from January of 2004 to April of 2004, for a total of 12 weeks. Students were expected to use the program for 15-20 minutes per session with a minimum of three sessions per week.

Prior to receiving instruction, students were assessed in six sub-skills (Sight Words, Phonics, Word Recognition, Spelling, Vocabulary, and Reading Comprehension) using the Diagnostic Online Reading Assessment (DORA) (Let's Go Learn, 2003). The system then automatically created individualized, customized lesson plans for each student based on his or her results. Immediately after assessment, students were able to log on and receive reading instruction according to their customized lesson plans in four of the six sub-skills-- i.e., Sight Words, Phonics, Vocabulary, and Reading Comprehension.

Assessment results were measured in grade levels that were further divided into sub-levels of low (indicated by a value of .17), mid (indicated by a value of .5), and high (indicated by a value of .83). A grade-level score was comprised of two parts. The digits before the decimal point indicated the grade level of the child, while the digits after the decimal point indicated the sub-level within that grade level. Thus, a 2nd grader scoring a 1.17 was at a low first-grade level.

Instruction consisted of online web-based lessons. Each lesson was comprised of tutorials, practice/review exercises, and graded activities. If a student successfully passed a graded activity (pass mark was set at 70%), he or she would then proceed to the next lesson in that specific reading sub-skill. If a student did not pass a graded activity, the system would automatically show the student the tutorial again, and he or she would view the graded activity for a second time. Due to randomization of questions, students did not necessarily see the same questions twice. If a student failed a graded activity twice, the system automatically moved him or her on to the next lesson in the sequence within that sub-skill. If a student failed a graded activity twice for five lessons in a row, the system automatically shut down that specific learning sub-skill, indicating that teacher intervention was required. A remediation report of students who had one or more of their tracks shut down was generated immediately and could be accessed by the teacher.

At the end of 12 weeks of instruction, students were re-assessed using the same version of the DORA as in the pre-assessment period.

Results

Grade-level gains (GLG) were computed by subtracting pre-assessment grade-level scores from post-assessment grade-level scores for each student.

The Diagnostic Online Reading Assessment showed that prior to training in the Effective Learning Reading Program, approximately 13% of the students scored below grade level in Sight Words, 75% scored below grade level in Phonics, 39% scored below grade level in Vocabulary, and 79% scored below grade level in Reading Comprehension. After 10-12 weeks in the program, these percentages were reduced with only 6% of the students now scoring below grade level in Sight Words, 48% in Phonics, 24% in Vocabulary, and 53% in Reading Comprehension (see Table 1 & Figure 1).

Sub-skill	% Scoring Below Grade Level at Pre-test	% Scoring Below Grade Level at Post-test
Sight Words	13%	6%
Phonics	75%	48%
Oral Vocabulary	39%	24%
Reading Comprehension	79%	53%

Table 1: Percentage of Students Scoring Below Grade Level from Pre-test to Post-test

The scores of students who showed total mastery in specific reading sub-skills, such as Sight Words and Phonics, on the pre-test were excluded from analysis.

Percentage of Students Scoring Below Grade Level

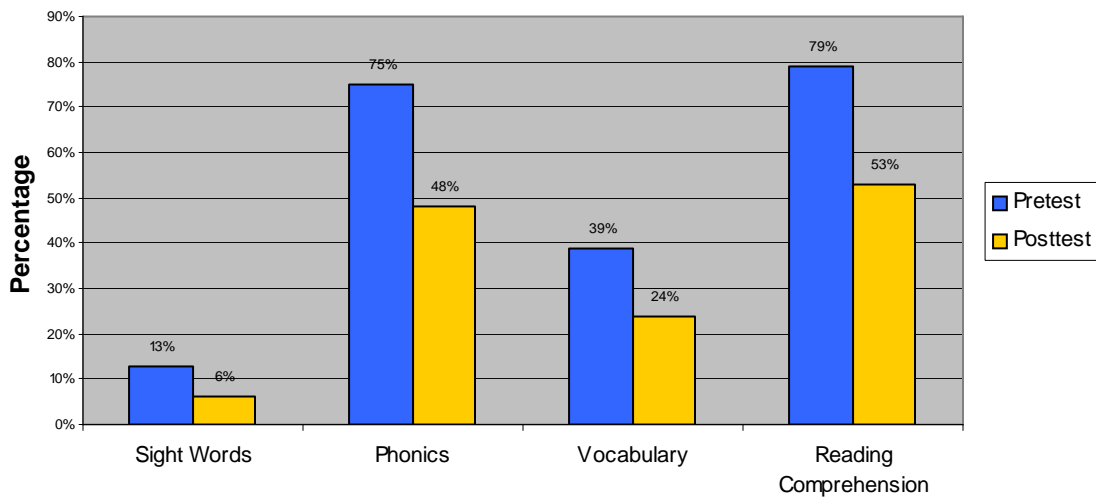
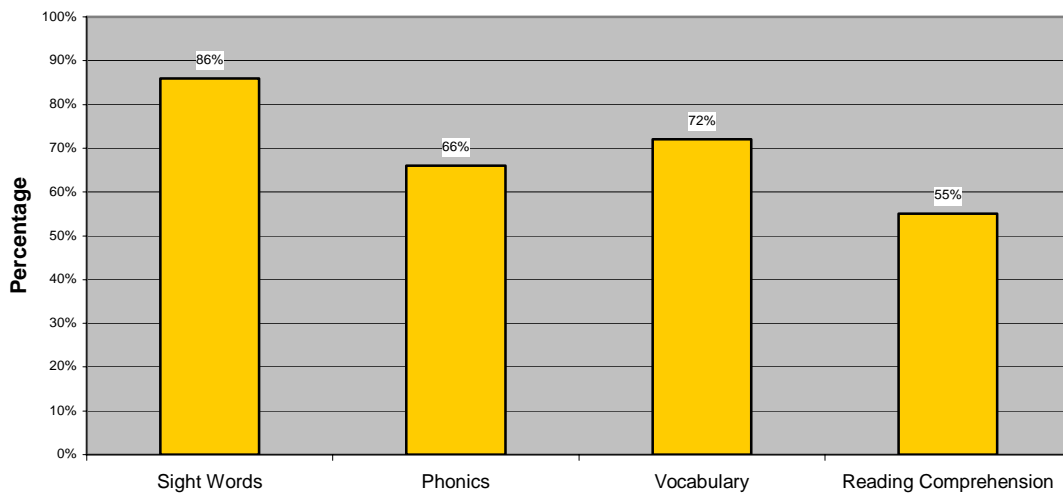


Figure 1: Percentage of Students Scoring Below Grade Level from Pre-test to Post-test

Eighty-six percent of the students in the experimental group showed an improvement or stayed at grade level in Sight Words, 66% in Phonics, 72% in Oral Vocabulary, and 55% in Reading Comprehension.

Percentage that Showed Improvement or Stayed Within Grade Level

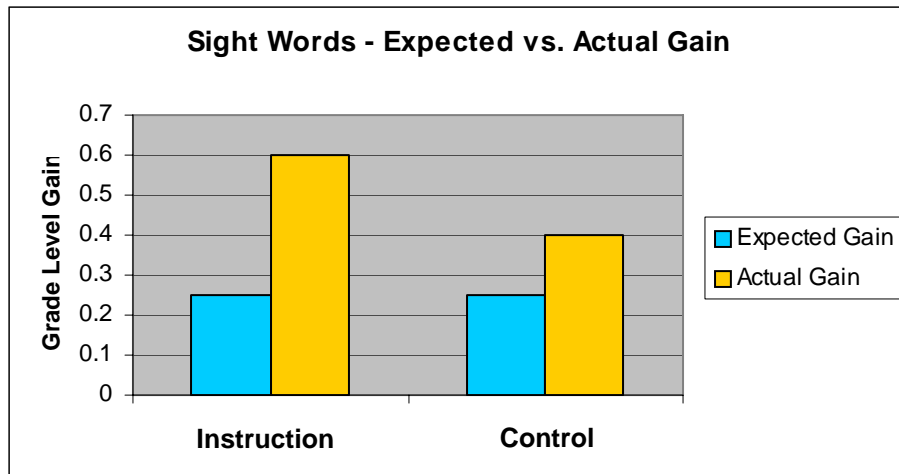


Sample t-tests were computed for both the control and instruction groups against an expected grade-level gain of .25 (equivalent to 1/4 of a school year) for all four reading sub-skills. Again, students who showed total mastery of Phonics and Sight Words on the pre-test were not included in the results. Students who showed grade-level gains of less than -1.00 were not included in the study based on the assumption that a drop of more

than a single grade level in reading skills was not possible within a 10-12 week period. Similarly, a grade-level gain of +2.67 (more than 2 and 2/3 grade levels) might be an indication of inaccurate pre-test results (for example, the student's headset or mouse was defective, resulting in too low a score on the pretest), and these scores were thus excluded from the study.

Sight Words

The reading instruction group showed a statistically significant grade-level gain (GLG) of 0.60 ($p < 0.5$). The control group showed a GLG of 0.40, which was not statistically significant ($p = 0.48$).



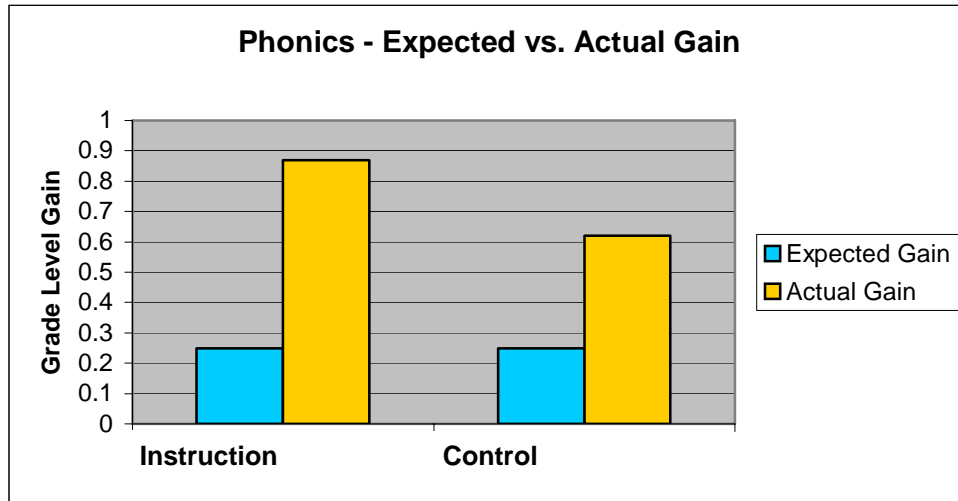
Instruction Group – Significant at $< .05$ (One Sample T-test – 0.039) ($n = 28$)

Control Group – Not Significant at $< .05$ (One Sample T-test – 0.488) ($n = 9$)

*Students exempted from Sight Words instruction on the pre-test were not included.

Phonics

The reading instruction group showed a statistically significant grade-level gain (GLG) of 0.87 ($p < 0.5$) in Phonics. The control group showed a GLG of 0.62, which was not statistically significant ($p = 0.08$).

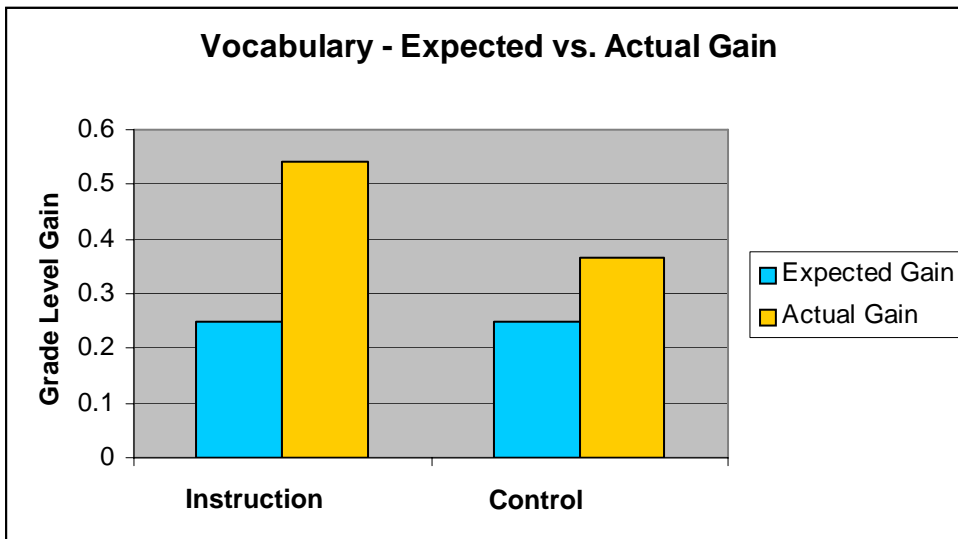


Instruction Group – Significant at $< .05$ (One Sample T-test – 0.000) (n=51)
 Control Group – Not Significant at $< .05$ (One Sample T-test – 0.080) (n=17)

*Students exempted from Phonics instruction on the pre-test were not included.

Vocabulary

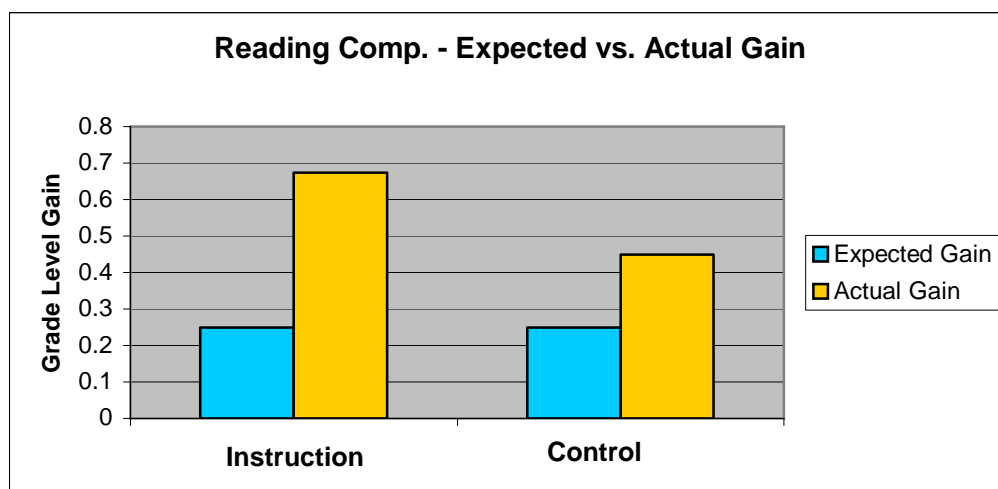
The reading instruction group showed a statistically significant grade-level gain (GLG) of 0.54 ($p < 0.5$) in Vocabulary. The control group showed a GLG of 0.36, which was not statistically significant ($p = 0.40$).



Instruction Group – Significant at $< .05$ (One Sample T-test – 0.009) (n=56)
 Control Group – Not Significant at $< .05$ (One Sample T-test – 0.404) (n=30)

Reading Comprehension

The reading instruction group showed a statistically significant grade-level gain (GLG) of 0.67 ($p < 0.5$) in Reading Comprehension. The control group showed a GLG of 0.45, which was not statistically significant.



Instruction Group – Significant at $< .05$ (One Sample T-test – 0.000) (n=49)
 Control Group – Not Significant at $< .05$ (One Sample T-test – 0.021) (n=18)

Discussion

These results indicate that when the Effective Learning Reading program is administered in a properly structured learning environment, disadvantaged students do show significant improvements in their reading skills.

An interesting and unanticipated result that occurred in this study was the improvement in the control group's scores. While some improvement through the 12-week program was expected, it was surprising to see that the control group scores improved as well. One reason for this could be the characteristics of the students in the control group. While the study began with an equal number of students in each group, many students in the control group did not continue with the program and dropped out. Those who left the program might have been those with lower scores, while those who remained might have shown a higher level of motivation to complete the program. An independent t-test on the pre-assessment scores of the control group, comparing those who left with those who continued in the program, does show a trend toward this explanation, though it was not statistically significant. It would be helpful in future studies to include a standardized test to examine differences in the attitudes as well as the motivation levels of students in the control and experimental groups both before and after using the program.

Since this was an after-school environment, teachers reported that it was particularly difficult to maintain a strict routine as per the guidelines of the study (15-20 minutes,

three times a week). Some students may have received less instruction as a result of absenteeism or parents picking them up early from the after-school program. Despite these factors, it must be noted that the majority of students still demonstrated marked improvements. It is expected that in a regular “in-school” environment, where the number of hours a student remains in the Effective Learning Reading program is consistent and can be more carefully controlled by the teacher, greater increases will occur.

It was difficult during the study to monitor whether students in the control and experimental groups received other forms of literacy instruction via computers, since students were in an after-school setting, across several sites and in different grade levels. Future studies would need to carefully account for whether students had access to other computer-based reading programs to help establish increased validity of the study.

Due to parental pressure, it was also not possible to withhold online instruction as a medium from the control group in this study, even though the instruction the students received was not in reading but in other subjects. The students in the study were members of families whose income was agriculturally based and thus they migrated during the summer months. Parents wished for their children to have some form of online education with the online reading program before leaving for the summer. It would be useful in future studies to establish an environment in which online instruction is temporarily withheld from the control group.

While outliers were disregarded from the study, a possible cause of dramatic drops or increases in scores may have occurred as a result of conditions in the testing environment. Unlike in a pencil-and-paper-based reading assessment, issues such as faulty headphones, bad mice, or lack of mouse pads may have caused additional problems (particularly for young children who lack fine motor control) and may have resulted in inadvertent clicking on incorrect answer buttons.

Even while children were given specific directions on what to do during the test, another factor that might have affected test results is the distractibility of young children, particularly in a computer-based learning environment where there is always the temptation to click on anything and everything that looks like a button. In order to facilitate the most accurate results in future studies, it is extremely important to ensure that all hardware is in good working condition and that children are instructed to raise their hands if they have problems with sound or with using their mice.

It was not possible to gain access to other standardized test scores for all the students in this study (i.e. FCAT). Correlating the scores of the students on the DORA with their performances on other tests, such as state tests and/or other standardized paper-based tests, would be important in future studies to increase the robustness of the design.

Conclusions

The overall finding of this study is that computer-assisted reading instruction can be an effective tool in increasing young students' reading skills and achievement. In environments such as after-school programs, where there are limited resources and the ratio of students to teacher is too high, CAI can empower teachers to meet the diverse needs of students. Students are able to learn at their own pace of instruction, and teachers are able to review student learning, reinforce specific skills and strategies, improve motivation, and provide students with immediate corrective feedback. It must be noted that in order for a program like this to be successful, a carefully controlled environment is absolutely essential to ensure the accuracy of the pre-assessment for initial placement and creation of an individualized instruction program. In conclusion, a computer-assisted diagnostic/prescriptive program can have a positive impact on students' reading achievement.

References

- Donahue, P. L., Finnegan, A. D., & Lutkus, N. L. *The nation's report card: Fourth-grade reading 2001*. U.S. Department of Education, NCES, Washington, DC 2001.
- Kinzie, M. B., Sullivan, H. J., & Berdel, R. L. (1992). Motivational and achievement effects of learner control over content review within CAI. *Journal of Educational Computing Research*, 8(1), 101-114.
- Let's Go Learn. (2003). *White paper assessment validity and reliability*.
<http://www.learningtoday.com/demo/images/pdf/Learning%20Today%20-%20Assessment%20Validity%20Study.pdf>
- National Center for Education Statistics (NCES). (1999). *NAEP 1998 reading: Report card for the nation and the states*. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement. (NCES No. 1999-500).
- Wasik, B. A. (1998). Volunteer tutoring programs in reading: A review. *Reading Research Quarterly*, 33, 266-292.