THE HILL READING ACHIEVEMENT PROGRAM IN CARTERET COUNTY SCHOOLS: FINAL EVALUATION RESULTS (2008-2011)

By:

Tamara M. Walser, Ph.D., Co-Principal Investigator

Christopher A. Bell, M.A., Research Staff

Michele A. Parker, Ph.D., Lead Analyst

Michael E. Tart, M.Ed., Graduate Assistant

Watson School of Education

University of North Carolina Wilmington

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EXECUTIVE SUMMARY

Background

The purpose of this evaluation study was to determine the effectiveness of the Hill Reading Achievement Program (HillRAP) in improving the reading achievement of students who need remediation in reading in Carteret County Schools. Evaluation questions were:

1. Do students who receive HillRAP instruction improve academic achievement in reading, overall, and by student groups?
2. How many sessions of HillRAP instruction did students receive? Is there a relationship between the number of HillRAP sessions students receive and achievement in reading?
3. Do teachers who receive HillRAP training effectively implement HillRAP in a public school setting?

Five samples were included in the evaluation study for separate analysis. Two were annual samples: 2008-2009 sample (n = 94) and 2009-2010 sample (n = 89). Due to size (n = 11), the 2010-2011 annual sample was not included for separate analysis. Two cohort samples of students who received two years of HillRAP were also included. Cohort one included students who received HillRAP from 2008-2010 (n = 19); cohort two included students who received HillRAP from 2009-2011 (n = 43). Finally, a fifth, combined sample, included students from the three annual samples combined (n = 194). Students in the 2008-2009 sample received HillRAP instruction from 17 teachers in 5 elementary schools, 3 middle schools, and 2 high schools. Students in the 2009-2010 sample received HillRAP instruction from 27 teachers in 8 elementary schools and 3 middle schools. Students in the 2010-2011 sample received HillRAP instruction from 20 teachers in 6 elementary schools and 2 middle schools. Data collection included:

- Woodcock-Johnson III Tests of Achievement: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack tests. These tests were administered prior to HillRAP implementation (pretest) and following one and two years of implementation.
- North Carolina End-of-Grade Reading Comprehension Test: This state assessment is administered at each school to students in grades 3 through 8. Levels I and II indicate below grade level achievement; Levels III and IV indicate at or above grade level achievement.

Student scores for the year prior to HillRAP implementation were obtained (pretest) as well as scores for each subsequent year of implementation.

- HillRAP Attendance Record: HillRAP teachers collected these data to document and monitor student attendance in HillRAP sessions.
- HillRAP Teacher Observation Form: Hill Center Master Teachers/Trainers completed this form as part of their regular observations of HillRAP teachers.

Other data used in the study included student demographic data. All particpating students had parental permission (informed consent) to participate in the study. Data analysis included descriptive statistics, t-tests, repeated measures analysis of variance, and correlation.

Summary of Findings and Related Recommendations

Findings provide support for HillRAP as an effective program for improving the reading achievement of struggling readers. Across years and student groups, HillRAP students demonstrated greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack. They similarly demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test, moving from lower to higher achievement levels. The following are findings and related recommendations for future studies of HillRAP. Findings for specific student groups (e.g., by school level, race/ethnicity) are based on data analysis results from the combined sample.

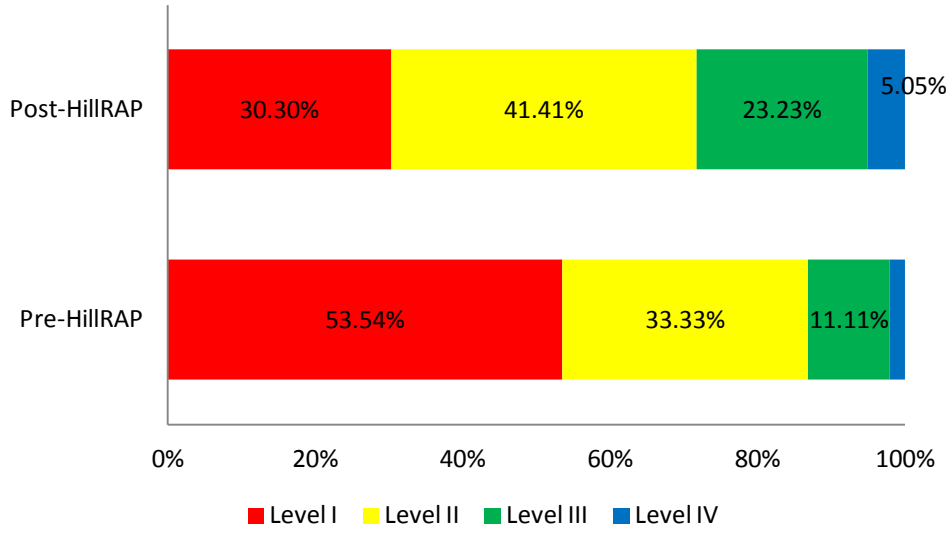
Students in annual, cohort, and combined samples improved academic achievement in reading.

- Students in the 2008-2009 sample demonstrated statistically significant and greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. In addition, they decreased the gap between their achievement and the *average* achievement range of the tests. Students also demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test. The percentage of students who scored at or above grade level more than doubled, from 9.43% prior to HillRAP to 28.30%

after one year of HillRAP; the percentage of students who scored at Level I decreased by more than half, from 64.15% to 30.19%.

- Students in the 2009-2010 sample demonstrated statistically significant and greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. In addition, they decreased the gap between their achievement and the *average* achievement range of the tests and moved into the *average* range for Word Attack. Students also demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test. The percentage of students who scored at or above grade level doubled, from 10.81% prior to HillRAP to 21.62% after one year of HillRAP; the percentage of students who scored at Level I decreased from 40.54% to 32.43%.
- Students in the cohort one sample demonstrated greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. In addition, they decreased the gap between their achievement and the *average* achievement range of the tests and moved into the *average* range for Word Attack.
- Students in the cohort two sample demonstrated statistically significant and greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. In addition, they decreased the gap between their achievement and the *average* achievement range of the tests and moved into the *average* range for Word Attack.
- Students in the combined sample demonstrated statistically significant and greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. They also decreased the gap between their achievement and the *average* achievement range of the tests. Students also demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test. The percentage of students who scored at or above grade level more than doubled, from 13.13% prior to HillRAP to 28.28% after one year of HillRAP; the percentage of students who scored at Level I decreased from 53.54% to 30.30%. The following figure shows this movement.

North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for Combined Sample (n = 99)



There was evidence of students demonstrating greater growth after two years of HillRAP instruction.

- Students in the cohort one sample made notable growth on the Passage Comprehension Test compared to those in the annual samples.
- Students in the cohort two sample made notable growth on the Word Attack and Reading Fluency tests compared to those in the annual samples.
- To better determine the impact of longer participation in HillRAP, future studies should include a larger sample from the beginning and efforts should be made to ensure that as many students as possible remain in HillRAP after one year.

Elementary school students who received HillRAP instruction improved academic achievement in reading.

- Elementary school students demonstrated statistically significant and greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. In addition, they decreased the gap between their achievement and the *average* achievement range of the tests and moved into the *average* range for Word Attack.

- Elementary school students demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test. The percentage of students who scored at or above grade level more than doubled, from 10.26% prior to HillRAP to 26.92% after one year of HillRAP; the percentage of students who scored at Level I decreased from 55.13% to 30.77%.

Secondary school students who received HillRAP instruction improved academic achievement in reading.

- Secondary school students (middle and high school) demonstrated greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. Although they scored lower at pretest compared to the overall combined sample, they demonstrated greater growth on Letter-Word Identification, Passage Comprehension, and Word Attack tests.
- Subsequent studies of HillRAP should include a larger number of secondary school students, from middle and high school, to better determine the impact of the program on these students.

Non-minority students who received HillRAP instruction improved academic achievement in reading.

- Non-minority students demonstrated statistically significant and greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. They also decreased the gap between their achievement and the *average* achievement range of the tests.
- Non-minority students demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test. The percentage of students who scored at or above grade level more than doubled, from 13.16% prior to HillRAP to 34.21% after one year of HillRAP; the percentage of students who scored at Level I decreased from 52.63% to 26.32%.

Minority students who received HillRAP instruction improved academic achievement in reading.

- Minority students demonstrated greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. In addition, they moved into the *average* achievement range for the Word Attack test.
- Minority students demonstrated growth on the North Carolina End-of-Grade Reading Comprehension Test. Although the percentage of students who scored at or above grade level slightly decreased after one year of HillRAP, the percentage of students who scored above grade level increased from 0% to 4.17% and the percentage of students who scored at Level I decreased from 54.17% to 41.66%.
- Future studies of HillRAP should include larger numbers of minority students to better determine program impacts for minority students and to allow for disaggregation of results by specific racial and ethnic groups.

Students Identified to Receive Exceptional Children's Services who received HillRAP instruction improved academic achievement in reading.

- Students Identified to Receive Exceptional Children's Services demonstrated statistically significant and greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered.
- Students Identified to Receive Exceptional Children's Services demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test. The percentage of students who scored at or above grade level nearly doubled, from 15.00% prior to HillRAP to 26.25% after one year of HillRAP; the percentage of students who scored at Level I decreased from 51.25% to 27.50%.
- Future studies of HillRAP should include more students representing the different types of Exceptional Children's services for which students are identified to better understand the effectiveness of the program in meeting the needs of these groups of students. The small number of students in some student groups (e.g., identified as having a mild intellectual disability) limited the conclusions that could be drawn in this evaluation study.

Additional Recommendations Related to Study Limitations

Based on limitations of the evaluation study, the following recommendations should also be considered:

A major limitation of the evaluation study was the lack of a comparison group. Similar to other studies of HillRAP (Christopoulos, Rosanbalm, & Rabiner, 2011a; Christopoulos, Rosanbalm, & Rabiner, 2011b; Downing et al., 2007), a quasi-experimental single group pretest-posttest design was used, increasing threats to the internal validity of study results—i.e., the degree to which results can be attributed to HillRAP. Future studies of HillRAP should employ a comparison group design with a large sample to better determine the effectiveness of the program.

The designs used for this and other HillRAP studies have been quantitative. Future studies of HilRAP should incorporate qualitative methods to gain deeper understanding of the program as it is implemented in public school settings.

UNCW used data that were collected for purposes other than the evaluation study. HillRAP student attendance was documented by HillRAP teachers; HillRAP teacher observations and proficiency ratings were conducted by Hill Center Master Teachers/Trainers for formative assessment and HillRAP certification. For future studies, evaluators should make sure data collection instruments and methods align with the needs of the study to the extent possible.

Despite limitations, **this evaluation study contributes to a growing body of support for HillRAP as an effective program for improving the reading achievement of struggling readers.** Results of this study are consistent with those of previous studies of HillRAP (Christopolous, Rosanbalm, & Rabiner, 2011a; Christopolous, Rosanbalm, & Rabiner, 2011b; Downing, Williams, & Holden, 2009; Downing, Williams, Lasater, & Bell, 2007). This replication increases the external validity of results—i.e., the extent to which study results apply to other people and settings. Replication studies of HillRAP should be continued across diverse school settings and populations.

INTRODUCTION

The University of North Carolina Wilmington (UNCW) was contracted by The Hill Center to provide an external evaluation study of the Hill Reading Achievement Program (HillRAP) as it was implemented in Carteret County Schools from the Fall of 2008 through the Spring of 2011. The purpose of the evaluation was to determine the effectiveness of HillRAP. Evaluation questions were:

1. Do students who receive HillRAP instruction improve academic achievement in reading, overall, and by student groups?
2. How many sessions of HillRAP instruction did students receive? Is there a relationship between the number of HillRAP sessions students receive and achievement in reading?
3. Do teachers who receive HillRAP training effectively implement HillRAP in a public school setting?

Background

Through multiyear funding from the Friends of Front Street Village, The Hill Center partnered with Carteret County Schools and UNCW to implement and evaluate the effectiveness of HillRAP in improving the reading achievement of struggling readers in elementary, middle, and high school. HillRAP is a theoretically supported program that builds on the principles of the research-based, multisensory Orton-Gillingham approach (see Ritchey & Goeke, 2006); is aligned with the recommendations of the National Reading Panel (National Institute of Child Health and Human Development, 2000); and The Hill Center's teacher certification program is accredited by the International Multisensory Structured Language Education Council. Implementation of HillRAP includes intensive teacher professional development and ongoing mentoring, 45 to 50 minute instructional sessions 4 to 5 days a week (see Ritchey & Goeke, 2006), and a 4 to 1 student to teacher ratio. HillRAP was first implemented in public schools from 2003 to 2006 in Durham Public Schools. Given positive results (Downing, Williams, Lasater, & Bell, 2007), HillRAP was continued in Durham Public Schools (2008-2010) and subsequently implemented in Davie County Schools (2008-2010), Carteret County Schools (2008-2011) and Brunswick County Schools (2009-2011)—Carteret County Schools being the site for this evaluation study.

PROCEDURES

Study Sample

Teachers were identified by school and district leadership to receive HillRAP training and become HillRAP teachers. Based on their understanding of HillRAP and the students it is intended to benefit, HillRAP teachers selected students to participate in the program. Parental consent was obtained for all students who participated in the evaluation study.

The 2008-2009 study sample included 94 students who were pretested and posttested. These students received HillRAP instruction from 17 teachers in 10 schools: 5 elementary schools, 3 middle schools, and 2 high schools. The 2009-2010 study sample included 89 students, not in the 2008-2009 sample, who were pretested and posttested. These students received HillRAP instruction from 27 teachers in 11 schools: 8 elementary schools and 3 middles schools. The 2010-2011 study sample included 11 students who were pretested and posttested. These students were taught by 20 teachers in 8 schools: 6 elementary schools and 2 middle schools. Due to the low number of students, separate analysis was not conducted for this sample; however, the 11 students were included in the combined sample described below.

In addition, some students received two years of HillRAP instruction. The cohort one sample included 19 students who received HillRAP from 2008-2010. The cohort two sample included 43 students who received HillRAP from 2009-2011. There were 11 students who received three years of HillRAP (2008-2011); however, due to the low number of students, separate analysis was not conducted for this cohort. Finally, all students from the three annual samples (2008-2009, 2009-2010, and 2010-2011) were combined into a larger sample of 194 students. Tables 1 through 5 include the characteristics of the study samples. More information about the schools involved is provided in the Appendix.

2008-2009 Sample

Table 1 presents the characteristics of the 2008-2009 sample of 94 students. Most students were at the elementary level (71.28%). Most of the students were White (79.79%). Most of the students were identified to receive Exceptional Children's (EC) services (77.66%).

Table 1

Characteristics of Students in the 2008-2009 Sample (n = 94)

Characteristic	Number of Students	Percentage of Students
School Level		
Elementary	67	71.28
Middle School	14	14.89
High School	13	13.83
Gender		
Male	64	68.09
Female	30	31.91
Race/Ethnicity		
White	75	79.79
Black	2	2.13
Hispanic	6	6.38
Multiracial	5	5.32
American Indian	4	4.26
Asian	2	2.13
Students with Disabilities		
Yes	73	77.66
No	21	22.34

2009-2010 Sample

Table 2 shows the characteristics of the 2009-2010 sample of 89 students. Most students were at the elementary level (88.76%). Most of the students were White (69.66%). Most of the students were identified to receive EC services (76.40%).

Table 2

Characteristics of Students in the 2009-2010 Sample (n = 89)

Characteristic	Number of Students	Percentage of Students
School Level		
Elementary	79	88.76
Middle School	10	11.24
Gender		
Male	52	58.43
Female	37	41.57

Table 2 (continued)

Characteristic	Number of Students	Percentage of Students
Race/Ethnicity		
White	62	69.66
Black	6	6.74
Hispanic	13	14.61
Multiracial	7	7.87
American Indian	1	1.12
Asian	0	0
Students with Disabilities		
Yes	68	76.40
No	21	23.60

2010-2011 Sample

Student characteristics data are not presented for the 11 students in the 2010-2011 sample due to the small sample size. These students are included in the combined sample below.

Cohort One Sample

Table 3 includes the characteristics of the 19 students who received HillRAP instruction from Fall 2008 through Spring 2010. Most students were at the elementary level (94.74%). Most of the students were White (73.68%). Most of the students were identified to receive EC services (89.47%).

Table 3

Characteristics of Students in the Cohort One Sample: 2008-2010 (n = 19)

Characteristic	Number of Students	Percentage of Students
School Level		
Elementary	18	94.74
Middle School	0	0
High School	1	5.26
Gender		
Male	14	73.68
Female	5	26.32

Table 3 (continued)

Characteristic	Number of Students	Percentage of Students
Race/Ethnicity		
White	14	73.68
Black	0	0
Hispanic	1	5.26
Multiracial	1	5.26
American Indian	2	10.53
Asian	1	5.26
Students with Disabilities		
Yes	17	89.47
No	2	10.53

Cohort Two Sample

Table 4 shows the characteristics of the 44 students who received HillRAP from Fall 2009 to Spring 2011. Most students were at the elementary level (93.18%). Most of the students were White (65.91%). Most of the students were identified to receive EC services (90.70%).

Table 4

Characteristics of Students in the Cohort Two Sample: 2009-2011 (n = 43)

Characteristic	Number of Students	Percentage of Students
School Level		
Elementary	41	95.34
Middle School	1	2.33
High School	1	2.33
Gender		
Male	23	53.49
Female	20	46.51
Race/Ethnicity		
White	28	65.12
Black	2	4.65
Hispanic	7	16.28
Multiracial	5	11.63
American Indian	1	2.33
Asian	0	0
Students with Disabilities		
Yes	39	90.70
No	4	9.30

Combined Sample

Table 5 includes the characteristics of the 194 students from the annual samples: 2008-2009, 2009-2010, and 2010-2011. Most students were at the elementary level (78.35%). Most of the students were White (75.13%) and most of the students were identified to receive EC services (77.72%).

Table 5

Characteristics of Students in the Combined Sample (n = 194)

Characteristic	Number of Students	Percentage of Students
School Level		
Elementary	152	78.35
Middle School	29	14.95
High School	13	6.70
Gender		
Male	122	62.87
Female	72	37.11
Race/Ethnicity*		
White	145	75.13
Black	9	4.66
Hispanic	19	9.84
Multiracial	13	6.74
American Indian	5	2.59
Asian	2	1.04
Students with Disabilities*		
Yes	150	77.72
No	43	22.28

**n = 193, data were missing for 1 student.*

Data Collection and Analysis

Data collection and analysis procedures are described in the following sections, organized by research question.

1. **Do students who receive HillRAP instruction improve academic achievement in reading, overall, and by student groups?**

Woodcock-Johnson III Tests of Achievement (WJ-III) scores and North Carolina End-of-Grade (NC EOG) Reading Comprehension Test achievement levels were used to address research question one.

Woodcock-Johnson III Tests of Achievement. Each student was individually pretested and posttested using four WJ-III tests: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack. The WJ-III tests are nationally normed, standardized tests. The four WJ-III tests used for this evaluation measure important dimensions of phonological awareness, phonics knowledge, and reading achievement (see Table 6).

Table 6

Description of Woodcock-Johnson III Tests Used

Test	Area/Narrow Abilities	Skills Measured
Letter-Word Identification	Reading *Reading decoding*	Identifying letters and pronouncing lists of words correctly
Reading Fluency	Reading *Reading speed* *Semantic processing speed*	Ability to quickly read simple sentences, decide of the statement is true, and then circle Yes or No.
Passage Comprehension	Reading *Reading comprehension* *Cloze ability*	Ability to match a rebus (pictographic representation of a word) with an actual picture of the object and identifying missing key words that make sense in the context of a passage
Word Attack	Reading *Reading decoding* *Phonetic coding*	Applying phonic and structural analysis skills to the pronunciation of unfamiliar printed words

Source: Woodcock-Johnson III Tests of Achievement Examiner's Manual (2001)

Trained UNCW test administrators conducted pretests of students each fall of the project and posttested students each spring. Students in cohorts one and two were tested a third time, the

spring of their second year of HillRAP. Resulting raw scores were transformed to age-referenced standard scores and grade equivalency using the *WJ-III Normative Update Compuscore and Profiles Program*. Age-referenced standard scores are based on test norms and account for expected academic growth for students at a given age over the course of a school year. In other words, a student who makes the expected growth for an average child of the same age would have the same standard score at the beginning and end of the school year. Thus, an increase in a standard score indicates greater than expected growth; a decrease indicates the opposite. In addition, the average standard score for the WJ-III is 100, with scores from 90 to 110 considered to be in the *average* range; scores from 80 to 89 are considered to be in the *low average* range; and scores from 70 to 80 are considered to be in the *low* range. Scores below 70 are considered *very low* (Mather & Woodcock, 2001).

After transforming scores, UNCW conducted descriptive analysis of pretest to posttest differences for the 2008-2009 sample, the 2009-2010 sample, the cohort one sample, the cohort two sample, and the combined sample, by school level (elementary and secondary) and student groups, as appropriate given sample size. Paired samples t-tests were also conducted for the annual and combined samples and repeated measures analysis of variance were conducted for the cohort samples to determine if any observed differences were statistically significant.

North Carolina End-of-Grade Reading Comprehension Tests. The NC EOG Reading Comprehension Test is a curriculum-based, multiple-choice achievement test aligned with the *North Carolina Standard Course of Study*. The test assesses reading and knowledge of vocabulary by having students read both literary and informational selections and then answer questions related to those sections. It is administered during the final weeks of the school year to students in grades 3 through 8.

Carteret County Schools provided available NC EOG Reading Comprehension Test scale scores and achievement levels to UNCW for students in the study. Because some students took the regular administration of the test and others took an alternative test, scale scores were not used for analysis. However, both the standard and alternative tests yield categorical achievement

levels for students: Levels I and II indicate below grade level achievement, and Levels III and IV indicate at or above grade level achievement (see Figure 1).

UNCW conducted descriptive analysis of differences in student achievement level data for the 2008-2009 sample and the 2009-2010 sample. There were too few students with NC EOG Reading Comprehension Test scores in the cohort samples for analysis. However, analysis was conducted for the combined sample overall, and by student groups for which there were a sufficient number of students for analysis. Further, due to individual students sometimes taking the alternative test one year and the alternative test the following year, results should be interpreted with caution.

Figure 1

NC EOG Reading Comprehension Achievement Levels Descriptors

Level I: Students performing at this level do not have sufficient mastery of knowledge and skills in this subject area to be successful at the next grade level.

Level II: Students performing at this level demonstrate inconsistent mastery of knowledge and skills that are fundamental in this subject area and that are minimally sufficient to be successful at the next grade level.

Level III: Students performing at this level consistently demonstrate mastery of grade-level subject matter and skills and are well prepared for the next grade level.

Level IV: Students performing at this level consistently perform in a superior manner clearly beyond that required to be proficient at grade-level work.

Source: North Carolina Department of Public Instruction

2. How many sessions of HillRAP instruction did students receive? Is there a relationship between the number of HillRAP sessions students receive and achievement in reading?

HillRAP Attendance Record data were used to address research question two. HillRAP teachers completed the HillRAP Attendance Record for their HillRAP students. Teachers provided these data to UNCW for descriptive and correlation analysis.

3. Do teachers who receive HillRAP training effectively implement HillRAP in a public school setting?

The HillRAP Teacher Observation Form was used to address research question three. Hill Center Master Teachers/Trainers completed the HillRAP Teacher Observation Form as part of their regular observations of HillRAP teachers. Observations were conducted in person or via live webcam sessions. The Hill Center provided overall teacher proficiency ratings from completed HillRAP Teacher Observation Forms to UNCW for descriptive analysis. Profiency ratings are on a scale of 1 to 3, with 3 indicating the high point on the scale.

RESULTS

Results are presented in the following sections, organized by research question.

1. Do students who received HillRAP instruction improve academic achievement in reading, overall, and by student groups?

Annual Samples: 2008-2009 and 2009-2010

Overall WJ-III and NC EOG Reading Comprehension Test results for the 2008-2009 sample and 2009-2010 sample are presented in the following sections.

Annual Samples: Woodcock-Johnson III Tests of Achievement

Overall, HillRAP students in the 2008-2009 sample and 2009-2010 sample made greater than expected growth on each WJ-III test (see Table 7). The range of change scores for the 2008-2009 sample was 3.39 to 5.96 and all change scores were statistically significant. Students demonstrated the greatest growth on Passage Comprehension (change = 5.96) and Reading Fluency (change = 4.51) tests. Students also moved from the *low* range for WJ-III scores (70-79) to the *low average* range (80-89) on the Letter-Word Identification (mean = 81.11) and Reading Fluency (mean = 82.55) tests.

The range of change scores for the 2009-2010 sample was 2.77 to 8.08 and all change scores were statistically significant. Students demonstrated the greatest growth on Word Attack (change = 8.08), Reading Fluency (change = 7.36), and Passage Comprehension (change = 5.79) tests. In addition, students moved from the *low* range for WJ-III scores to the *low average* range on the Passage Comprehension (mean = 80.27) test, and the Spring 2010 (posttest) mean for the Word Attack test moved from the *low average* range to the *average* range for WJ-III scores (mean = 91.00).

2008-2009 Sample: North Carolina End-of-Grade Reading Comprehension Test

Overall, students in the 2008-2009 sample demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 2). The percentage of students who scored at or above grade level increased from 9.43% prior to HillRAP to 28.30% after one year of implementation. The percentage of students who scored at Level I decreased from 64.15% to 30.19% after one year of HillRAP.

Table 7

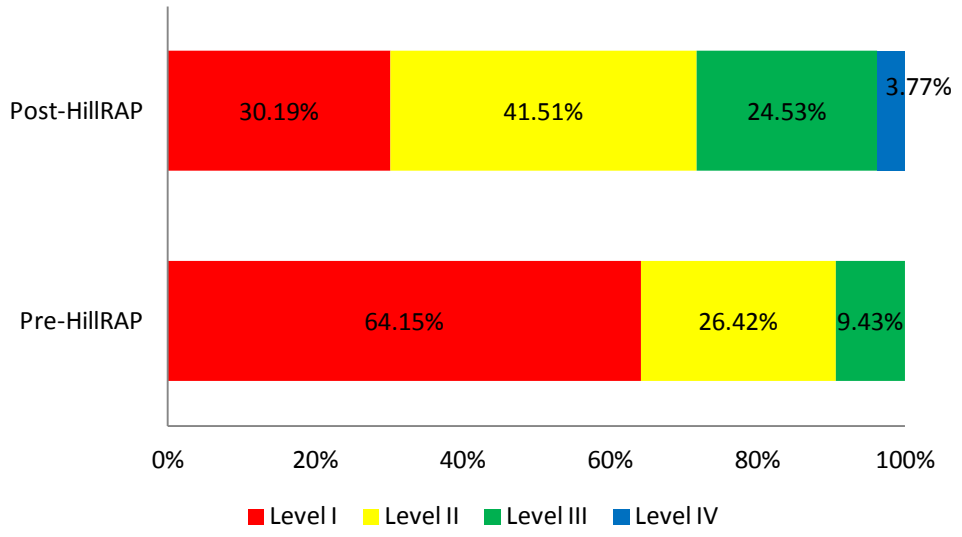
Means, Standard Deviations (SD), and Change Scores for 2008-2009 Sample and 2009-2010 Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests

Test	2008-2009 Sample (n = 94)			2009-2010 Sample (n = 89)		
	Fall 2008 Mean	**Spring 2009 Mean**	**2008–2009 Change**	**Fall 2009 Mean**	**Spring 2010 Mean**	**2009-2010 Change**
Letter-Word Identification	77.72 (21.25)	81.11 (20.25)	3.39**	80.52 (14.68)	83.29 (15.68)	2.77**
Reading Fluency	78.04 (18.78)	82.55 (17.73)	4.51**	72.09 (23.72)	79.45 (18.39)	7.36**
Passage Comprehension	70.83 (22.34)	76.79 (20.98)	5.96**	74.48 (14.64)	80.27 (14.30)	5.79**
Word Attack	85.20 (16.18)	88.81 (13.16)	3.61**	82.92 (18.45)	91.00 (10.66)	8.08**

*p <.05. **p < .01

Figure 2

North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for 2008-2009 Sample (n = 53)

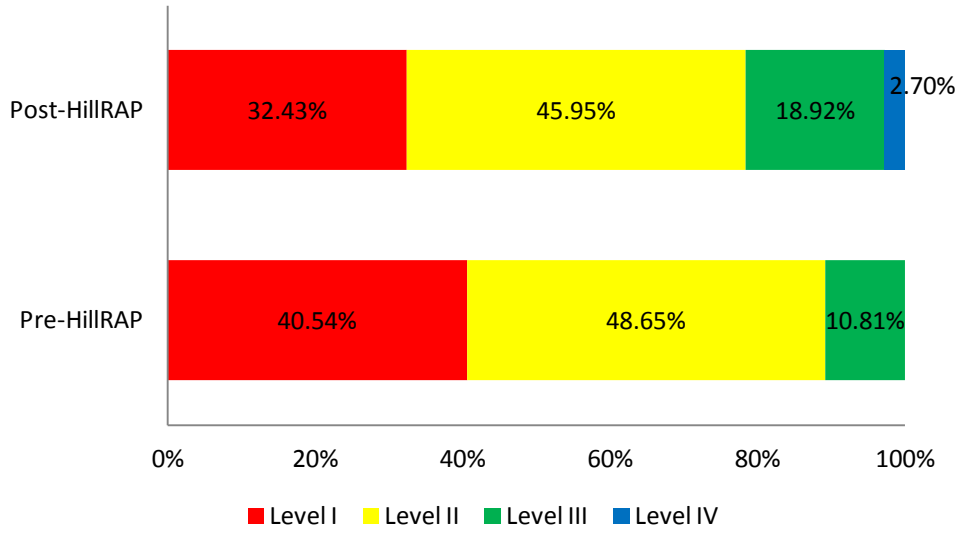


2009-2010 Sample: North Carolina End-of-Grade Reading Comprehension Test

Overall, students in the 2009-2010 sample demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 3). The percentage of students who scored at or above grade level increased from 10.81% prior to HillRAP to 21.62% after one year of implementation. The percentage of students who scored at Level I decreased from 40.54% to 32.43% after one year of HillRAP.

Figure 3

North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for 2009-2010 Sample (n = 37)



Cohort Samples: 2008-2010 and 2009-2011

Overall WJ-III results for the cohort one sample and cohort two sample are presented below. Students in both samples made greater than expected growth on each WJ-III test (see Table 8). There were too few students in these samples with NC EOG Reading Comprehension Test scores to conduct analysis of these data.

The range of change scores for the cohort one sample was 4.00 to 11.36 and all change scores, with the exception of the Word Attack change score, were statistically significant. Students demonstrated the greatest growth on Passage Comprehension (change = 11.36) and Letter-Word

Identification (change = 5.63) tests, and moved from the *low average* range to the *average* range of the WJ-III for the Word Attack test in Spring 2010 (mean = 91.16).

The range of change scores for the cohort two sample was 2.63 to 13.32 and all change scores were statistically significant. Students demonstrated the greatest growth on Reading Fluency (change = 13.32) and Word Attack (change = 11.04) tests. In addition, Passage Comprehension test means moved from the *very low* range for WJ-III scores in Fall 2009 (mean = 67.91), to the *low* range in Spring 2010 (mean = 76.95), to the *low average* range in Spring 2011 (mean = 81.23). Further, the Spring 2010 and Spring 2011 means for the Word Attack test moved from the *low* range to the *average* range for WJ-III scores (Spring 2010 mean = 90.91; Spring 2011 mean = 90.67).

In addition, students in the cohort one sample made notable growth compared to those in the annual samples on the Passage Comprehension test; thus, students who received two years of HillRAP instruction as part of cohort one demonstrated greater growth on this test compared to students who received one year of HillRAP instruction. Similarly, students in the cohort two sample made notable growth compared to the annual samples on the Word Attack and Reading Fluency tests. Cohort two students who received HillRAP for two years demonstrated greater growth on these tests compared to students who received one year of HillRAP instruction.

Table 8

Means, Standard Deviations (SD), and Change Scores for Cohort Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests

	Cohort One Sample (n = 19)				**Cohort Two Sample (n = 43)**			
Test	**Fall 2008 Mean**	**Spring 2009 Mean**	**Spring 2010 Mean**	**2008-2010 Change**	**Fall 2009 Mean**	**Spring 2010 Mean**	**Spring 2011 Mean**	**2009-2011 Change**
Letter-Word Identification	81.00 (13.43)	85.26 (12.44)	86.63 (12.36)	5.63**	81.70 (15.59)	82.35 (17.76)	84.33 (16.15)	2.63*
Reading Fluency	80.11 (14.64)	83.79 (17.11)	84.89 (12.36)	4.78*	67.91 (30.56)	76.95 (21.94)	81.23 (14.34)	13.32**
Passage Comprehension	72.11 (13.61)	76.84 (14.95)	83.47 (12.96)	11.36**	75.56 (14.12)	77.47 (14.76)	79.93 (16.15)	4.37*
Word Attack	87.16 (9.93)	89.32 (7.18)	91.16 (6.62)	4.00	79.63 (23.50)	90.91 (10.47)	90.67 (11.25)	11.04**

*p <.05. **p < .01

Combined Sample

WJ-III and NC EOG Reading Comprehension Test results for the combined sample are presented in the following sections, overall and by student groups for which there were sufficient numbers of students for analysis.

Overall Results

Overall: Woodcock-Johnson III Tests of Achievement

Overall, HillRAP students in the combined sample made greater than expected growth on each WJ-III test (see Table 9). The range of change scores was 3.07 to 6.20 and all change scores were statistically significant. Students demonstrated the greatest growth on Passage Comprehension (change = 6.20), Word Attack (change = 5.82), and Reading Fluency (change = 5.46) tests. In addition, students moved from the *low* range for WJ-III scores on Letter-Word Identification (mean = 78.43) and Reading Fluency (mean = 74.78) to the *low average* range (means = 81.50 and 80.24, respectively).

Table 9

Means, Standard Deviations (SD), and Change Scores for Combined Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests (n = 194)

Test	Pretest Mean	Posttest Mean	One Year Change
Letter-Word Identification	78.43 (18.66)	81.50 (18.52)	3.07**
Reading Fluency	74.78 (21.27)	80.24 (18.16)	5.46**
Passage Comprehension	71.97 (19.12)	78.17 (18.19)	6.20**
Word Attack	83.82 (17.00)	89.64 (12.04)	5.82**

*p <.05. **p < .01

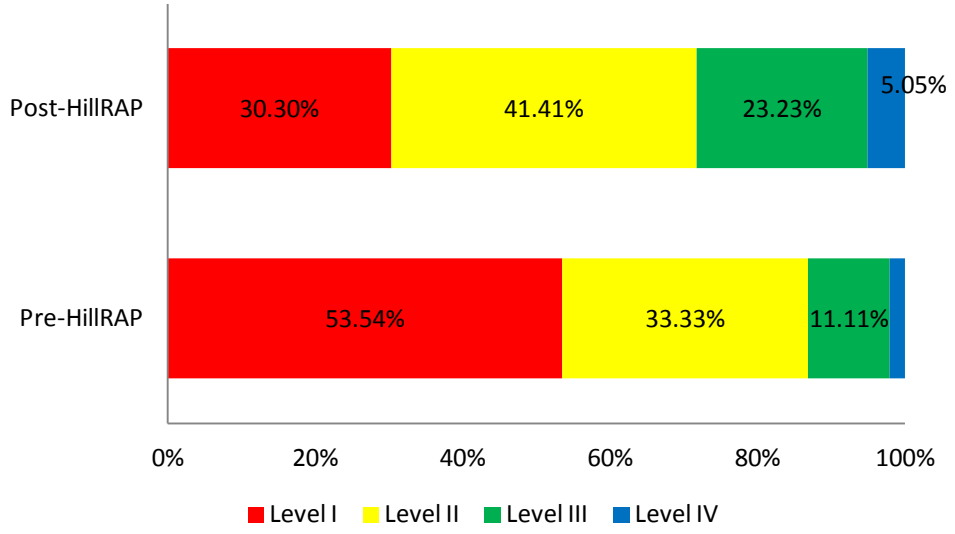
Overall: North Carolina End-of-Grade Reading Comprehension Test

Overall, students in the combined sample demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 4). The percentage of students who scored at or above grade level increased from 13.13% prior to

HillRAP to 28.28% after one year of implementation. The percentage of students who scored at Level I decreased from 53.54% to 30.30% after one year of HillRAP.

Figure 4

North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for Combined Sample (n = 99)



School Level Results

WJ-III age-referenced standard score results are presented in the following sections for elementary school students and secondary school students (middle and high school) in the combined sample. EOG Reading Comprehension Test results are presented for elementary students, but there were too few secondary school students with data for analysis.

Elementary School Students: Woodcock-Johnson III Tests of Achievement

Elementary school students in the combined sample made greater than expected growth on each WJ-III test (see Table 10). The range of change scores was 2.47 to 6.61 and all change scores were statistically significant. Students demonstrated the greatest growth on Reading Fluency (change = 6.61), Word Attack (change = 5.73), and Passage Comprehension (change = 5.49) tests. In addition, students moved from the *low range* for WJ-III scores on Reading Fluency (mean = 76.77) and Passage Comprehension (mean = 76.54) to the *low average* range (means = 83.38 and 82.03, respectively). The mean for the Word Attack test moved from the *low average*

range to the *average* range for WJ-III scores (mean = 91.98). Finally, compared to the overall combined sample, elementary school students in the combined sample had higher mean scores at pretest, but less growth on all tests except Reading Fluency.

Table 10

Elementary School Student Means, Standard Deviations (SD), and Change Scores for Combined Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests (n = 151)

Test	Pretest Mean	Posttest Mean	One Year Change
Letter-Word Identification	83.76 (13.52)	86.23 (14.35)	2.47**
Reading Fluency	76.77 (22.09)	83.38 (17.98)	6.61**
Passage Comprehension	76.54 (15.77)	82.03 (13.95)	5.49**
Word Attack	86.25 (16.20)	91.98 (10.31)	5.73**

*p <.05. **p < .01

Elementary School Students: North Carolina End-of-Grade Reading Comprehension Test

Elementary school students in the combined sample demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 5). The percentage of students who scored at or above grade level increased from 10.26% prior to HillRAP to 26.92% after one year of implementation. The percentage of students who scored at Level I decreased from 55.13% to 30.77% after one year of HillRAP.

Secondary School Students: Woodcock-Johnson III Tests of Achievement

Secondary school students in the combined sample made greater than expected growth on each WJ-III test (see Table 11). The range of change scores was 1.33 to 8.76 and, with the exception of the Reading Fluency test, all change scores were statistically significant. Students demonstrated the greatest growth on Passage Comprehension (change = 8.76), Word Attack (change = 6.17), and Letter-Word Identification (change = 5.22) tests. In addition, students moved from the *low range* for WJ-III scores on Word Attack (mean = 75.07) to the *low average* range (mean = 81.24). Compared to the overall combined sample, secondary school students in

the combined sample had lower mean scores at pretest, but greater growth on all tests except Reading Fluency.

Figure 5

Elementary School Student North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for Combined Sample (n = 78)

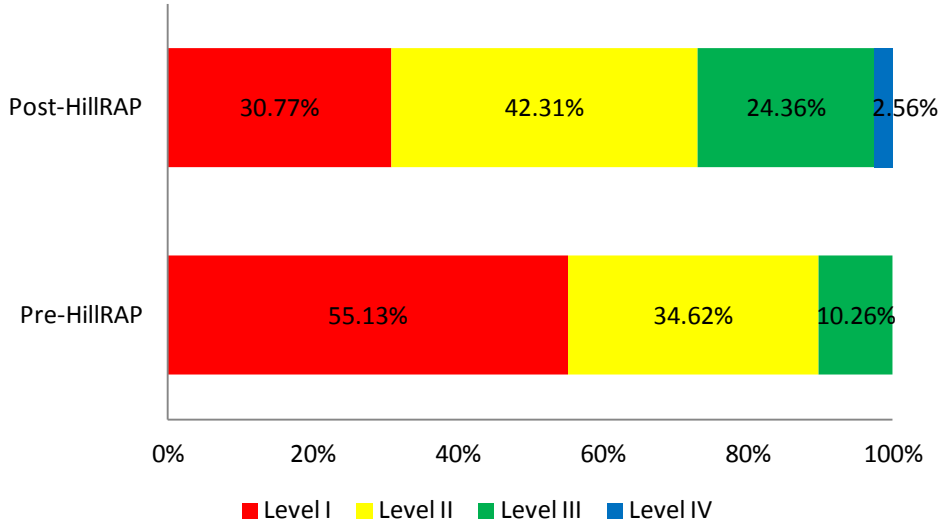


Table 11

Secondary School Student Means, Standard Deviations (SD), and Change Scores for Combined Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests (n = 42)

Test	Pretest Mean	Posttest Mean	One Year Change
Letter-Word Identification	59.26 (21.91)	64.48 (21.77)	5.22*
Reading Fluency	67.60 (16.34)	68.93 (13.94)	1.33
Passage Comprehension	55.55 (21.17)	64.31 (24.21)	8.76**
Word Attack	75.07 (17.08)	81.24 (14.03)	6.17**

*p <.05. **p < .01

Race and Ethnicity Results

WJ-III age-referenced standard score and EOG Reading Comprehension Test results are presented in the following sections for non-minority students and minority students. With the exception of White students, there were insufficient numbers of students from specific racial and ethnic groups (e.g., Hispanic students) to conduct disaggregated analysis at this level.

Non-Minority Students: Woodcock-Johnson III Tests of Achievement

Non-minority students in the combined sample made greater than expected growth on each WJ-III test (see Table 11). The range of change scores was 3.05 to 6.98 and all change scores were statistically significant. Students demonstrated the greatest growth on Passage Comprehension (change = 6.98), Reading Fluency (change = 6.29), and Word Attack (change = 6.02) tests. In addition, students moved from the *low range* for WJ-III scores on Letter-Word Identification (mean = 79.24) and Reading Fluency (mean = 74.99) tests to the *low average* range (means = 82.29 and 81.28, respectively). Compared to the overall combined sample, non-minority students in the combined sample demonstrated greater growth on all tests except Letter-Word Identification.

Table 11

Non-Minority Student Means, Standard Deviations (SD), and Change Scores for Combined Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests (n = 144)

Test	Pretest Mean	Posttest Mean	One Year Change
Letter-Word Identification	79.24 (18.73)	82.29 (18.76)	3.05**
Reading Fluency	74.99 (21.52)	81.28 (18.44)	6.29**
Passage Comprehension	72.62 (19.69)	79.60 (18.31)	6.98**
Word Attack	83.38 (18.27)	89.40 (12.86)	6.02**

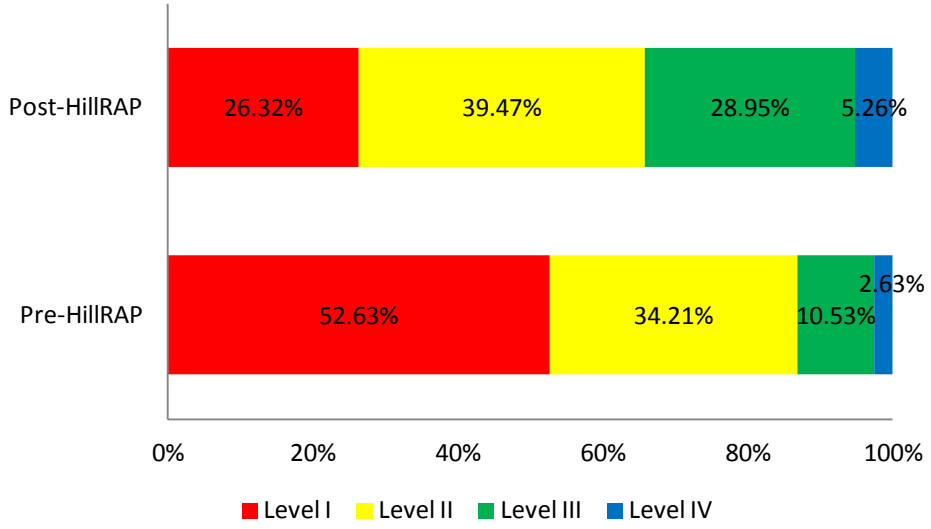
*p <.05. **p < .01

Non-Minority Students: North Carolina End-of-Grade Reading Comprehension Test

Non-minority students in the combined sample demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 6). The percentage of students who scored at or above grade level increased from 13.16% prior to HillRAP to 34.21% after one year of implementation. The percentage of students who scored at Level I decreased from 52.63% to 26.32% after one year of HillRAP.

Figure 6

Non-Minority Student North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for Combined Sample (n = 76)



Minority Students: Woodcock-Johnson III Tests of Achievement

Minority students in the combined sample made greater than expected growth on each WJ-III test (see Table 12). The range of change scores was 2.92 to 5.16 and, with the exception of the Reading Fluency test, all change scores were statistically significant. Students demonstrated the greatest growth on the Word Attack (change = 5.16) test, and also moved from the *low average* range for WJ-III scores on the Word Attack test (mean = 85.13) to the *average* range (mean = 90.29). Compared to the overall combined sample, minority students in the combined sample started out with slightly lower pretest means and demonstrated greater growth on the Letter-Word Identification test.

Table 12

Minority Student Means, Standard Deviations (SD), and Change Scores for Combined Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests (n = 48)

Test	Pretest Mean	Posttest Mean	One Year Change
Letter-Word Identification	76.04 (18.61)	79.21 (17.99)	3.17*
Reading Fluency	74.31 (20.93)	77.23 (17.31)	2.92
Passage Comprehension	70.02 (17.54)	73.60 (17.33)	3.58*
Word Attack	85.13 (12.75)	90.29 (9.37)	5.16**

*p <.05. **p < .01

Minority Students: North Carolina End-of-Grade Reading Comprehension Test

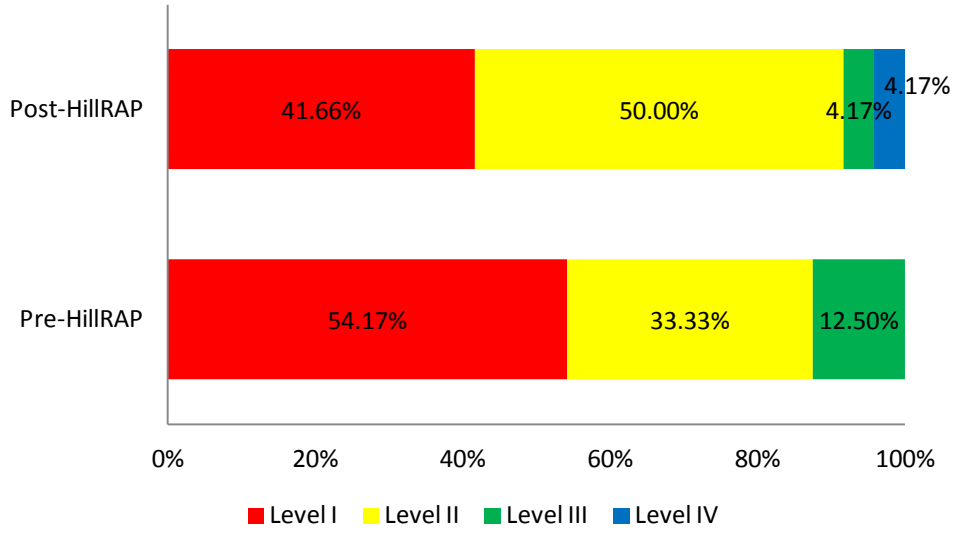
Minority students in the combined sample demonstrated some growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 7). Although the percentage of students who scored at or above grade level decreased from 12.50% prior to HillRAP to 8.34% after one year of implementation, the percentage of students who scored above grade level increased from 0% to 4.17%. Additionally, the percentage of students who scored at Level I decreased from 54.17% to 41.66% after one year of HillRAP.

Results for Students Identified to Receive Exceptional Children's Services

WJ-III age-referenced standard score results are presented in the following sections for the combined sample disaggregated by students identified to receive EC services, and further disaggregated by students identified as learning disabled, students identified as other health impaired, and students identified as having a mild intellectual disability. NC EOG Reading Comprehension Test scores for students identified to receive EC services and students identified as learning disabled are also presented.

Figure 7

Minority Student North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for Combined Sample (n = 24)



Students Identified to Receive EC Services: Woodcock-Johnson III Tests of Achievement

Students in the combined sample who were identified to receive EC services made greater than expected growth on each WJ-III test (see Table 13). The range of change scores was 3.11 to 6.08 and all change scores were statistically significant. Students demonstrated the greatest growth on the Word Attack (change = 6.08), Passage Comprehension (change = 5.96), and Reading Fluency (change = 5.07) tests. They also moved from the *very low* range for WJ-III scores on the Passage Comprehension test (mean = 68.95) to the *low* range (mean = 74.91). Compared to the overall combined sample, students identified to receive EC services started out with slightly lower pretest means and demonstrated greater growth on the Letter-Word Identification test.

Students Identified to Receive EC Services: North Carolina End-of-Grade Reading Comprehension Test

Students identified to receive EC services in the combined sample demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 8). The percentage of students who scored at or above grade level increased from 15.00% prior to HillRAP to 26.25% after one year of implementation. The percentage of students who scored at Level I decreased from 51.25% to 27.50% after one year of HillRAP.

Table 13

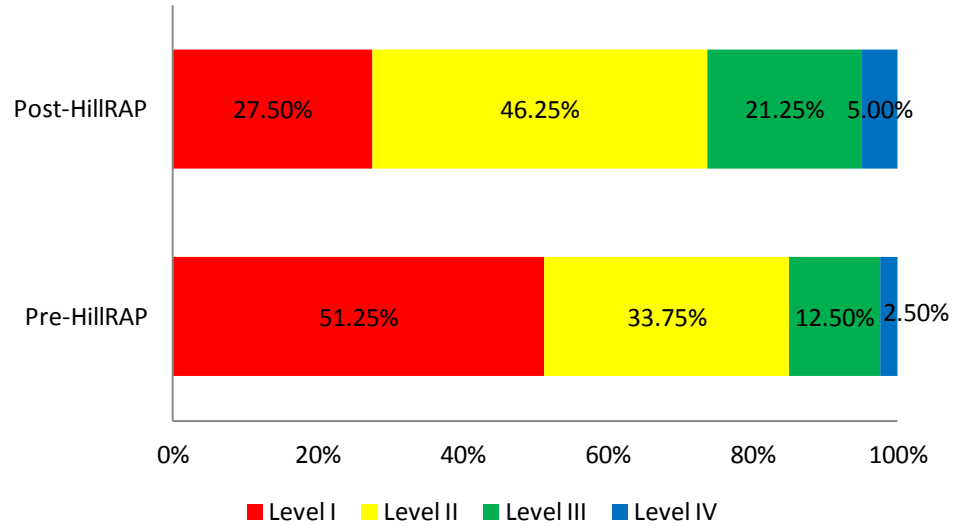
Students Identified to Receive EC Services Means, Standard Deviations (SD), and Change Scores for Combined Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests (n = 149)

Test	Pretest Mean	Posttest Mean	One Year Change
Letter-Word Identification	75.24 (17.88)	78.35 (17.64)	3.11**
Reading Fluency	71.45 (21.75)	76.52 (17.86)	5.07**
Passage Comprehension	68.95 (18.91)	74.91 (17.38)	5.96**
Word Attack	81.28 (17.70)	87.36 (11.50)	6.08**

*p <.05. **p < .01

Figure 8

Students Identified to Receive EC Services North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for Combined Sample (n = 80)



Students Identified as Learning Disabled: Woodcock-Johnson III Tests of Achievement

Students in the combined sample who were identified as learning disabled made greater than expected growth on each WJ-III test (see Table 14). The range of change scores was 2.01 to 5.28 and all change scores were statistically significant. Students demonstrated the greatest growth on the Passage Comprehension test (change = 5.28). Compared to the overall combined sample,

students identified as learning disabled started out with slightly higher pretest means on all tests except Letter-Word Identification and demonstrated less growth on all tests.

Table 14

Students Identified as Learning Disabled Means, Standard Deviations (SD), and Change Scores for Combined Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests (n = 72)

Test	Pretest Mean	Posttest Mean	One Year Change
Letter-Word Identification	76.69 (13.86)	79.26 (13.66)	2.57**
Reading Fluency	76.74 (13.21)	78.75 (14.20)	2.01*
Passage Comprehension	72.18 (15.50)	77.46 (13.88)	5.28**
Word Attack	84.39 (13.25)	88.42 (8.97)	4.03**

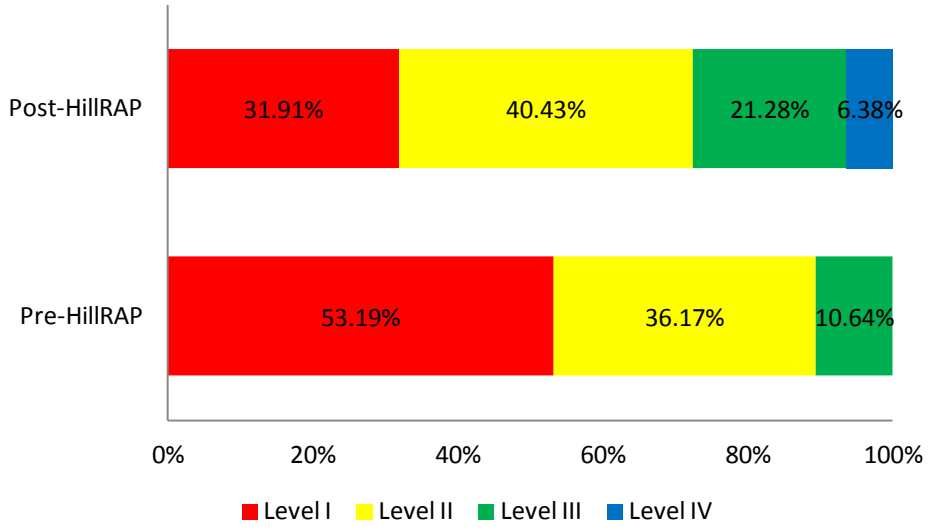
*p <.05. **p < .01

Students Identified as Learning Disabled: North Carolina End-of-Grade Reading Comprehension Test

Students identified as learning disabled in the combined sample demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 9). The percentage of students who scored at or above grade level increased from 10.64% prior to HillRAP to 27.66% after one year of implementation. The percentage of students who scored at Level I decreased from 53.19% to 31.91% after one year of HillRAP.

Figure 9

Students Identified as Learning Disabled North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for Combined Sample (n = 47)



Students Identified as Other Health Impaired: Woodcock-Johnson III Tests of Achievement

Students in the combined sample who were identified as other health impaired made greater than expected growth on each WJ-III test (see Table 15). The range of change scores was 2.48 to 8.12 and change scores for Passage Comprehension and Word Attack tests were statistically significant. Students demonstrated the greatest growth on the Passage Comprehension test (change = 8.12). Students also moved from the *low* range for WJ-III scores on Reading Fluency (mean = 77.64) and Passage Comprehension (mean = 73.20) at pretest to the *low average* range (means = 80.12 and 81.32, respectively) at posttest. The posttest mean for the Word Attack test moved from the *low average* range (mean = 86.36) to the *average* range (mean = 90.40). Compared to the overall combined sample, students identified as other health impaired started out with slightly higher pretest means on all tests and demonstrated greater growth on the Passage Comprehension test

Table 15

Students Identified as Other Health Impaired Means, Standard Deviations (SD), and Change Scores for Combined Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests (n = 25)

Test	Pretest Mean	Posttest Mean	One Year Change
Letter-Word Identification	81.72 (16.93)	84.32 (16.25)	2.60
Reading Fluency	77.64 (15.43)	80.12 (15.67)	2.48
Passage Comprehension	73.20 (14.83)	81.32 (13.66)	8.12**
Word Attack	86.36 (12.33)	90.40 (9.51)	4.04*

*p <.05. **p < .01

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Students Identified as Having a Mild Intellectual Disability: Woodcock-Johnson III Tests of Achievement

Students in the combined sample who were identified as having a mild intellectual disability made greater than expected growth on each WJ-III test (see Table 16). The range of change scores was 2.18 to 8.91 and change scores for Letter-Word Identification and Word Attack tests were statistically significant. Students demonstrated the greatest growth on the Word Attack (change = 8.91), Passage Comprehension (change = 7.96), and Letter-Word Identification (change = 7.82) tests. Compared to the overall combined sample, students identified as having a mild intellectual disability started out with lower pretest means on all tests. Pretest means for Passage Comprehension (mean = 48.27), Letter-Word Identification (mean = 55.36), and Reading Fluency (mean = 60.64) were in the *very low* range for WJ-III scores. Although posttest means remained in the *very low* range for these tests, students identified as having a mild intellectual disability demonstrated greater growth on all tests except Reading Fluency compared to the overall combined sample.

Table 16

Students Identified as Having a Mild Intellectual Disability Means, Standard Deviations (SD), and Change Scores for Combined Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests (n = 22)

Test	Pretest Mean	Posttest Mean	One Year Change
Letter-Word Identification	55.36 (20.91)	63.18 (22.36)	7.82*
Reading Fluency	60.64 (21.44)	62.82 (20.75)	2.18
Passage Comprehension	48.27 (23.17)	56.23 (21.76)	7.96
Word Attack	70.59 (19.73)	79.50 (16.99)	8.91**

*p <.05. **p < .01

Results for Students Not Identified to Receive Exceptional Children's Services

WJ-III age-referenced standard score results are presented below for students not identified to receive EC services. There were too few students with NC EOG Reading Comprehension Test scores for analysis.

Students in the combined sample who were not identified to receive EC services made greater than expected growth on each WJ-III test (see Table 17). The range of change scores was 1.27 to 6.82 and change scores for Reading Fluency and Passage Comprehension tests were statistically significant. Students demonstrated the greatest growth on the Reading Fluency test (change = 6.82). In addition, the pretest mean for the Reading Fluency test (mean = 85.27) was in the *low average* range for WJ-III scores, but moved into the *average* range at posttest (mean = 92.09). Both pretest and posttest means for the Word Attack test were in the *average* range for WJ-III scores. Compared to the overall combined sample, students not identified to receive EC services started out with higher pretest means on all tests and demonstrated greater growth on the Reading Fluency test.

Table 17

Students Not Identified to Receive EC Services Means, Standard Deviations (SD), and Change Scores for Combined Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests (n = 22)

Test	Pretest Mean	Posttest Mean	One Year Change
Letter-Word Identification	87.18 (22.73)	88.45 (22.99)	1.27
Reading Fluency	85.27 (18.70)	92.09 (16.17)	6.82**
Passage Comprehension	81.09 (22.08)	85.23 (22.11)	4.14**
Word Attack	92.59 (12.14)	95.73 (12.97)	3.14

*p <.05. **p < .01

2. How many sessions of HillRAP instruction did students receive? Is there a relationship between the number of HillRAP sessions students receive and achievement in reading?

Descriptive results addressing the first part of research question two appear in Table 18 below. Although the mean number of sessions attended was similar for annual samples (means = 91.54, 106.73, and 97.79) and cohort samples (means = 223.50 and 229.45), standard deviations and ranges indicate notable variability in the number of sessions attended, with the exception of the cohort one sample (SD = 12.02). In addition, correlation analysis was conducted to determine if there was a relationship between the number of HillRAP sessions students received and reading achievement, but no correlation was evidenced. It should be noted that correlation analysis is a different type of analysis than the pretest-posttest analysis presented earlier that showed a pattern of students demonstrating greater growth after two years of HillRAP.

Table 18

HillRAP Attendance for Study Samples

Sample	n-size[a]	Mean	Standard Deviation	Range of Sessions
2008-2009 Sample	84	91.54	20.71	8-127
2010-2011 Sample	71	106.73	20.37	30-148
Cohort 1 Sample[b]	2	223.5	12.02	215-232
Cohort 2 Sample[b]	33	229.45	31.77	180-322
Combined Sample	162	97.79	22.47	8-148

[a]Data were not available for every student.
[b]Includes two years of implementation.

3. Do teachers who receive HillRAP training effectively implement HillRAP in a public school setting?

Results based on analysis of HillRAP teacher observation "Overall Teaching Proficiency" ratings appear in Table 19 below, organized by each of five observations. Overall, all teacher ratings were above 2 on a 3-point scale. In addition, mean teacher ratings increased with each observation and standard deviations (i.e., variability in ratings) decreased. Thus, "Overall Teaching Proficiency" improved over time; however, based on the results of correlation analysis, no relationship between teacher proficiency ratings and student achievement in reading were evidenced. The lack of relationship is potentially a result of restriction of range—i.e., the 3-point scale doesn't allow for much variability in teacher ratings and in this study the range was further restricted by the generally high ratings received by HillRAP teachers.

Table 19

HillRAP Teacher Proficiency Ratings Means and Standard Deviations

2008-2011	Observation 1 (n = 54)	Observation 2 (n = 48)	Observation 3 (n = 44)	Observation 4 (n = 36)	Observation 5 (n = 24)
Mean	2.41	2.71	2.75	2.86	2.92
Standard Deviation	0.57	0.46	0.44	0.35	0.28

FINDINGS AND RECOMMENDATIONS

Overall, students who received HillRAP instruction improved academic achievement in reading. Across samples, years, and student groups, HillRAP students demonstrated greater than expected growth for average ability students their age on all WJ-III reading tests administered: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack. They similarly demonstrated growth on the NC EOG Reading Comprehension Test, moving from lower to higher achievement levels. The following are specific findings:

Students decreased and sometimes closed the gap between their achievement and the *average* range for WJ-III scores. Students most frequently moved into the *average* range for the Word Attack test. Of particular interest is the cohort two sample. At pretest, the Word Attack mean for this sample was in the *low* range for WJ-III scores, but following one year of HillRAP, the mean was in the *average* range and stayed there through the second year of the program. In addition, the Reading Fluency test mean for the cohort two sample was in the *very low* range for WJ-III scores; following one year of HillRAP, the mean was in the *low* range; and after two years of HillRAP, the mean was in the *low average* range. Likewise, there was growth among samples and student groups who, at pretest, had test means considered *low* for WJ-III scores and after one year of HillRAP had test means in the *low average* range. This exemplifies the growth HillRAP students experienced.

In some cases, students who received HillRAP instruction for two years demonstrated greater growth than those who received it for only one year. Specifically, students in the cohort one sample made notable growth on the Passage Comprehension test compared to those in the annual samples. Similarly, students in the cohort two sample made notable growth on the Word Attack and Reading Fluency tests compared to the annual samples.

Elementary school students in the combined sample demonstrated greater growth compared to the overall combined sample on the Reading Fluency test and moved into the *average* range of the WJ-III for the Word Attack test. In addition, the percentage of elementary school students

who scored at or above grade level on the NC EOG Reading Comprehension Test more than doubled after one year of HillRAP instruction.

Secondary school students in the combined sample demonstrated greater growth compared to the overall combined sample on Letter-Word Identification, Passage Comprehension, and Word Attack tests. However, they scored lower at pretest than students in the overall combined sample.

Non-minority students in the combined sample demonstrated greater growth compared to the overall combined sample on Reading Fluency, Passage Comprehension, and Word Attack tests. In addition, the percentage of non-minority students who scored at or above grade level on the NC EOG Reading Comprehension Test more than doubled after one year of HillRAP instruction.

Minority students in the combined sample demonstrated greater growth compared to the overall combined sample on the Letter-Word Identification test and moved into the *average* range for WJ-III scores at posttest on the Word Attack test. The percentage of minority students who scored at or above grade level on the NC EOG Reading Comprehension Test slightly decreased after one year of HillRAP; however, the percentage of minority students who scored at Level I decreased after one year of HillRAP.

Students identified to receive EC services in the combined sample demonstrated greater growth compared to the overall combined sample on Letter-Word Identification and Word Attack tests. From this group of students, students identified as learning disabled demonstrated less growth on all tests compared to all students identified to receive EC services; however, students identified as learning disabled had slightly higher test means at pretest, comparatively. Students identified as other health impaired similarly made less growth compared to all students identified to receive EC services on Letter-Word Identification, Reading Fluency, and Word Attack tests; however, they made more growth on the Passage Comprehension test and moved into the *average* range of the WJ-III for the Word Attack test. They also had higher pretest means on all tests comparatively. Students identified as having a mild intellectual disability demonstrated greater growth compared to all students identified to receive EC services on all tests with the exception of the Reading Fluency test. However, this group of students had means in the *very low* or *low*

range of the WJ-III on all tests at pretest, with no movement from these ranges at posttest. Finally, the percentage of students identified to receive EC services who scored at or above grade level on the NC EOG Reading Comprehension Test nearly doubled after one year of HillRAP instruction. The percentage of students identified as learning disabled who scored at or above grade level on the NC EOG Reading Comprehension Test more than doubled after one year of HillRAP.

There was considerable variability in the number of HillRAP sessions students received. No relationship between HillRAP attendance and student reading achievement was found.

HillRAP teachers' overall teaching proficiency ratings were high and improved over time. No relationship between ratings and student reading achievement was found.

Recommendations Related to Study Findings

Based on the findings of the evaluation study, the following recommendations should be considered:

- There was some evidence of students demonstrating greater growth after two years of HillRAP instruction. Given study attrition and the small sample sizes of the cohort groups, future studies of HillRAP should include a larger sample from the beginning and efforts should be made to ensure that as many students as possible remain in HillRAP for a second year. In addition, future studies should include an implementation period of more than two years to determine the impact of longer participation in the program.
- Although they started out with lower means at pretest comparatively, secondary school students in the evaluation study demonstrated notable growth in reading achievement. These results are promising; however, the small number of secondary school students in study sample limited the analysis that could be done and conclusions that can be drawn. Subsequent studies of HillRAP should include a larger number of secondary school students, middle and high school, to better determine the impact of the program on these students.
- Non-minority students generally demonstrated greater growth in reading achievement compared to minority students; however, the limited number of minority students in the study

sample limited the analysis that could be done (e.g., disaggregation by specific racial and ethnic groups) and conclusions that can be drawn. Future studies of HillRAP should include a larger number of minority students, representing diverse racial and ethnic groups, to better determine the impact of the program on these students.

- Across annual, cohort, and combined study samples, most students were identified to receive EC services and, overall, students made greater than expected growth on all WJ-III tests administered: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack. Students identified to receive EC services similarly showed a pattern of growth from lower to higher achievement levels on the NC EOG Reading Comprehension Test. However, based on subsequent analysis of students identified as learning disabled, students identified as other health impaired, and students identified as having a mild intellectual disability; there is much variability within the broader group of students identified to receive EC services. For example, students identified as having a mild disability demonstrated greater gains on some tests comparatively, but the pretest means for this group of students were considerably lower than those of other students identified to receive EC services. The small number of students in some of the groups of students identified to receive EC services (e.g., identified as having a mild intellectual disability) limited the conclusions that can be drawn. Subsequent studies of HillRAP should include enough students representing the different types of EC services for which students are identified to better understand the effectiveness of the program in meeting the needs of these groups of students.

Recommendations Related to Study Limitations

Based on limitations of the evaluation study, the following recommendations should be considered:

- A major limitation of the evaluation study was the lack of a comparison group. Similar to other studies of HillRAP (Christopoulos, Rosanbalm, & Rabiner, 2011a; Christopoulos, Rosanbalm, & Rabiner, 2011b; Downing et al., 2007), a quasi-experimental single group pretest-posttest design was used, increasing threats to the internal validity of study results—i.e., the degree to which results can be attributed to HillRAP. Future studies of HillRAP

should employ a comparison group design with a large sample to better determine the effectiveness of the program.

- The designs used for this and other HillRAP studies have been quantitative. Future studies of HilRAP should incorporate qualitative methods to gain deeper understanding of the program as it is implemented in public school settings.
- UNCW used data that were collected for purposes other than the evaluation study. HillRAP student attendance was documented by HillRAP teachers; HillRAP teacher observations and proficiency ratings were conducted by Hill Center Master Teachers/Trainers for formative assessment and HillRAP certification. For future studies, evaluators should make sure data collection instruments and methods align with the needs of the study to the extent possible.
- Finally, although the evaluation study had limitations, it contributes to a growing body of support for HillRAP as an effective program for improving the reading achievement of struggling readers. Results of this study are consistent with those of previous studies of HillRAP (Christopolous, Rosanbalm, & Rabiner, 2011a; Christopolous, Rosanbalm, & Rabiner, 2011b; Downing, Williams, & Holden, 2009; Downing, Williams, Lasater, & Bell, 2007). This replication increases the external validity of results—i.e., the extent to which study results apply to other people and settings. Replication studies of HillRAP should be continued across diverse school settings and student populations.

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APPENDIX

Study Schools 2008-2011

Year	Elementary	Secondary
2008-2009	Bogue Sound Elementary	Beaufort Middle
	Morehead Elementary at Camp Glenn	Broad Creek Middle
	Newport Elementary	Newport Middle
	Smyrna Elementary	East Carteret High
	White Oak Elementary	West Carteret High
2009-2010	Beaufort Elementary	Broad Creek Middle
	Bogue Sound Elementary	Morehead Middle
	Harkers Island Elementary	Newport Middle
	Morehead City Primary	
	Morehead Elementary at Camp Glenn	
	Newport Elementary	
	Smyrna Elementary	
	White Oak Elementary	
2010-2011	Bogue Sound Elementary	Morehead Middle
	Bridges Learning Center at West Carteret	Newport Middle
	High	Croatan High
	Harkers Island Elementary	
	Morehead City Primary	
	Newport Elementary	
	Smyrna Elementary	
	White Oak Elementary	