

Overview



Highland Elementary School, located in Lake Worth, Florida was seeking a solution to supplement their existing reading programs for their students that were considered part of the lowest performing 25th percentile. Many of these students were classified as ESOL and/or ESE, and some were illiterate in their

own native language. In addition to their low performance, Brian Killeen, Principal of Highland Elementary School, was also concerned about the students' low motivation to continue to learn after FCAT. During the prior school year, he and his staff had noticed a significant drop in the students' motivation to learn, as well as a drop in their academic skills during the period after FCAT and the end of the school year. After meeting with Brian Killeen, Rich Contartesi, Director of Educational Technology for the School District of Palm Beach County, suggested piloting Learning Today's Smart Tutor program for 8 weeks during the post-FCAT period to evaluate its effectiveness and viability in the Palm Beach County school system.

Program Implementation

- In April 2006, seven 3rd grade and four 4th grade classroom teachers along with one reading specialist incorporated Smart Tutor as a supplemental tool for their lowest performing 25th percentile students.
- A total of 67 students (69% Hispanic, 27% Black and 4% White) were selected to be part of the pilot study.
- Students were administered a diagnostic/formative skills assessment (pre-test) that was used by Smart Tutor to automatically create an individualized learning program for each student.
- Students utilized Smart Tutor in 40-minute daily instructional sessions for a period of approximately 6 weeks (30 school days). Normally, the Smart Tutor program is implemented in the beginning of the school year and runs throughout the entire school year for 60-minutes per week per student.
- Students were able to accomplish a mean time on task of 11.25 instructional hours.
- Lessons emphasized instruction in key reading sub skills, including phonics, sight words, vocabulary and comprehension strategies.
- Teacher surveys were also conducted at the end of the program to solicit educators' opinions of the instructional content, the overall program effectiveness and student reactions.

Student Demographics

- 67 students, Grades 3 & 4
- 54% Male
- 46% Female
- 69% Hispanic
- 27% non-Hispanic Black
- 4% non-Hispanic White

Program Overview

- 6-week (30 school days) intensive reading instruction program conducted post-FCAT
- Daily 40-minute instruction sessions
- Lab/Classroom instruction model
- Instructional Focus on Phonics, Sight Words, Vocabulary, Comprehension

Results

- The majority of students exhibited significant increases in their reading skill levels
- Significant academic gains were achieved in phonics, sight words, vocabulary and comprehension
- Mean time on task = 11.25 instruction hours
- Teacher surveys indicated students were engaged and motivated despite the program being conducted after the FCAT test.

Results

Analysis of Students with Academic Gains

Students' skill levels in phonics, sight words, vocabulary and comprehension were measured via Learning Today's Diagnostic/Formative Reading Assessment. Pre and post tests were administered to all students before and after utilizing the Smart Tutor instruction program. The majority of students exhibited significant increases in their reading skill levels. See Illustration 1 for further analysis.

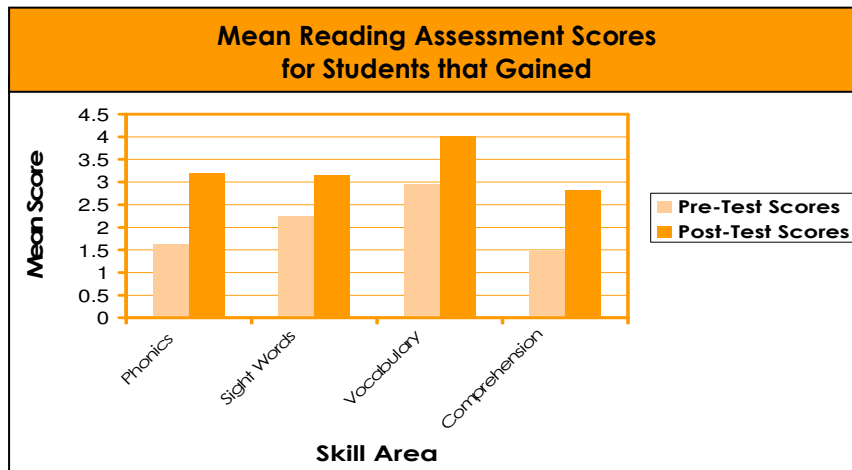


Illustration 1 – Mean Reading Assessment Scores & Grade Level Gains for Students that Showed Academic Gain

Mean Reading Assessment Scores for Students that Gained				
	Phonics	Sight Words	Vocabulary	Comprehension
Mean Pre-Test	1.63	2.25	2.95	1.47
Mean Post-Test	3.19	3.16	4.02	2.81
Mean Grade Level Gain	1.56	0.91	1.07	1.34

Table 1 – Mean Reading Assessment Scores and Grade Level Gains for Students that Showed Academic Gain

Students excluded in the illustration and table above include:

- Students that scored at a mastery level in the pre-test in sight words (grade level of 3.83 or high 3rd), and/or those that scored at a mastery level in the pre-test in phonics (grade level of 4.83 or high 4th)
- Students whose scores remained stable from pre-test to post-test
- Students whose scores showed a decrease from pre-test to post-test

Analysis of All Students' Scores

While the majority of the students' scored higher on the post test, some students' scores remained stable while others showed a decrease (see Table 3). When the results of students who showed a decrease and those that remained stable are included in the analysis, significant gains were achieved. See Appendix A for detailed statistical analysis.

	Sight Words	Phonics	Vocabulary	Comprehension
# that increased	21	32	28	39
# that stayed stable	14	17	30	12
# that decreased	4	8	9	16
Total # of Students	39*	57**	67	67

Table 3 – Reading Assessment Patterns of Response for All Students in Pilot Program

*Students that scored at a mastery level in the pre-test in sight words (grade level of 3.83 or high 3rd) were excluded

**Students that scored at a mastery level in the pre-test in phonics (grade level of 4.83 or high 4th) were excluded

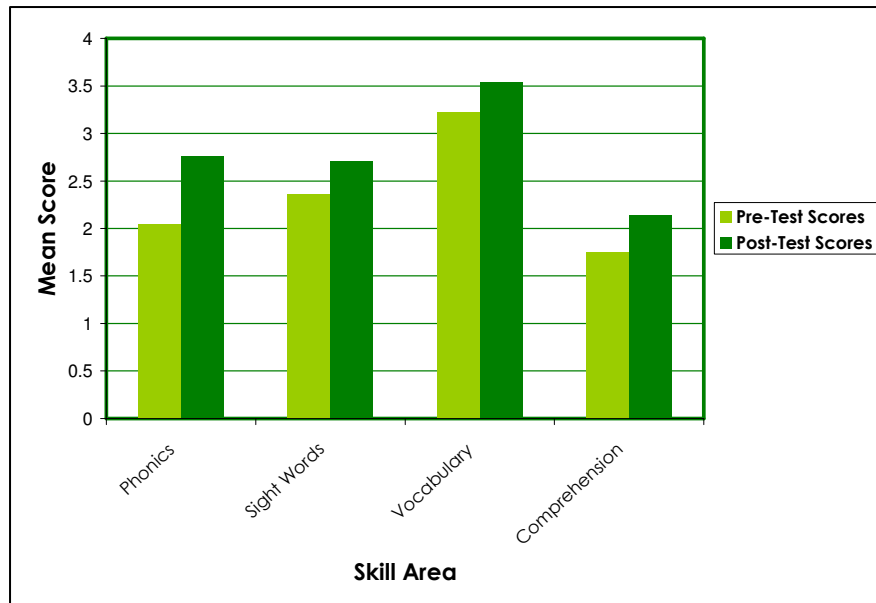


Illustration 2 – Mean Reading Assessment Scores & Grade Level Gains for All Students

	Mean Reading Assessment Scores for All Students			
	Phonics	Sight Words	Vocabulary	Comprehension
Mean Pre-Test	2.05	2.36	3.23	1.75
Mean Post-Test	2.76	2.71	3.54	2.14
Mean Grade Level Gain	0.71	0.35	0.31	0.39

Table 4 – Mean Reading Assessment Scores & Grade Level Gains for All Students

Teacher Reactions

Seven out of twelve teachers responded to the teacher survey. The survey instrument consisted of a Likert-type scale with a series of statements and open-ended questions designed to elicit teachers' perceptions of the instructional materials, system performance, student usage, the teacher application, progress reporting, system training and support. The majority of the teachers responded favorably to all aspects of the program (See Table 9).

Sample Statements	Percentage who	
	Strongly agree	agree
Student Usage*** My students enjoyed the materials and were eager to use Smart Tutor	57%	29%
System Performance The Learning Today system was easy for my students to access, log on and use	57%	43%
Teacher Application I like the many features in the application and found it to be more than adequate	43%	57%
Reporting I think the student progress reporting is very useful and I liked the formats	20%	80%
Curriculum The Smart Tutor materials are very good quality and met or exceeded my expectations.	29%	43%

Table 9 – Summary of Sample Responses

*** One teacher responded in an unusual pattern, indicating a negative response to some aspects of the program but rating all others favorably.

Observations

Data Fluctuations

The increase in scores for the majority of the students is significant due to the following factors:

- The short duration of the pilot study (30 school days)
- The fact that the pilot study was conducted during the post-FCAT, end of the school year period
- The demographics of the students included:
 - Lowest performing 25th percentile
 - ESE
 - ESOL (some illiterate in English, Spanish, and their own native language)

Due to the analysis of the data in the prior year, Brian Killeen was concerned about the students' willingness and ability to learn during the post-FCAT period. Smart Tutor's effectiveness in improving the majority of the students' skills during this period of time, is a testament to the program's ability to reach most students even during periods of heightened fatigue and lack of motivation to learn.

The decrease in scores for some students may be due to the fact that the assessment was administered close to the end of the school year and post-FCAT. Another factor that might have contributed to the decreases was that all four sub skill assessments were administered at the

same time with reading comprehension being the last sub skill administered. Students may have experienced strain and weariness after being at the computer for a lengthy period of time.

It must also be added that increases and decreases pre-to-post testing may be an artifact typically referred to as “regression effect” (Dallal, 2005). This effect typically causes the tails of any distribution to “regress” or move toward the mean in pre-to-post assessment situations. This phenomenon has been observed in regular school assessments of children in compensatory programs. Implementation of the program over a full school year with a pre, mid and post test would determine the long term effects of the score changes.

Duration of Pilot Study

This pilot study was conducted over an 8-week period. However, 2 weeks were used for pre and post testing. During the remaining 6 weeks, the students used the system for 30 consecutive school days and accomplished a mean time on task of 11.25 instruction hours. Some students received less instruction due to delays in pre-testing. Despite the short duration of the pilot study, a majority of the students showed significant gains in phonics, sight words, vocabulary and comprehension skills. These results indicate that the Smart Tutor instruction program can be utilized to help improve the skill levels of low performing students in a short period of time even during difficult periods during the school year. It is expected that a greater number of students would be able to make even higher gains if the program were to be implemented over a full school year.

Instructional Emphasis

Due to the short duration of the program, instructional emphasis was placed on critical skills such as phonics, sight words, vocabulary and basic reading comprehension strategies.

In a normal, full school year implementation, instruction in phonemic awareness and higher levels of reading comprehension would be given. It is possible that over a greater period of time, additional instruction in phonemic awareness and higher level reading comprehension strategies would most likely result in even greater gains for this population of students.

Teacher & Administrator Perceptions

Almost all teachers surveyed indicated positive reactions to all aspects of the program. Many felt that the students enjoyed the materials and found the system easy to use. Some teachers indicated that the 40-minute daily instructional sessions were “too much” and were not happy that administrators had asked them to exclude other computer-based programs they had been utilizing. Under typical circumstances, students use the program for three 20-minute sessions per week thus allowing Smart Tutor to be used in conjunction with other computer assisted instruction. Informal feedback from the school’s designated Smart Tutor administrator indicated that the Administrator Application was easy to use and implement.

Sample Teacher Comments

“I loved the program, if for no other reason than that it gave my low students (especially ESOL) an engaging, meaningful chance to reinforce skills and vocabulary. They need repeated reinforcement in a variety of ways and this was a way they enjoyed.”

- 3rd Grade Teacher

“They were always asking to use it (Smart Tutor)”

- 4th Grade Teacher

“It was another resource that helped me meet the needs of my diverse learners”

- 3rd Grade Teacher

Conclusion

Challenges:

- Post FCAT period
- Lowest performing 25th percentile
- ESOL, including students that were illiterate in their native language
- ESE
- Short duration of time (30 school days)

Outcomes

- The majority of the students in the pilot demonstrated academic gains
- The mean reading grade level gains for students that showed academic gain were as follows:
 - Phonics = 1.56
 - Sight Words = 0.91
 - Vocabulary = 1.07
 - Comprehension = 1.34
- The mean reading grade level gains for all students (including those that stayed stable or showed a decrease in scores) were as follows:
 - Phonics = 0.71
 - Sight Words = 0.35
 - Vocabulary = 0.31
 - Comprehension = 0.39
- Teachers indicated that the students were motivated to learn and were engaged in the program, regardless of “Post-FCAT” and “end-of-school-year” fatigue

Learning Today was pleased to help this group of students improve their academic skills. We look forward to working with more Palm Beach County elementary schools in the 2006/2007 school year.

Appendix A – Detailed Statistical Analysis

The following analysis includes the results of all students including those that showed an increase, those whose scores remained stable and those whose scores showed a decrease.

Phonics

Table 5: Phonics Assessment Summary Results

		N	Mean	SD	Min	Max
Phonics (WA)	Pre	57	2.05	1.34	0	4.50
	Post	57	2.76	1.44	0.17	4.83
	Gain		0.71			

As can be seen in Table 5, children’s scores ranged from 0 to 4.50 points in the pre-test and .17 to 4.83 points in the post-test, with a mean of 2.05 points for the pre-test and 2.76 points for the post-test. This is an increase of .71 points from the pre- to post-test sessions, which is equivalent to approximately two thirds of a grade level.

Children’s patterns of response were analyzed using a Wilcoxon Signed Ranks Test. To ensure validity of the results, children whose pre-test scores were at ceiling were omitted from these analyses. Results indicated that of those children whose performance varied, there was a significant increase in children’s phonics skills ($z=-3.97$, $p<.01$). To confirm a significant increase in children’s phonics abilities, a paired t-test was performed on the pre- and post- test scores. Results found that there was a significant increase in test scores ($t(56)=-4.60$, $p<.01$), indicating a significant increase in children’s phonics skills.

Sight Words

Table 6: Vocabulary Assessment Summary Results

		N	Mean	SD	Min	Max
Sight Words (HF)	Pre	39	2.36	0.84	0.5	3.50
	Post	39	2.71	0.91	0.5	3.83
	Gain		0.35			

As can be seen in Table 6, children’s scores ranged from .5 to 3.50 points in the pre-test and .5 to 3.83 in the post-test, with a mean of 2.36 points for the pre-test and 2.71 points for the post-test. This is an increase of .35 points from the pre- to post-test sessions, which is equivalent to approximately one third of a grade level.

Children’s patterns of response were analyzed using a Wilcoxon Signed Ranks Test. To ensure validity of the results, children whose pre-test scores were at ceiling were omitted from these analyses. Results indicated that of those children whose performance varied, there was a significant increase in children’s sight words skills ($z=-2.79$, $p<.01$). To confirm a significant increase in children’s site words abilities, a paired t-test was performed on the pre- and post- test scores. Results found that there was a significant increase in test scores ($t(38)=-3.05$, $p<.01$), indicating a significant increase in children’s sight words skills.

Vocabulary

Table 7: Vocabulary Assessment Summary Results

		N	Mean	SD	Min	Max
Vocabulary (WM)	Pre	67	3.23	1.12	0.5	6.17
	Post	67	3.54	1.19	0.5	6.17
	Gain		0.31			

As can be seen in Table 7, children’s scores ranged from 0.5 to 6.17 points in the pre-test and .5 to 6.17 points in the post-test, with a mean of 3.23 points for the pre-test and 3.54 points for the post-test. This is an increase of .31 points from the pre- to post-test sessions, which is equivalent to approximately one third of a grade level.

Children’s patterns of response were analyzed using a Wilcoxon Signed Ranks Test. To ensure validity of the results, children whose pre-test scores were at ceiling were omitted from these analyses. Results indicated that of those children whose performance varied, there was a significant increase in children’s vocabulary skills ($z=-2.67$, $p<.01$). To confirm a significant increase in children’s vocabulary abilities, a paired t-test was performed on the pre- and post- test scores. Results found that there was a significant increase in test scores ($t(66)=-2.79$, $p<.01$), indicating a significant increase in children’s vocabulary skills.

Comprehension

Table 8: Comprehension Assessment Summary Results

		N	Mean	SD	Min	Max
Comprehension (SR)	Pre	67	1.75	1.31	0.5	5.5
	Post	67	2.14	1.55	0.5	6.5
	Gain		0.39			

As can be seen in Table 8, children’s scores ranged from .5 to 5.50 points in the pre-test and from .5 to 6.50 points in the post-test, with a mean of 1.75 points for the pre-test and 2.14 points for the post-test. This is an increase of .39 points from the pre- to post-test sessions, which is equivalent to a little more than one third of a grade level.

Children’s patterns of response were analyzed using a Wilcoxon Signed Ranks Test. To ensure validity of the results, children whose pre-test scores were at ceiling were omitted from these analyses. Results indicated that of those children whose performance varied, there was a significant increase in children’s vocabulary skills ($z=-2.25$, $p<.05$). To confirm a significant increase in children’s comprehension abilities, a paired t-test was performed on the pre- and post-test scores. Results found that there was a significant increase in test scores ($t(66)=-2.25$, $p<.05$), indicating a significant increase in children’s comprehension skills.