

Region
Midwest

Schools
2

Grade
5th

Students
146

Race & Ethnicity

- 59% African American
- 23% Caucasian
- 9% Hispanic or Latino
- 4% Asian
- 5% Other

Free/Reduced-Price Lunch

- 82%

Gender

- 53% Male
- 47% Female

Pre- & Post-Treatment Reading Achievement Measures:

- Group Reading Assessment Diagnostic Evaluation (GRADE)
- Reading Efficiency/Eye-Movement Recording (Visagraph)
- Dynamic Indicator of Beginning Early Literacy Skills (DIBELS)

Treatment

40 15-min. Reading Plus lessons (~10 hours) using 1 of 4 text presentation formats:

- Static Text Display
- Passage Build-Up
- Line by Line
- Guided Window

Effects of Four Electronic Text Presentation Formats on Reading Efficiency and Comprehension

Dissertation Summary
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Overview

The ability to read fluently and with good comprehension is a primary goal within the reading curriculum. Despite the fact that reading as a school exercise has a long-standing tradition, instructional approaches to achieve this curricular goal have varied substantially over the years. Technology has introduced new features for enhanced instructional approaches. Yet prior to this investigation, no studies have isolated the instructional impact of text presentation formats on reading development using 21st-century technology.

The goal of this study was to determine whether the exposure to a particular text presentation format as part of reading instruction (consisting of 40 fifteen-minute lessons) resulted in the same or different reading development gains achieved by fifth-grade students.

This study examined possible causal relationships between four text presentation formats and three reading achievement outcome measures. The four text presentation formats included (a) a *Static Display*, (b) a *Passage Build-Up* format, (c) a *Line-by-Line Display* (or saccadic scrolling), and (d) a *Guided Window* format that revealed and concealed text from left to right. The three reading outcome measures included (a) reading comprehension as measured by standardized test scores achieved on the Group Reading Assessment Diagnostic Evaluation (GRADE); (b) comprehension-based silent reading efficiency (reading rate, fixations [eye stops], and regressions [jump backs]) as measured by an eye-movement recording system (Visagraph); and (c) oral reading rate as measured by the criterion-referenced Dynamic Indicator of Beginning Early Literacy Skills (DIBELS).

Key Results

- ✓ All treatment groups achieved significant reading proficiency improvements as a result of reading 40 appropriately leveled text passages utilizing one of the four text presentation formats.
- ✓ Different treatment groups achieved significantly different performance improvements. The treatment group using the *Guided Window* text presentation format consistently achieved the largest improvements on all learning outcome measures. The *Line-by-Line Display* group achieved the smallest comprehension gains, and the *Static Display* group achieved the smallest reading efficiency gains.
- ✓ Improved comprehension-based silent reading efficiency behavior transferred into both GRADE reading comprehension score increases and oral reading rate improvements as measured by DIBELS.

Results

Reading Comprehension Growth – All treatment groups made significant reading comprehension gains as a result of engaging in 40 appropriately leveled 15-minute practice lessons ($p < .001$) (Figure 5). The *Line-by-Line* text presentation format group made the smallest improvements (6.2 NCE, or ~10 months’ growth) and the *Guided Window* group achieved the largest gains (9.8 NCE, or ~15 months’ growth). Only the group that used the *Guided Window* format achieved gains that were significantly larger than those of the other groups.

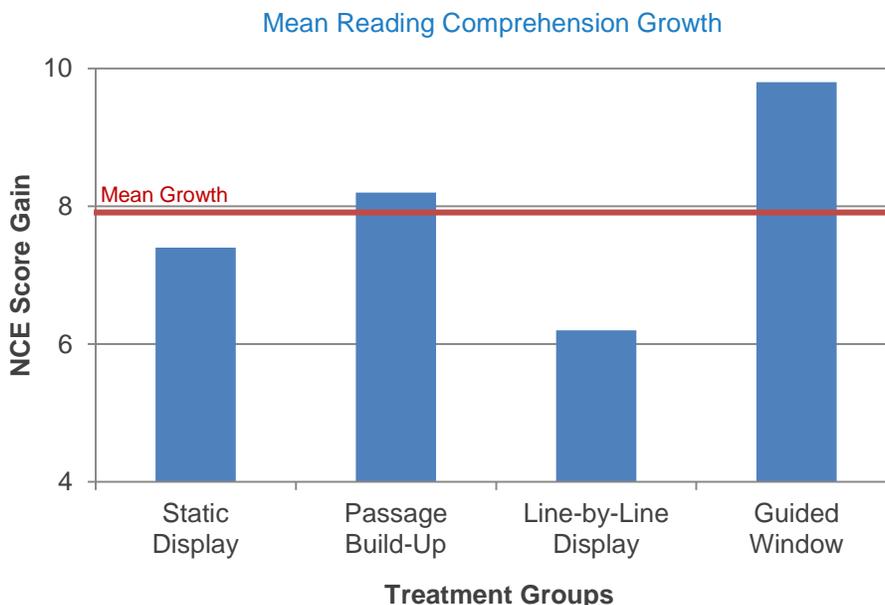


Figure 5. Mean NCE score gains achieved by the four treatment groups as measured by the GRADE.

Silent Reading Efficiency Growth – Reading efficiency improvements varied significantly across the four treatment groups (Table 1). Across all reading efficiency measures and test difficulty levels, the reading efficiency (reading rate, fixations, and regressions) of the *Guided Window* group improved the most, and the efficiency of the *Static Display* group improved the least. Comprehension-based silent reading rate improvements across the three test levels are graphed in Figure 6. The *Guided Window* group was the only group that achieved reading rate gains that were consistently above the overall growth means of all students.

Table 1. Mean Reading Efficiency Improvements by Efficiency Measures and Treatment Group

Text Presentation Formats	Reading Rate Gain (wpm)			Reduction in Fixations (eye stops)			Reduction in Regressions (jump backs)		
	Level 1	Level 3	Level 5	Level 1	Level 3	Level 5	Level 1	Level 3	Level 5
Static Display	6.9	9.1	26.3	-3.9	-7.1	-21.6	0.4	-1.1	-7.7
Passage Build-Up	12.3	20.8	30.2	-6.8	-14.1	-29.2	-2.5	-4.8	-7.7
Line-by-Line Display	21.1	24.0	31.8	-13.4	-13.5	-34.1	-3.9	-4.8	-10.0
Guided Window	28.1	32.3	42.5	-16.3	-22.3	-40.3	-6.7	-6.8	-11.9
Mean	17.1	21.5	32.6	-10.1	-14.2	-31.1	-3.2	-4.4	-9.3

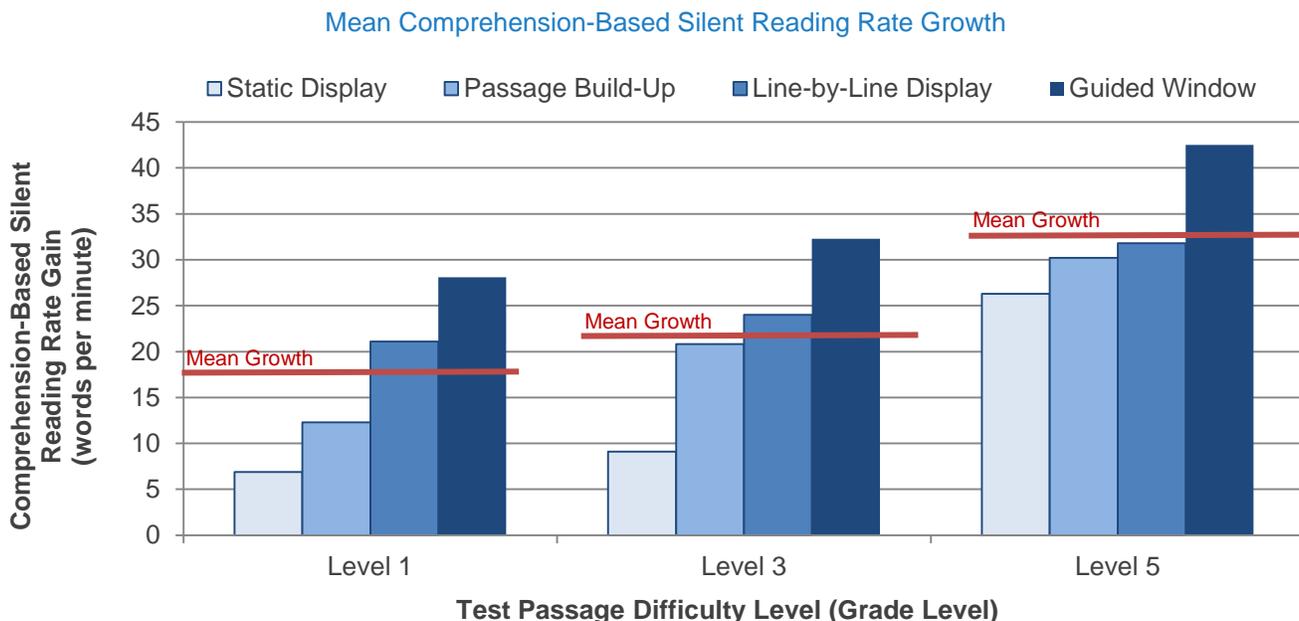


Figure 6. Mean comprehension-based silent reading rate gains achieved by the four treatment groups as measured by the Visagraph using normed test passages from three difficulty levels (grades 1, 3, and 5).

Oral Reading Rate Growth – For a subset of students (in one school) DIBELS data were collected (Figure 7). To various degrees, all treatment groups improved their oral reading rates significantly ($p < .05$). The *Static Display* group improved by the smallest amount (10.4 cwpm), and the *Guided Window* group improved by the largest amount (nearly 26 cwpm). The *Line-by-Line* text presentation format group improved by about 13 cwpm and the *Passage Build-Up* group by about 19 cwpm.

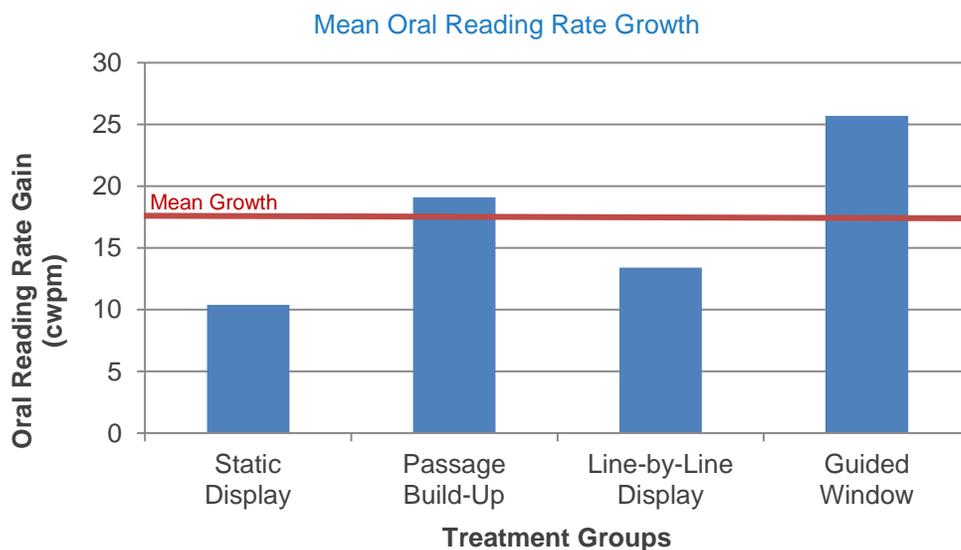


Figure 7. Mean oral reading rate gains achieved by the four treatment groups as measured by the DIBELS.

Conclusion

This study showed that simply engaging students in 40 appropriately leveled reading lessons resulted in reading proficiency improvements regardless of how text was presented to students. However, the different treatment groups achieved significantly different amounts of performance improvements as highlighted by the three types of learning outcomes that were measured: (a) reading comprehension improvements; (b) comprehension-based silent reading efficiency improvements; and (c) oral reading efficiency improvements. The *Guided Window* group consistently achieved the largest gains across all measures. While the *Line-by-Line Display* group achieved the smallest comprehension gains, the *Static Display* group achieved the smallest reading efficiency improvements. These findings are important because the study also revealed that improved comprehension-based silent reading behavior significantly transferred into both reading comprehension proficiency ($r=.5$; $p<.001$) and oral reading fluency ($r=.7$; $p<.001$).