

Prince George's County Public Schools

**A Study of the Effectiveness of the
Waterford Program
at
Glenridge Elementary School**

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EXECUTIVE SUMMARY

Glenridge is one of the largest elementary schools in Prince George's County, Maryland. Sixty-two percent of the school's population qualifies for the Federal Free/Reduced Lunch Program and close to 12 percent of its students are from homes where the primary language is other than English (ESOL students). Over the past four years Glenridge Elementary, with support from the Prince George's County school system, the State, and Federal grant programs, has planned and initiated specific programs to meet the literacy growth and development needs of its students. Last year (1996-97), the Maryland State Department of Education awarded Glenridge a Challenge School Program grant to target its early childhood literacy program and the impact of technology on the early learner. To implement the proposed program, the school chose the Waterford Early Reading Program, a multi-media interactive program that integrates technology with the school's initiatives in early childhood education.

The Challenge Grant proposal stipulated that Glenridge would conduct on-site research to measure Kindergarten students' growth in emergent reading. A similar school in Prince George's County with a comparable program and the same emphasis on early learning activities was invited to participate in this research as a comparison school. Whereas Glenridge had purchased the Waterford Early Reading Program for its Kindergarten classes, the comparison school had hired two classroom instructional aides. Both Glenridge and the comparison school's Kindergarten students were tested during the school year. These tests included eight subtests that assessed essential dimensions of

literacy development.

This report delineates the results of studies of early learning activities during the first program year at Glenridge, at the comparison school, and in Title 1 schools County-wide. The report concludes the following:

- Glenridge's Kindergarten students as a whole achieved considerable growth in literacy between the first and last test periods (average growth 309 percent).
- Glenridge's Kindergarten ESOL students were able to achieve an average growth of 630 percent and significantly reduce their literacy gap with other students.
- When compared with other Title 1 schools in Prince George's County, Kindergarten students in both Glenridge and the comparison school had significantly higher average scores in **letter recognition** than the County's half-day Kindergarten students and even slightly higher than those of full-day Kindergarten students.
- By the end of the school year, Glenridge's Kindergarten students performed as well as students from the comparison school in the following dimensions of literacy development: **letter recognition, forming letters, and letter sounds**. Their average achievement measures were significantly higher than those of the comparison school in **reading, concepts about print, rhyming words, and learning songs and nursery rhymes**.

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GLENRIDGE ELEMENTARY SCHOOL WATERFORD EARLY READING PROGRAM

INTRODUCTION

Glenridge, one of the largest elementary schools in Prince George's County, is a comprehensive school in Landover Hills, Maryland that serves more than 840 students in grades pre-K through six. None of Glenridge's students walk to school. Students board buses from six diverse neighborhoods, some more than five miles away. Student mobility is high. During the school year two out of five students either enter or withdraw from school. Close to 12 percent of the students are from homes where the primary language is other than English (ESOL students). Sixty-two percent of the school's population qualifies for the Federal Free and Reduced Lunch program.

The administration and staff of Glenridge are committed to the idea that school should be safe, rigorous, and challenging. For children of all backgrounds, school is an opportunity for a bright future, and learning to read — to read well — is critical to a child's future. In the past four years Glenridge Elementary, with support from the school system, the State, and Federal grant programs, has planned and initiated specific programs to meet this need. Last year (1996-97), the Maryland State Department of Education awarded Glenridge a Challenge School Program grant to target its early childhood literacy program and the impact of technology on the early learner. The grant proposal stipulated that the school would conduct on-site research to measure Kindergarten students' growth in emergent reading.

After a careful search, the school selected the Waterford Early Reading Program. This multi-media, interactive program was selected for its ability to infuse technology in a meaningful way while complementing the school system's strong initiative in early childhood education. Prince George's County Public Schools developed a teacher training program to help teachers apply teaching strategies that would strengthen each young child's reading performance. The Waterford Early Reading Program (Level 1) was implemented at Glenridge in the third week of October with 124 Kindergarten students.

ABOUT THE PROGRAM

The Waterford Institute, a nonprofit educational research organization, has invested \$8 million over the last six years developing the Waterford Early Reading Program. The program is designed to help children enter the first grade prepared to read by helping them

- build automatic letter recognition
- gain phonological awareness skills
- comprehend print concepts such as the directionality of print and the difference between letters, words, and spaces
- understand oral and written language
- gain basic readiness skills using activities that teach shapes, colors, sizes, numbers, story sequence, and more.

The Waterford multi-media learning stations are housed in the classroom and become an integral part of the daily instructional activities as students work with them. Each student interacts with engaging computer software for 15 minutes a day. The software contains more than 920 separate activities, an easy-to-use teacher and student management system that makes individualized programming possible, and take-home materials that support a home-school connection. The program includes books and video tapes for parents to use and keep at home. In addition, children “write” and print their own books and certificates of achievement to take home and read with their families.

PROGRAM EVALUATION

Glenridge’s administration contacted Research, Assessment & Measurement, Inc. (R.A.M.) to design and implement a longitudinal study of the Waterford Program’s impact and effectiveness. The study’s objectives were specified and defined as follows:

- To construct a **literacy development profile** based on periodic measures of students’ growth in letter recognition, letter sounds, concepts about print, and understanding of oral and written language.
- To gather information on students’ classroom learning behavior as well as parents’ reactions to their children’s involvement in the program.

- To reference and relate Glenridge Kindergarten students' literacy growth to the progress of Kindergarten students of a similar school with a comparable program and the same emphasis on early learning activities.
- To examine the extent of support the program provided for the literacy development of Glenridge's ESOL students.
- To investigate the longitudinal and sustained effect of the program on students' educational growth and development throughout the first, second and third grades.

Based on the study's design and objectives, students were tested in September, late January, and late May. Teachers also administered a pre-, mid-, and post-test Learning Behavior Inventory (developed by R.A.M.) that evaluated student learning behavior. Another questionnaire was developed and administered to parents in mid-year to measure their reactions to the program.

A comparable Prince George's County public elementary school was invited to participate in the study as a comparison school. Bladensburg Elementary was selected because of its similar population demographics, similar size, and similar half-day Kindergarten program. Both Glenridge and Bladensburg were conducting intensive instructional programs to improve Kindergarten performance and better prepare students to enter the first grade. Both schools purchased an additional half-time teaching position in order to keep class size below 25. Bladensburg Elementary

(hereafter referred to as the comparison school) hired two classroom instructional aides to assist in Kindergarten and Glenridge Elementary purchased the Waterford Early Reading Program for its Kindergarten classrooms. The program was implemented in Glenridge classrooms beginning the third week in October. By the time the comparison school was identified, it was too late to administer the pre-test instrument. Consequently, the second (mid-year) and third (end-of-year) tests were administered in the comparison school.

DATA COLLECTION AND ANALYSIS

As stated above, students were tested three times during the school year. The test included the following eight subtests that assessed essential dimensions of literacy development:

1. **Letter identification:** Students were asked to identify as many upper and lower case letters of the alphabet as they could. Scores were based on the number of letters correctly identified.
2. **Letter sounds:** Students were asked to generate the sounds of the 26 letters of the alphabet. Scores were based on the number of sounds generated.
3. **Forming letters:** Students were asked to write as many of the 52 upper and lower case letters of the alphabet as they could.

4. **Writing names:** Students were asked to write their names and were assigned a score of 1 if they were able to do so.
5. **Reading words:** Students were asked to read two simple sentences, each consisting of six short words regularly used by children of this age group (total of 12 words). The score on this test represented the number of words the child could read.
6. **Concepts about print:** Students were tested on their recognition of five critical concepts about print, including identification of the front of the book, where to begin reading on a page, which direction to read, isolation of a word in the text, and isolation of a letter in a word. Scores were based on the number of concepts identified.
7. **Rhyming words:** Students were presented with six words and asked to generate a word or nonsense word that rhymes with each of the six.
8. **Songs and nursery rhymes:** Students were tested on their familiarity with a number of widely recognized nursery rhymes and songs such as “Pat-a-Cake,” “Hey Diddle, Diddle,” “Jack and Jill,” and “Mary Had a Little Lamb.”

In addition to scores generated by the administration of these tests, each student's learning behavior was evaluated on three occasions during the year by the classroom teacher. Together with demographic data and quarterly attendance records, these records comprised a student data base. A similar but somewhat simpler data base was developed for students of the comparison school.

In May 1997, all PGCPS Title 1 schools were asked to participate in the Title 1 Desired Outcome study, which included reporting each Kindergarten student's score on letter identification. For the purpose of comparative analysis, these scores were integrated into the data base and used to generate a relative measure of achievement for the two schools in our study. The data base for Glenridge included data for 131 Kindergarten students, 111 to 113 of whom were present at the three test administrations. The comparison school's total data base included 100 students, with 88 to 93 students present at test administrations. Scores from 3,011 Kindergarten students at PGCPS Title 1 schools were available for use in the study. Sixty-nine Glenridge parents participated in a survey that provided additional insights into the effectiveness of the program. Reactions from three Glenridge teachers who participated in the program are included, as well as written and oral comments of some outside observers.

RESULTS

The results of the study are presented in three parts. In **Part I**, average raw scores and average percent correct scores for each subtest are reported. These scores are used in a comparison of overall performance of students at Glenridge with that of students in the comparison school. In addition, growth in achievement from one testing period to another is computed. The average growth of Glenridge students from mid-year to the end of the year is compared with that of students in the comparison school. Average raw scores on letter identification for students at Glenridge and those in the comparison school are compared with the scores of students from all PGCPs Title 1 schools. While these comparisons are useful and informative, they partially mask the real picture of growth and achievement. In order to achieve a more in-depth understanding of the pattern of students' progress, we compared distributions of students' performance measures in the two schools. The results of this comparison are presented in **Part II**. In **Part III**, we look at the comparative performance of ESOL and non-ESOL students in the two schools and investigate the relative effectiveness of the two programs in the literacy development of ESOL students. Finally, in **Part IV** we present teachers' classroom observations of students' learning behavior and parents' reactions to the program, the school, and their children's learning activities.

Part I. Comparison of Score Averages. Tables 1 to 4 and Figures 1 to 4 present average achievement scores for each subtest and average growth in literacy development of students in the two schools. Table 1 shows that both schools had effective programs and compared favorably with the rest of the County’s schools. Students from Glenridge and the comparison school (with average **letter identification** scores of 45.09 and 45.29 respectively) performed significantly better than students from all Title 1 schools (average 42.86) and the subset of those in schools which, like Glenridge and the comparison school, operated half-day Kindergarten programs (average 39.52). At the same time, the average **letter identification** scores of students in these two schools were slightly higher (though not statistically significant) than those of students at all-day Kindergartens throughout the County (44.94).

Table 1. End of the Year Average Letter Identification Scores: Students at Glenridge, the Comparison School, All PGCPs Title 1 Schools, Full-day, and Half-day Kindergartens

	No. Students	End of Year Average	Standard Deviation
Glenridge	113	45.09	12.54
Comparison School	86	45.29	10.74
All PGCPs Title 1	3011	42.86	13.26
Full-day Kindergarten	1854	44.94	11.42
Half-day Kindergarten	1157	39.52	15.19

To better understand the significance of these differences in relative achievement, we should point out that 80 percent of students at Glenridge scored higher than 39.52, the average score of all Title 1 half-day Kindergarten students (see also Figure 6).

Table 2 presents a comprehensive summary of students' average subtest scores from both schools. Average raw scores are presented along with average percent correct scores. Average correct scores on subtests are also shown in Figures 1 to 4. To facilitate overall comparison, we also present weighted averages (by the number of items in the subtests) at the bottom of Table 2. This table shows that students of both schools achieved significant measures of growth at mid-year and end-of-the-year testing periods. The table illustrates that on the whole, students at Glenridge performed better than those in the comparison school at both mid-year and end-of-the-year tests.

Students' performance is also compared graphically in Figures 1 to 4. Figure 1 shows that the average **letter identification** scores of students in the two schools were similar. Glenridge students rose from a lower achievement standing in mid-year to catch up with comparison school students by the end of the year in **letter sounds**. Glenridge students performed better in **forming letters** and **writing names** (Figure 2). As shown in Figure 3, their performance in **reading words** and **concepts about print** was significantly better than that of students in the comparison school. Finally,

Figure 4 shows that Glenridge students' averages in **rhyming words** and **learning songs and nursery rhymes** were clearly superior to those in the comparison group.

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Table 2. Average Test Scores at Glenridge Elementary and the Comparison School

	Glenridge Elementary School						Comparison School			
	First Test N = 112		Mid Year N = 113		End of Year N = 111		Mid Year N = 97		End of Year N = 88	
Number tested = N										
Subtests	Ave. Raw Score	% Correct	Ave. Raw Score	% Correct	Ave. Raw Score	% Correct	Ave. Raw Score	% Correct	Ave. Raw Score	% Correct
Letter Identification No. of items = 52	20.87	40.1	37.32	71.7	45.09	86.7	36.49	70.2	45.29	87.1
Letter Sounds No. of items = 26	2.65	10.2	7.94	30.5	18.81	72.3	11.97	46.0	19.18	73.8
Forming Letters No. of items = 52	13.13	25.3	27.71	53.3	38.61	74.3	25.93	49.9	37.11	71.4
Reading Words No. of items = 12	0.52	4.2	1.42	11.8	4.10	34.2	0.57	4.8	2.23	18.6
Concepts in Print No. of items = 5	2.98	59.6	3.89	77.8	4.70	94.0	3.71	74.2	4.42	88.4
Rhyming Words No. of items = 6	1.01	16.8	1.66	27.7	3.39	56.5	0.95	15.8	1.43	23.8
Learning Songs No. of items = 26	3.25	12.5	11.21	43.1	18.59	71.5	3.72	14.3	4.08	15.7
Writing Name No. of items = 1	0.46	46.0	0.87	87.0	0.91	91.0	0.76	76.0	0.85	85.0
Wtd. Average Total Possible No. of items = 180		24.9		51.1		74.6		46.7		63.7

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Percent Correct Averages of each Subtest at each Testing Period

Figure 1

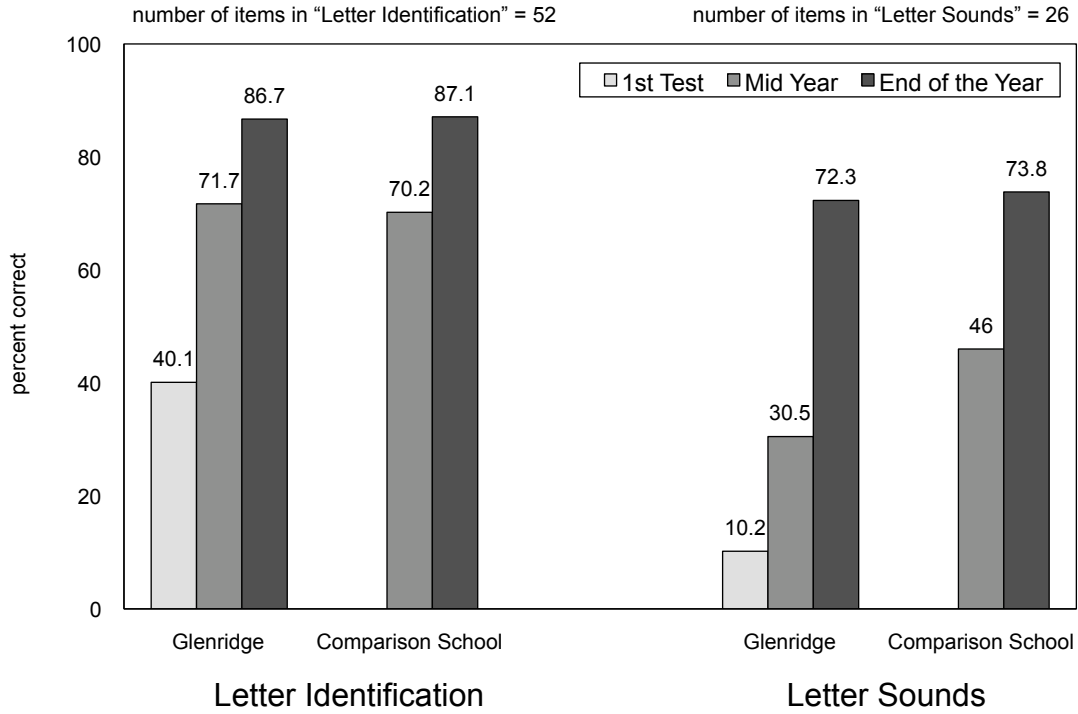
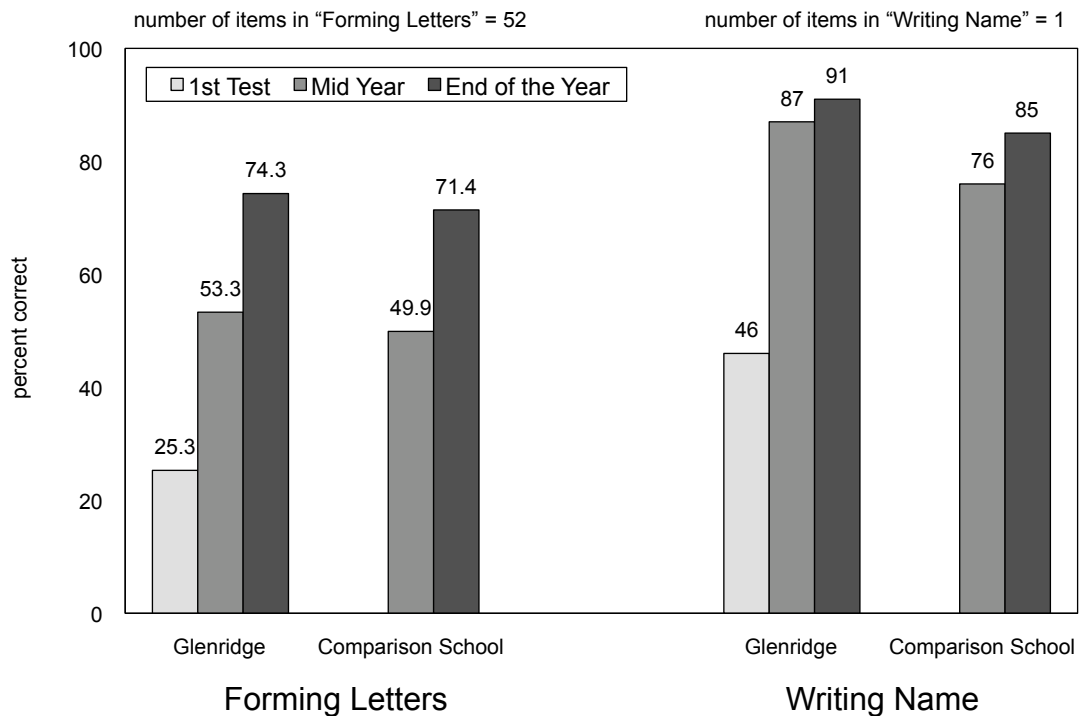


Figure 2



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Percent Correct Averages of each Subtest at each Testing Period

Figure 3

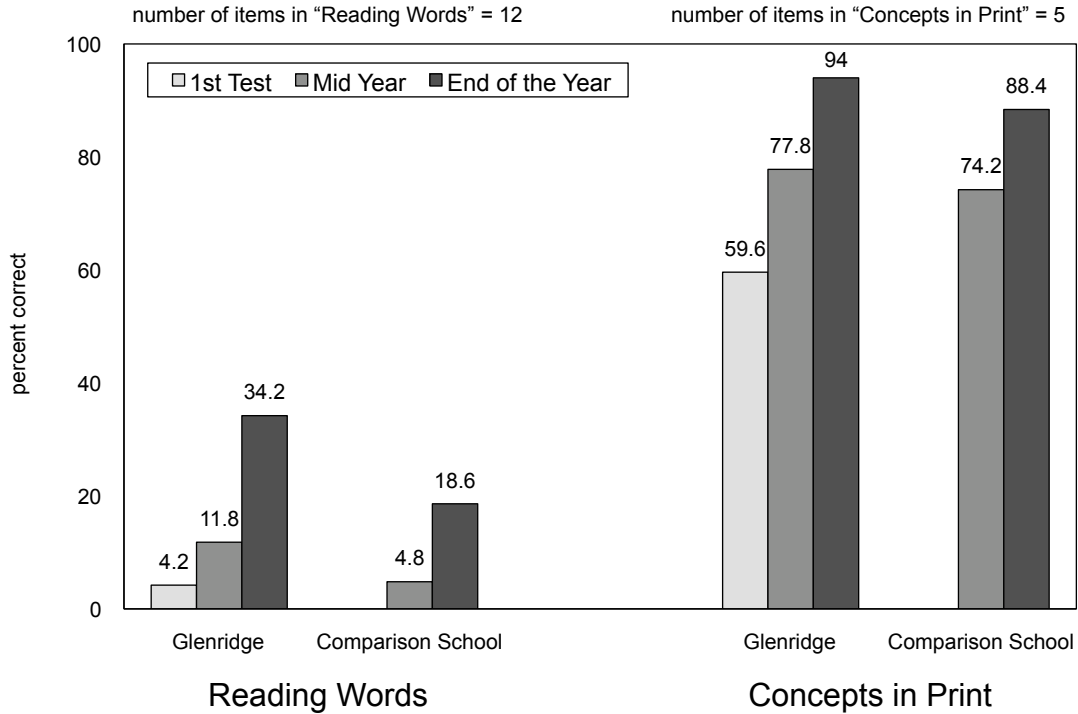
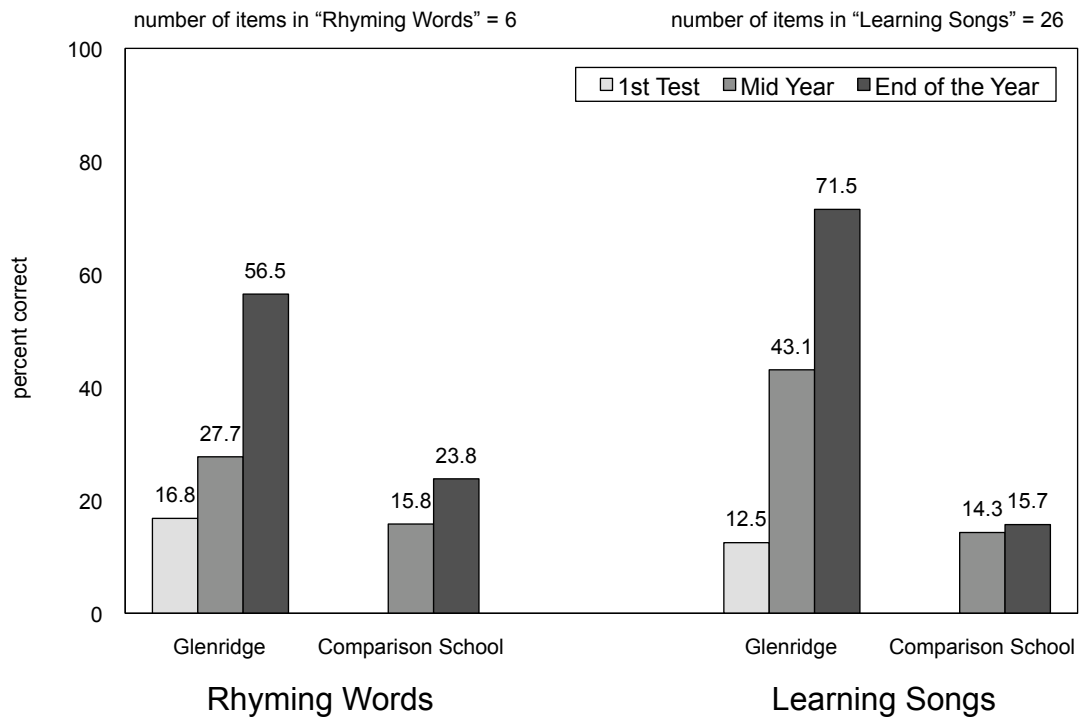


Figure 4



Tables 3 and 4 present measures of percentage growth in the two groups' averages from one test period to the next. To facilitate comparison, again we present the weighted average of growth for all subtests. Here too, we observe that students in both schools achieved strong measures of growth, and that in comparing percentage growth from mid-year to the end of the year, Glenridge students' average growth of 72.6 percent clearly exceeded that of the comparison group (63.7 percent). As shown in Table 3, Glenridge students' average percentage growth from the first test to the end of the year was 309 percent. In other words, their overall mastery of the material in the subtests between the first and final tests had increased more than three-fold.

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Table 3. Measures of Relative Growth Between Testing Periods:
Glenridge Elementary

Subtests	Percentage Growth between 1 st & 2 nd tests	Percentage Growth between 2 nd & 3 rd tests	Percentage Growth between 1 st & 3 rd tests
Letter Identification No. of items = 52	78.8%	20.8%	116.1%
Letter Sounds No. of items = 26	199.6%	136.9%	609.8%
Forming Letters No. of items = 52	111.2%	39.3%	194.3%
Reading Words No. of items = 12	173.1%	188.7%	688.5%
Concepts in Print No. of items = 5	30.5%	20.8%	57.7%
Rhyming Words No. of items = 6	64.4%	104.2%	235.6%
Learning Songs No. of items = 26	244.9%	65.8%	472.0%
Writing Name No. of items = 1	89.1%	4.6%	97.8%
Average Growth	123.9%	72.6%	309.0%

Note: Subtests with fewer test items allowed for a smaller percentage of growth.

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Table 4. Measures of Relative Growth Between Testing Periods:
Comparison School

Subtests	Percentage Growth between the two tests
Letter Identification No. of items = 52	24.1%
Letter Sounds No. of items = 26	60.2%
Forming Letters No. of items = 52	43.1%
Reading Words No. of items = 12	291.2%
Concepts in Print No. of items = 5	19.1%
Rhyming Words No. of items = 6	50.5%
Learning Songs No. of items = 26	9.7%
Writing Name No. of items = 1	11.8%
Average Growth	63.7%

Part II. Comparison of Distribution of Students' Performance

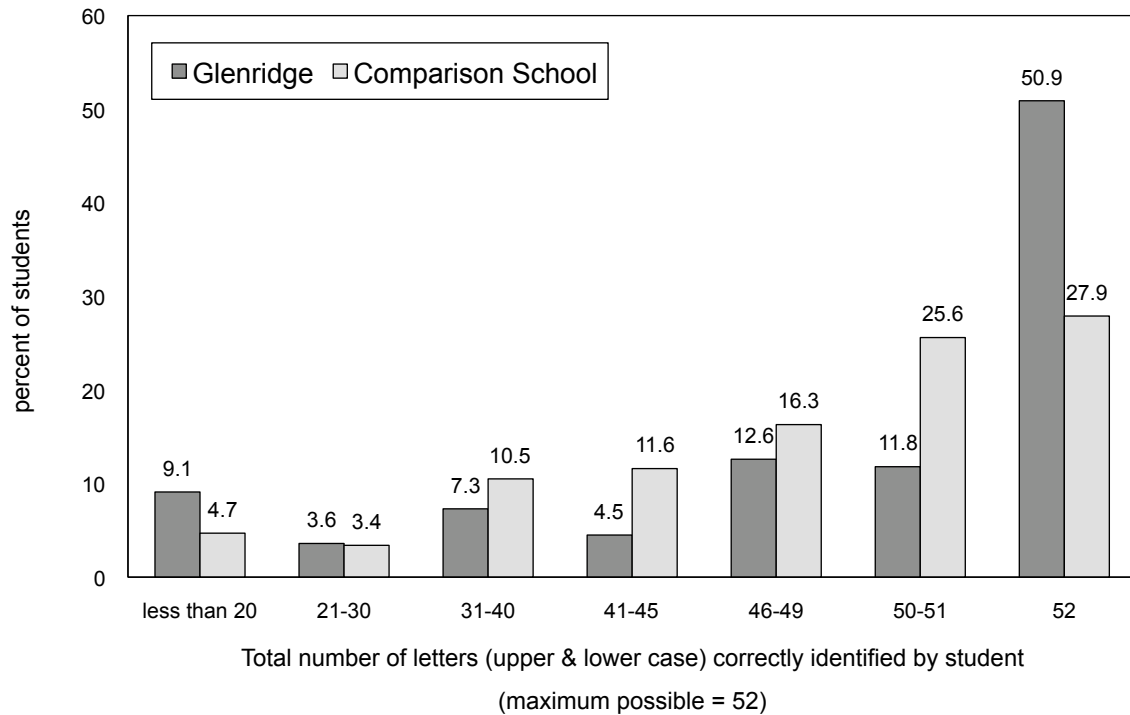
Measures. As we stated previously, students' average scores on subtests are informative summary data but do not reveal the true picture of performance distribution. For example, both groups of students had average **letter identification** scores of approximately 45 (or 87 percent correct). However, examination of Figure 5 shows that almost twice as many Glenridge students could identify all 52 (upper and lower case) letters as students from the comparison group (50.9 percent vs. 27.9 percent). This means that twice as many students from Glenridge could start the first grade confident that they know all letters of the alphabet. In this part, we examine these comparative distributions and present a brief description of the importance of each dimension tested to literacy development.

Letter Identification:

A first step in literacy development is **recognition and identification of letters**.

- By the end of the school year, 51 percent of Glenridge Kindergarten students could correctly identify all upper and lower case letters, compared with 28 percent of students in the comparison school (see Figure 5 below).

Figure 5
Comparison of End-of-year **Letter Identification Scores**
of Students of the Two Schools

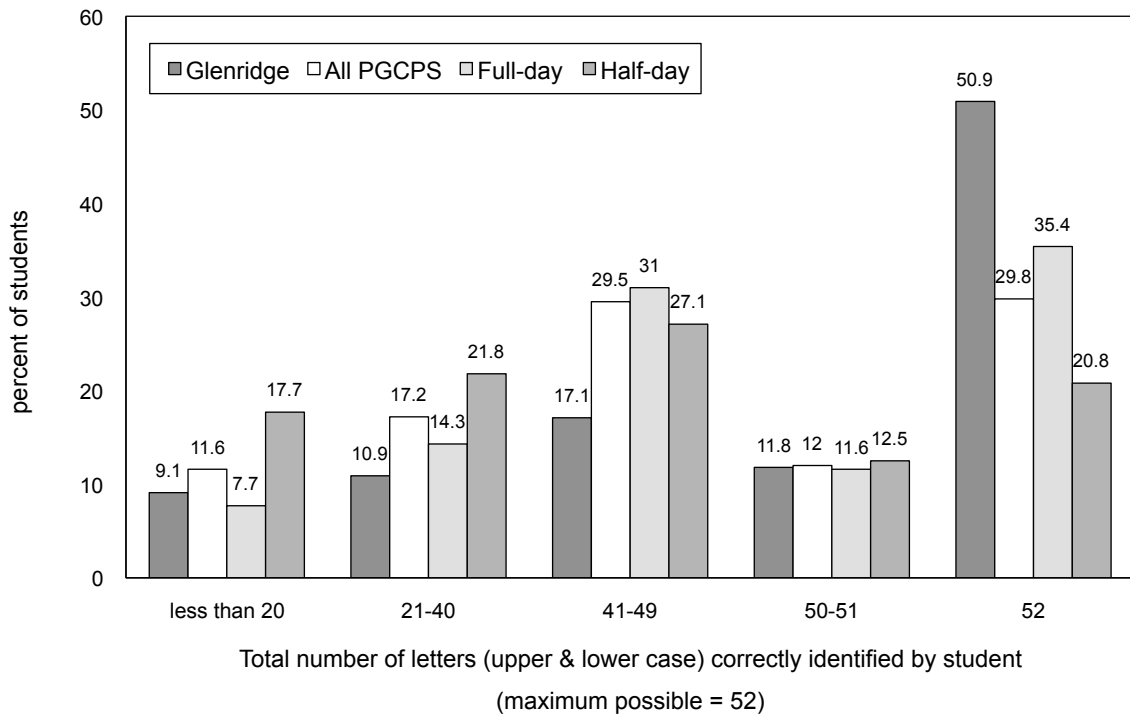


The above graph shows frequency distribution of scores (the number of letters of the alphabet students could identify). The left side of the graph shows, for example, that 9.1 percent of Glenridge students and 4.7 percent of students in the comparison school scored less than 20. The right side shows that 50.9 percent of Glenridge students and 27.9 percent of students in the comparison school had a perfect score of 52.

- When compared with all Title 1 Prince George’s County Public Schools, Glenridge students’ mastery of upper and lower case letters was significantly better. Had PGCPs students performed as well as Glenridge students, more than 600 additional PGCPs students would have mastered the alphabet (see Figure 6 below).

Figure 6
Comparison of Letter Identification Scores:

Glenridge, All PGCPs Title 1 Schools, Full-day, & Half-day Kindergarten Programs



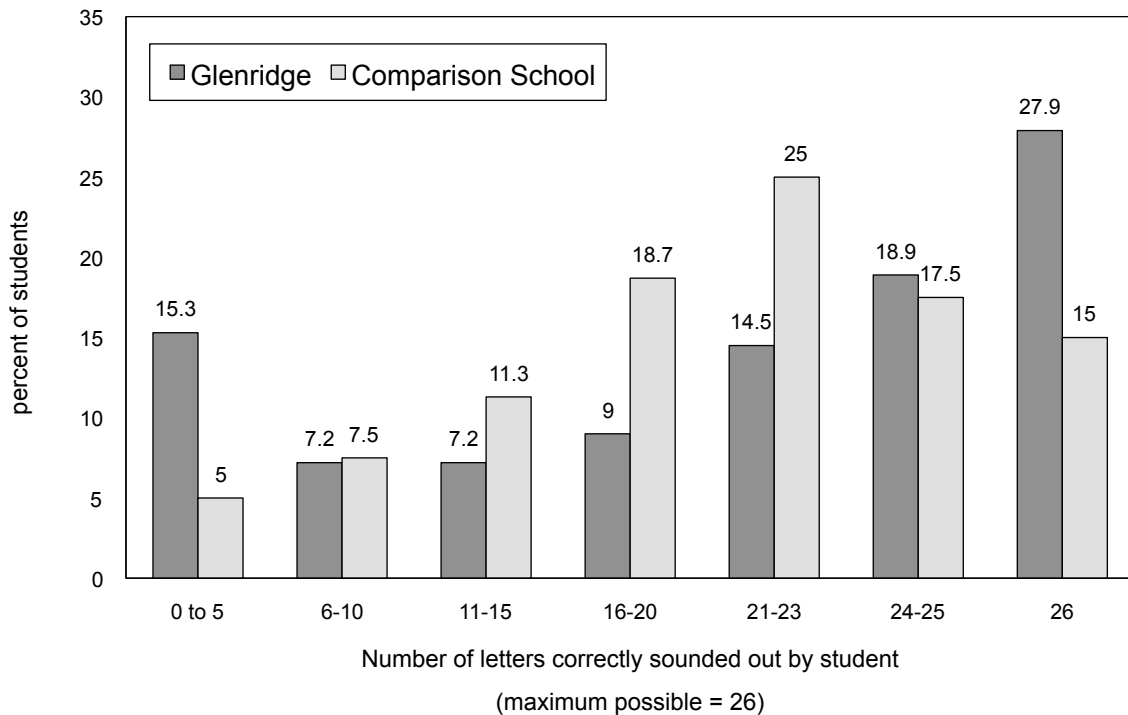
The above graph shows frequency distribution of scores (the number of letters of the alphabet students could identify). For example, it shows that 9.1 percent of Glenridge Kindergarten students and 11.6% of all county Title 1 Kindergarten students knew 20 or fewer letters, and that 50.9 percent of Glenridge students and 29.8 percent of county students knew all 52 letters.

Letter Sounds:

The recognition and formation of **letter sounds** are considered key to initial decoding of words. Some research suggests that a child's knowledge of phonemes and letter names in the language best predicts that child's future reading success.

- Based on the results of the end-of-the-year test, nearly half of Glenridge students (46.8 percent) could generate almost all of the letter sounds (24-26 letters). Slightly less than one-third (32.5 percent) of students in the comparison school could do the same.

Figure 7
Comparison of **Recognition of Letter Sounds**
by Students of the Two Schools



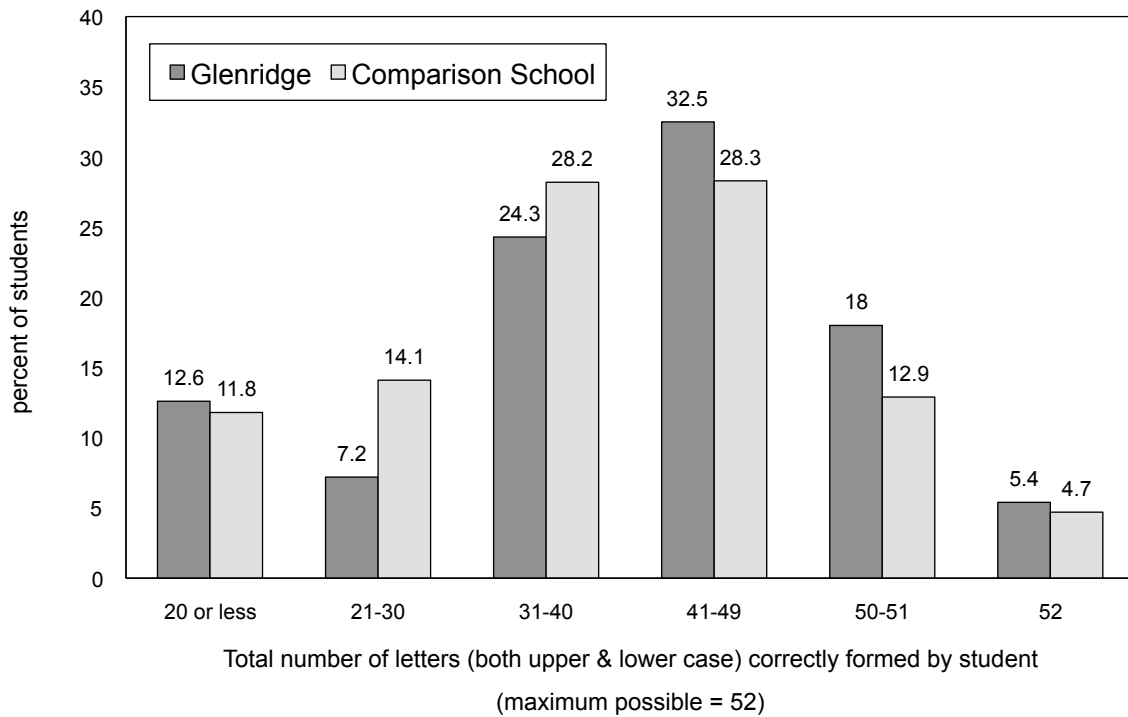
This graph shows the frequency distribution of the number of letter sounds students could identify. For example, the right side of the graph shows that 27.9 percent of Glenridge students and 15 percent of those in the comparison school had a perfect score of 26 (i.e., identified the sounds of all 26 letters).

Forming Letters:

Learning how to **form letters** is a critical step in developing the connection between reading and writing.

- Results of the end-of-the-year test show that approximately 56 percent of Glenridge students could write more than 40 upper and lower case letters, compared with approximately 46 percent of students in the comparison school (see Figure 8 below).

Figure 8
Comparison of **Forming Letters Correctly**
by Students of the Two Schools



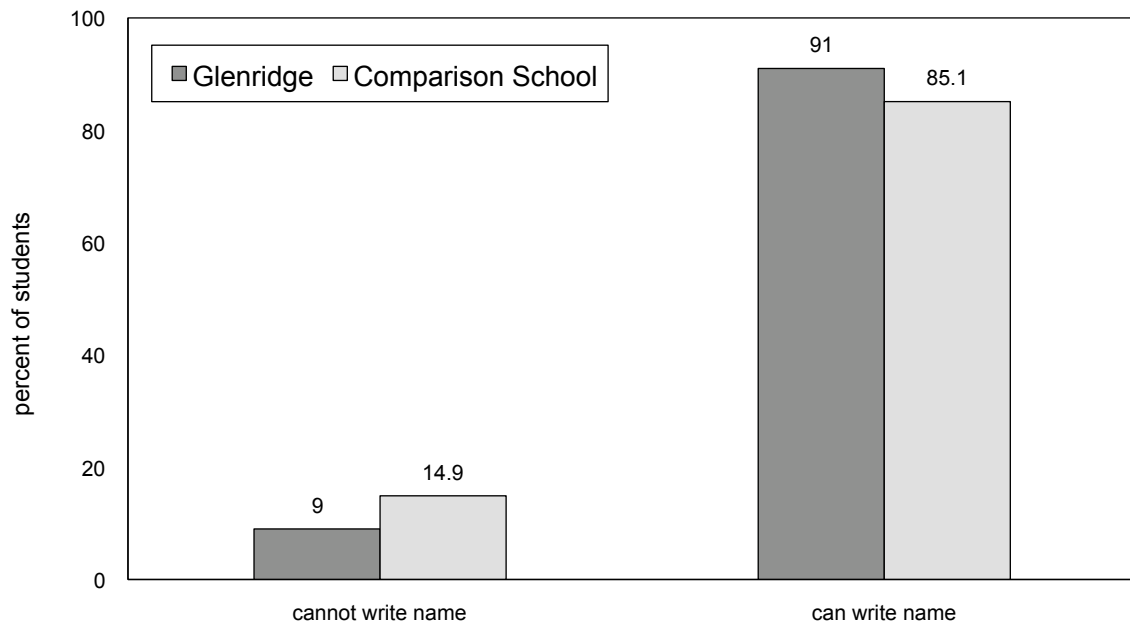
The graph shows that 7.2 percent of Glenridge students and 14.1 percent of students in the comparison school could form 21 to 30 letters, and that 18 percent of Glenridge students and 12.9 percent of students in the comparison school could form 50 or 51 letters.

Writing Names:

Writing one's own name is a natural extension of forming letters that reinforces and personalizes using letters.

- 90 percent of Glenridge students could write their names. A slightly lower proportion (85 percent) of students in the comparison school could do the same (see Figure 9 below).

Figure 9
Comparison of Number of Students
Who Can Write Their Names



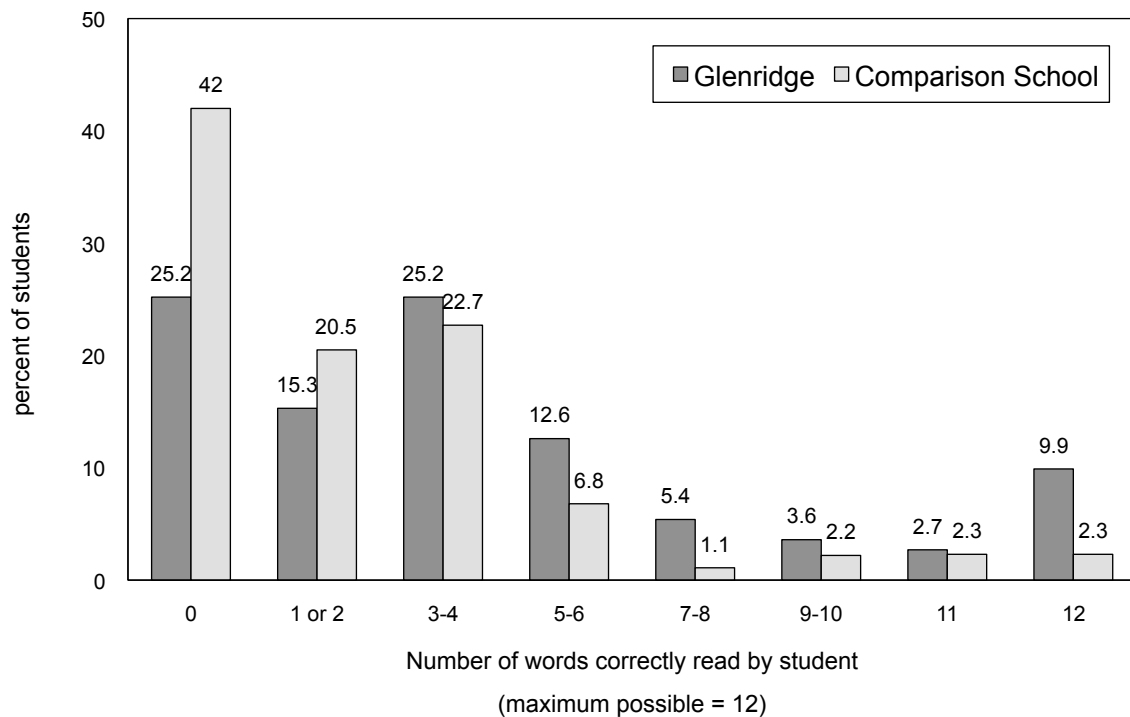
Percentages of students who could write their names and students who could not

Reading:

Reading well is the main objective of the literacy development program. In order to test students' reading proficiency, teachers presented them with twelve words that formed two sentences. These sentences were shown with related pictures. The two six-word sentences included some sight words, while other words were suggested by picture clues. Students were tested on their ability to read as many words as they could in the two sentences.

- The end-of-the-year test showed that more than one-third (34.3 percent) of Glenridge students could read from 5 to 12 words out of 12. Only 14.8 percent of students in the comparison school could do the same (see Figure 10 below).

Figure 10
Comparison of **Number of Words Read**
by Students of the Two Schools



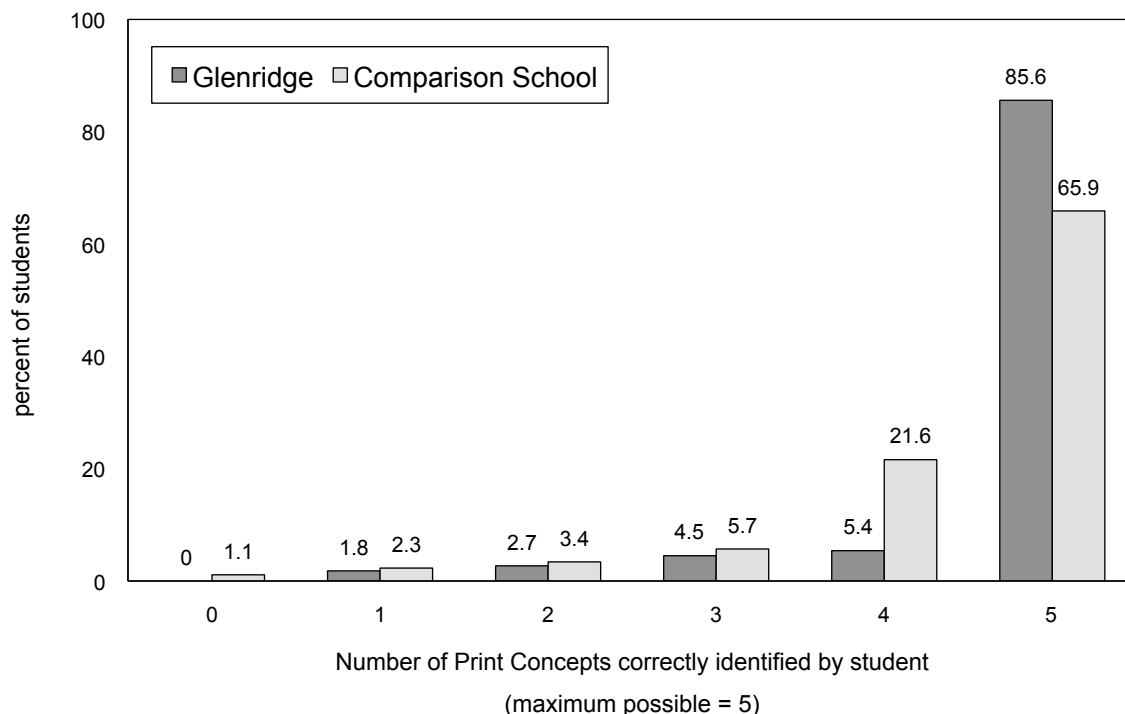
The graph presents frequency distribution of scores. For example, it shows that 25.2 percent of Glenridge students and 42 percent of students in the comparison school could not read a single word. On the other hand, 9.9 percent of Glenridge students and 2.3 percent of those in the comparison school could read all 12 words.

Concepts About Print:

Five critical **concepts about print**, which are essential to later success in reading, are recognition and identification of:

- ⇒ front of the book
 - ⇒ where to begin reading on a page
 - ⇒ which direction to read
 - ⇒ isolation of a word in text
 - ⇒ isolation of a letter in a word
- By the year's end almost 9 out of 10 Glenridge students could correctly identify all five concepts about print. This was 20 percent higher than the proportion of students in the comparison school (see Figure 11 below).

Figure 11
Comparison of **Identification of Print Concepts**
by Students of the Two Schools



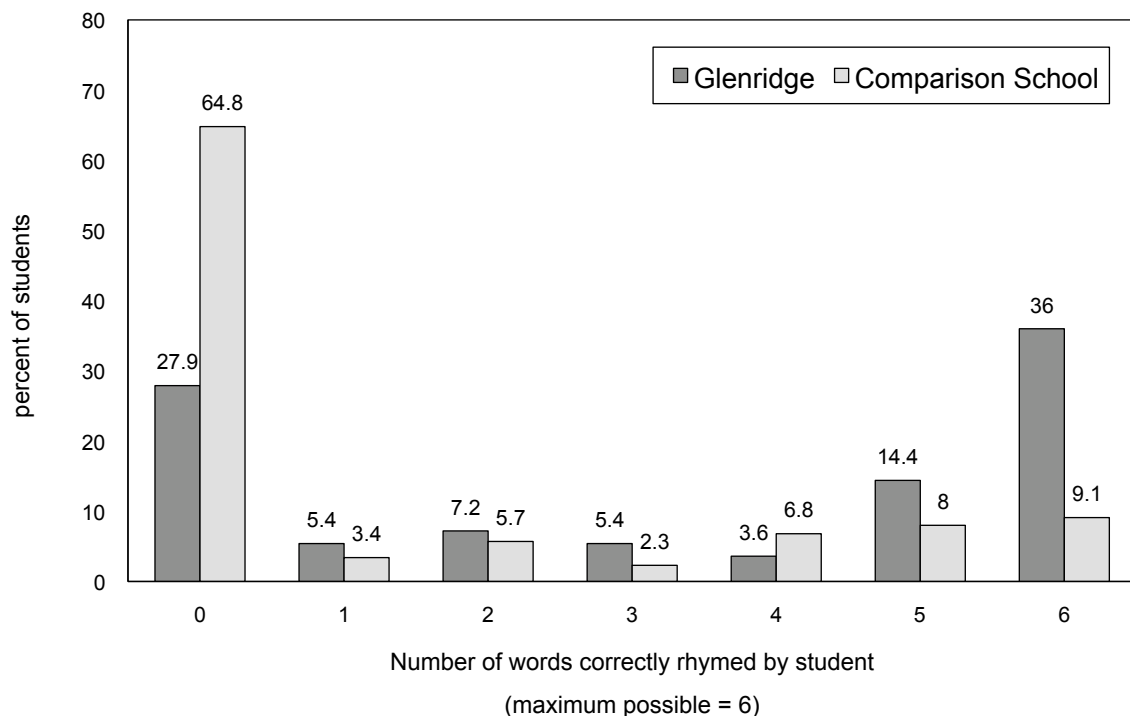
The above graph presents frequency distribution of scores (the number of concepts about print students could identify). It shows, for example, that 1.8 percent of Glenridge students and 2.3 percent of students in the comparison school could identify only one of the five concepts. The right side of the graph shows that 85.6 percent of Glenridge students and 65.9 percent of students in the comparison school could identify all five concepts.

Rhyming Words:

Recognizing **words that rhyme** and **word sound patterns** is essential to linguistic development. In order to test their proficiency in these areas, students were given examples of words that rhyme (e.g., “cat and hat,” “pet and get”). Students then were presented with six words and asked to generate a word or nonsense word that rhymes with each of the six.

- Test results at the end of the year show that slightly more than half (50.4 percent) of Glenridge students could generate 5 to 6 words (out of a maximum possible 6 words) that would correctly rhyme with each given word. Only 17.1 percent of students in the comparison school could do the same (see Figure 12 below).

Figure 12
Comparison of **Number of Words that Rhyme Scores**
of Students of the Two Schools



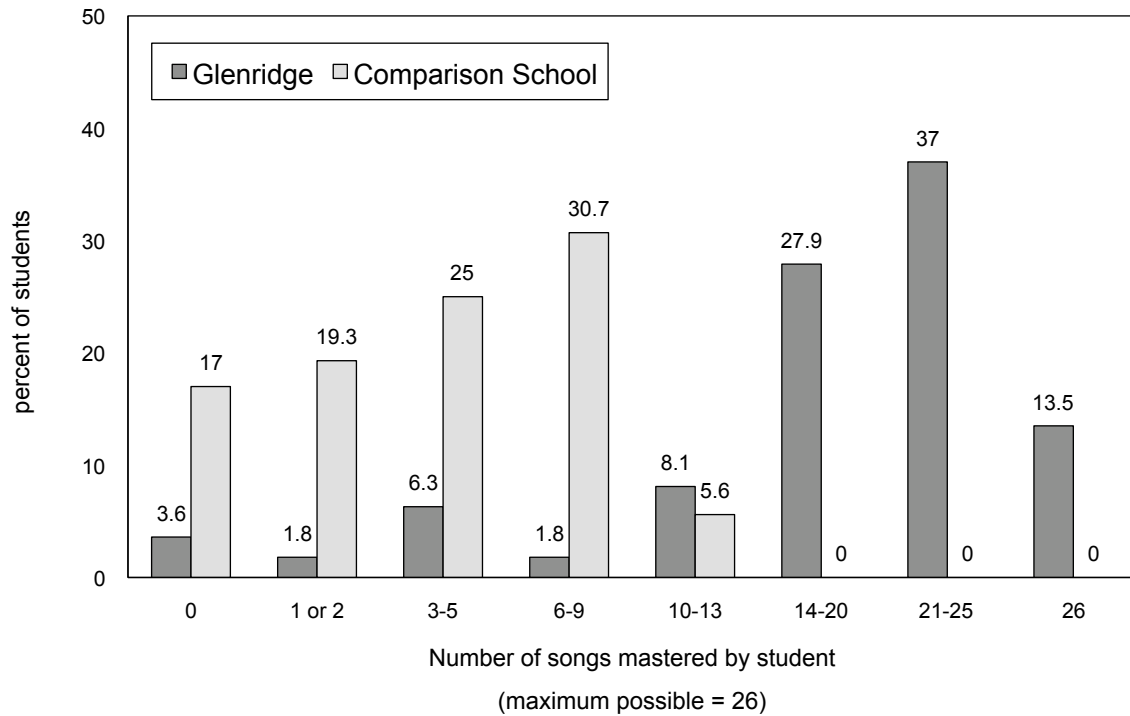
The graph shows percentages of students who could produce rhymes for given words. For example, it shows that 27.9 percent of Glenridge students and 64.8 percent of students in the comparison school could not think of anything to rhyme with any of the six given words. On the other hand, 36 percent of Glenridge students and 9.1 percent of students in the comparison school could think of rhymes for each of the six words.

Songs and Nursery Rhymes:

Learning **songs and nursery rhymes** is important to literacy development. Research on this subject indicates a strong relationship between early knowledge of nursery rhymes and success in reading and spelling.

- End-of-the-year test results indicated that 78.4 percent of Glenridge students could sing/say 14-26 songs from a collection of 26 widely known songs and nursery rhymes. None of the students in the comparison school knew more than 13 songs (see Figure 13 below).

Figure 13
Comparison of Mastery of Nursery Rhymes & Songs
by Students of the Two Schools



The graph presents a frequency distribution of the number of songs and nursery rhymes students have mastered. For example, it shows that 1.8 percent of Glenridge students and 30.7 percent of students in the comparison school have mastered 6 to 9 songs. It also shows that none of the comparison school students knew more than 13 songs, while most of Glenridge students knew 14 to 26 songs (the sum of the percentages of the three bars on the right is 78.4 percent).

Part III. Comparison of ESOL and Non-ESOL Students' Performance: An important objective of both schools' emergent reading programs in Kindergarten was to provide much-needed support for the literacy growth of their ESOL students. For many of these children, Kindergarten provided their first formal exposure to English. Glenridge's staff was therefore very interested in knowing to what extent the Waterford Program had helped these students. Tables 5 and 6 and Figures 14 to 16 illustrate the comparative assessment of ESOL and non-ESOL students' growth in eight dimensions of literacy development over the course of the program year.

Table 5 compares percentage growth of Glenridge's ESOL and non-ESOL students. Both groups experienced significant growth in all eight dimensions. However, ESOL students' average growth was more than twice that of non-ESOL students (630.8 percent vs. 283.3 percent).

In Table 6 and Figures 14-16 we compare the achievement of both ESOL and non-ESOL students at Glenridge with that of students in the comparison school at the end of the program year. In all dimensions except letter sounds, the scores of Glenridge's ESOL students exceeded those of their ESOL counterparts in the comparison school. It is important to note that in all of these dimensions, there was much closer correspondence between Glenridge's ESOL and non-ESOL students' scores than among students in the comparison school. Considering that Glenridge's ESOL students began the program year with scores of zero in some dimensions (i.e., reading words and rhyming words), this represents a significant achievement in

literacy development. It should also be noted that in some cases (i.e., concepts about print and learning songs), end-of-the-year scores of ESOL students at Glenridge were higher than those of non-ESOL students in the comparison school (Figures 15 and 16).

Study of Effectiveness of Waterford Program
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1996-97

Table 5. Percentage Growth in Achievement of Glenridge's ESOL and Non-ESOL Students: Raw Score Averages

Subtests	ESOL Students N = 17				Non-ESOL Students N = 112			
	First Test	Second Test	Third Test	% Growth	First Test	Second Test	Third Test	% Growth
Letter Identification	9.69	27.41	42.0	333.4	22.33	39.07	45.66	104.5
Letter Sounds	0.38	1.59	12.35	1135.0	2.95	9.06	19.98	577.3
Forming Letters	4.85	17.0	35.47	631.3	14.21	29.60	39.18	175.7
Reading Words	0.00	0.12	1.12	NC	0.59	1.66	4.64	686.4
Concepts In Print	2.23	2.35	4.59	105.8	3.08	4.17	4.72	53.2
Rhyming Words	0.00	0.12	0.59	NC	1.14	1.94	3.89	241.2
Learning Songs	0.15	3.71	12.76	840.7	3.66	12.54	19.65	436.9
Writing Name	0.38	0.82	0.88	131.6	0.46	0.87	0.91	97.8
Wtd. Average				630.8				283.3

**Table 6. Percent Correct Score Averages of ESOL & Non-ESOL Students
at Glenridge and Comparison School**

End of the year Test June 1997

SUBTESTS	GLENRIDGE		COMPARISON SCHOOL	
	Number of Students	Percent Correct Average	Number of Students	Percent Correct Average
ESOL STUDENTS				
Letter Identification	17	80.8	12	62.2
Letter Sounds	17	47.5	8	67.8
Forming Letters	17	68.2	11	63.3
Writing Name	17	88.0	13	62.0
Reading Words	17	9.3	13	5.9
Concepts About Print	17	91.8	13	78.4
Rhyming Words	17	9.8	13	2.5
Learning Songs	17	49.1	13	6.2
NON-ESOL STUDENTS				
Letter Identification	93	87.8	74	91.0
Letter Sounds	94	76.8	72	74.4
Forming Letters	94	75.3	74	72.6
Writing Name	94	91.0	74	89.0
Reading Words	94	38.7	75	20.7
Concepts About Print	94	94.4	75	90.2
Rhyming Words	94	64.8	75	27.5
Learning Songs	94	75.6	75	17.3
ALL STUDENTS				
Letter Identification	110	86.7	86	87.1
Letter Sounds	111	72.3	80	73.8
Forming Letters	111	74.3	85	71.4
Writing Name	111	91.0	87	85.0
Reading Words	111	34.2	88	18.6
Concepts About Print	111	94.0	88	88.4
Rhyming Words	111	56.5	88	23.8
Learning Songs	111	71.5	88	15.7

Study of Effectiveness of Waterford Program
at Glenridge Elementary School 1996-97

Comparison of ESOL and Non-ESOL Students' Performance
Percent Correct Averages of each Subtest at End-of-Year Testing Period

Figure 14

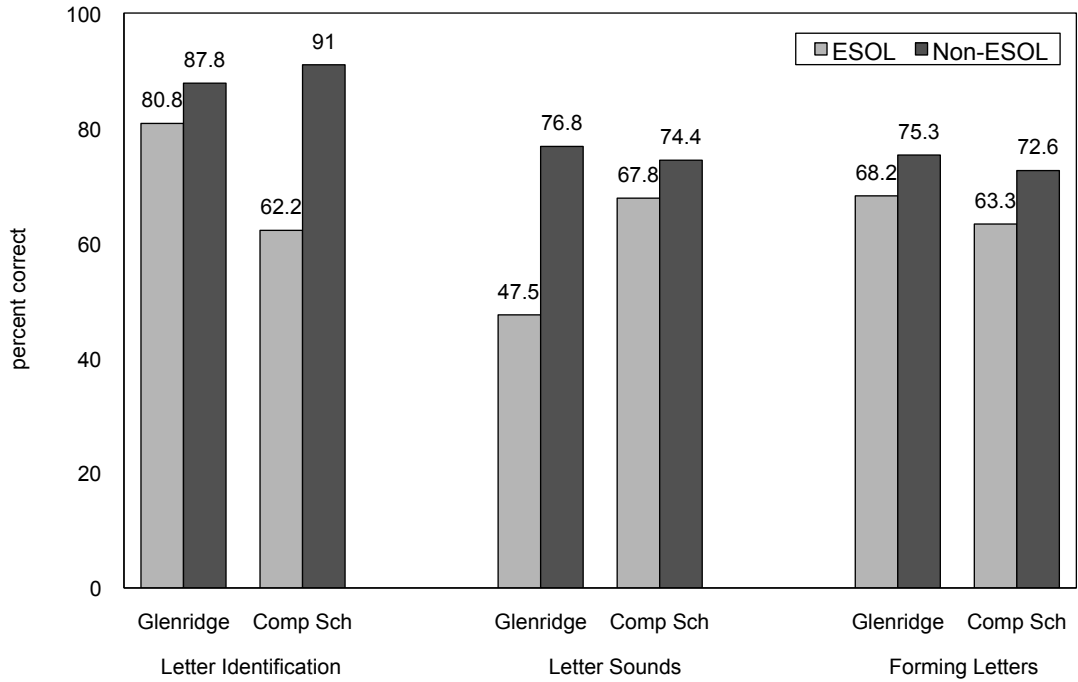
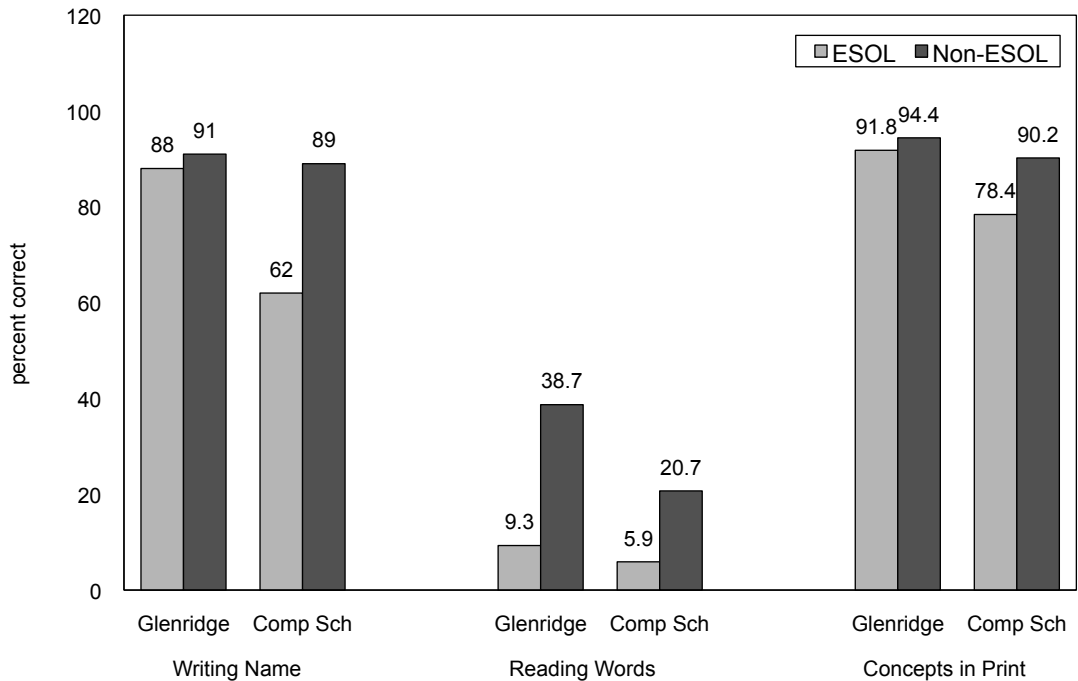


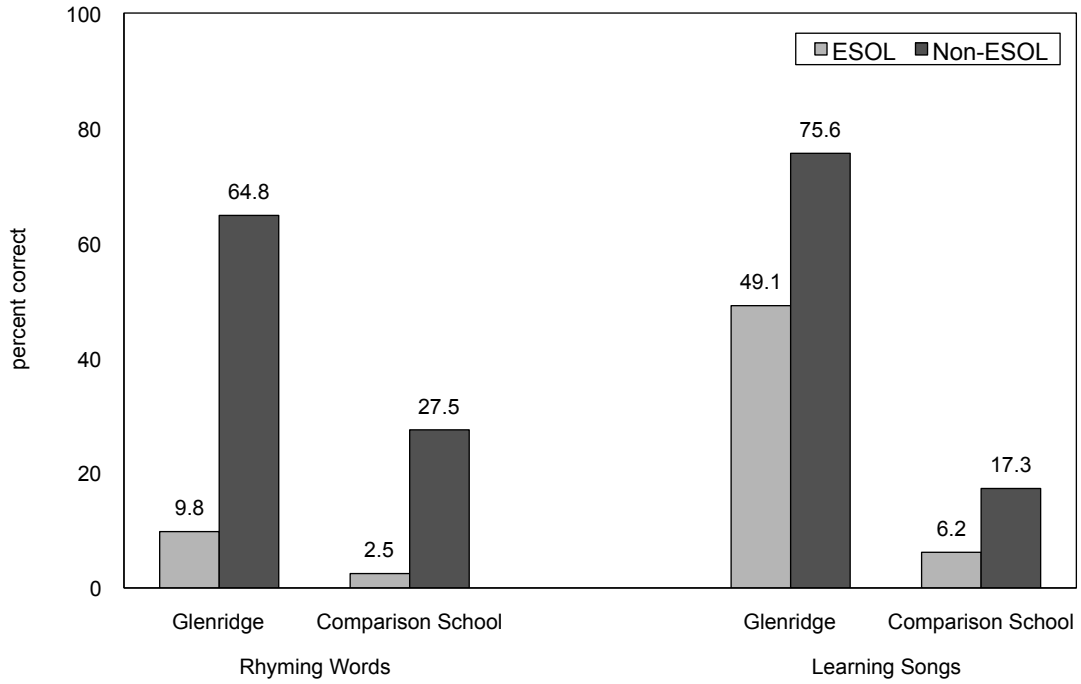
Figure 15



Study of Effectiveness of Waterford Program
at Glenridge Elementary School 1996-97

Comparison of ESOL and Non-ESOL Students' Performance
Percent Correct Averages of each Subtest at End-of-Year Testing Period

Figure 16



Part IV. Other Indicators of Program Effectiveness: One objective of the evaluation was to gather information on changes in students' learning behavior and parents' reactions to the program. RAM developed a Learning Behavior Inventory (see Appendix) which was used by teachers to assess each student's behavior based on classroom observation at three points during the program year. The Inventory contained 10 specific desired behaviors (e.g., listens attentively) on which students were rated on a scale of 1 (high) to 5 (low). As is typical of Kindergarten students, Glenridge's students began their schooling with a great deal of enthusiasm for both the school and their program. On the above scale, their teachers rated their learning behavior a high score average of 1.9. We were interested to learn whether this level of enthusiasm would be sustained throughout the program year. The average composite score on all 10 items for all students participating in the program was even slightly higher at mid-year (1.86). This average declined slightly at the end of the year (1.94), but all three ratings reflected a high level of interest and positive learning behavior.

In addition, the Glenridge staff and RAM developed a survey instrument to elicit parents' reactions to the school and to their children's participation in the program. The survey contained 10 statements to which parents were asked to respond on a Likert scale of "strongly agree" to "strongly disagree." Sixty-nine parents participated in the survey. As shown in Table 7, more than three-fourths of all respondents agreed or strongly agreed with 9 of the 10 statements. Ninety percent of parents agreed that their children were proud of what they were learning and were eager to share what they had learned when they came home from school. Close to 96 percent stated that their children brought home books they made with the computer and that they reviewed their children's work at home.

Table 7. GLENRIDGE PARENT SURVEY

February 1997

N = 69

Questions	PERCENT RESPONSES				
	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. My child usually comes home from school eager to share what she/he has learned today.	56.5	31.9	8.7	1.4	1.4
2. My child is proud of what she/he is learning at school.	69.6	27.5	2.9		
3. Teachers regularly inform me about my child's progress.	56.5	36.2	5.8		1.4
4. My child brings home books she/he has made with the computer.	75.4	20.3	1.4	1.4	1.4
5. I review my child's work and what has been learned in school every night.	68.1	27.5	1.4	1.4	1.4
6. I feel comfortable and welcome when I visit the school.	53.6	42.0	4.3		
7. I go to meetings in the school.	21.7	50.7	21.7	2.9	2.9
8. It is easy to make appointments with the principal/teacher to discuss parental concerns.	47.8	40.6	8.7	1.4	1.4
9. I find the Waterford video tapes and small books sent from school helpful.	68.1	26.1	4.3		1.4
10. Younger children in the family use and benefit from the video tapes and small books.	50.7	18.8	26.1	1.4	2.9

CONCLUSION

In the initial phase of evaluation of the Waterford Early Reading Program, a number of specific objectives were identified for the study. Our first objective was to construct a literacy development profile for Kindergarten students at Glenridge using periodic measures of growth in letter recognition, letter sounds, concepts about print, and understanding of oral and written language. Tests composed of eight subtests were administered three times during the school year. Analysis of the results of these tests provided us with the following summary conclusions:

- Glenridge students achieved significant growth in all eight dimensions of literacy development: letter identification, forming letters, letter sounds, writing names, reading words, concepts in print, rhyming words, and learning songs and nursery rhymes. Percentage growth measured between testing periods varied from one subtest to another. A weighted average for all subtests indicated an overall growth of 309 percent between the first and the third test.
- By the end of the school year, 80 percent of students at Glenridge recognized 40 or more upper and lower case letters of the alphabet. More than half of the students could recognize all 52 letters.

In a previous study, we found that **letter recognition** directly influences a student's ability to read (RAM 1995). In a three-year sustained effect study of PGCPs Head Start participants, we found that Kindergarten students who had scored above average in letter recognition were twice as likely as those who had scored below average to be among the top one-third of students in first grade MRT reading or math tests. The same pattern of differential growth in achievement was observed in CTB/4 reading or math scores at the end of the first grade. Moreover, students who had perfect scores in letter recognition in Kindergarten scored in the top 10 percent in both reading and math tests in the first grade. The results of this study suggest that participation in the Waterford Program has given Glenridge students a sound foundation for greater achievement in reading.

- An important concern of the school was to provide the needed support and assistance for its ESOL students' literacy development. Glenridge's ESOL Kindergarten students achieved a growth of 631 percent, more than twice the growth of non-ESOL students (283 percent).

A second objective of the evaluation was to reference and relate Glenridge Kindergarten students' literacy growth to the progress of Kindergarten students at a similar school with the same emphasis on early learning activities. Glenridge's staff was successful in involving a comparison school in this study. The comparison school was very similar to Glenridge in all respects except that it had employed two

Kindergarten classroom aides instead of purchasing the Waterford Program.

Comparing test results of students from the two schools provided the following observations:

- Based on the results of the end-of-the-year test in letter identification, both schools had strong early reading programs. Their score averages were higher than the average of the County's Title 1 schools' all-day Kindergarten students and significantly higher than the average of all half-day Kindergarten students in the County.
- The percentage of Glenridge students who knew all 52 letters of the alphabet was considerably higher than that of the comparison group (50.9 percent vs 27.9 percent).
- Glenridge students performed as well as or significantly better than students in the comparison group on 7 of the 8 subtests.
- ESOL students at Glenridge achieved a relatively higher percentage of growth than ESOL students at the comparison school.

Additional observations were as follows:

- Students at Glenridge started school with high teacher ratings in classroom learning behavior and sustained their high ratings throughout the year.

- Parents responding to a survey expressed a very positive reaction to the program and seemed involved and interested in their children's learning activities.

These findings and observations lead us to the conclusion that the program has been effective in helping the vast majority of Kindergarten students at Glenridge achieve considerable growth in literacy development. Moreover, these students' progress has been significantly greater than that experienced by students in Title 1 regular Kindergarten programs in Prince George's County Public Schools.

Limitations of the Literacy Program: While the program has effectively helped most of Glenridge's students achieve a significant measure of growth, a relatively small percentage of students, varying from 9 to 13 percent, has continually lagged behind in literacy development. Administration and staff of Glenridge are fully aware of this situation and are considering various plans of action to remedy it. From the beginning the principal and staff of Glenridge have been very enthusiastic and involved in the program and have continually pressed on for the full utilization of Waterford technology wherever possible. It may be difficult to separate their effect from that of the Waterford Program independent of their involvement. In replicating the program elsewhere, it should be noted that this high level of commitment and support are key to its successful implementation.

APPENDIX A

A Comparison of Student Population Characteristics

Enrollment on September 30, 1996	Glenridge Elementary	Comparison School
Kindergarten	123	112
Total Enrollment	839	811
Student Mobility:		
-Entrants	20.5%	21.7%
-Withdrawals	18.9%	14.8%
Limited English Proficient (ESOL)		
Kindergarten	13.0%	12.0%
Total Enrollment	11.3%	12.0%
Title 1	16.4%	17.4%
Free/Reduced Price Meals	61.9%	70.2%
Special Education	10.3%	8.0%
Attendance Rate	94.6%	94.5%

Source: Maryland School Performance Program Report, 1996

APPENDIX B

Learning Behavior Inventory

APPENDIX C

Analysis of Correlation

Glenridge Kindergarten students' scores were further analyzed to investigate the relationship between scores of various subtests. Correlation coefficient (r) represents the strength of linear relationship between two variables. Based on the values listed in the table on the following page, we can make the following statements:

- All correlation coefficients (r) are significant at the $p = 0.05$ level, and most are significant at the $p = 0.01$ level. This means that there is some association between the variations of any two subtest scores. The higher the value of correlation coefficient of any two subtests (the closer it is to the number 1), the greater the association between their variations.
- **Letter identification** scores and **forming letters** scores have the highest value ($r = 0.8693$).
- **Letter sounds** have relatively high correlation with **letter identification** ($r = 0.6025$) and **forming letters** ($r = 0.6674$), and even higher correlation with **learning songs** ($r = .7474$), but lower correlation with **reading words** ($r = 0.5716$), **concepts about print** ($r = 0.3700$), and **rhyming words** ($r = 0.4341$).
- **Letter identification** scores in test two (mid-year) have a relatively high correlation with all other subtests.

All of the above mentioned results and other observations from the table need further analysis and careful interpretation.

- - Correlation Coefficients - -

	LETTRID3	LETTRID2	WRTLET3	LETSND3	PRINT3	READ3	RHYME3	SONGS3
LETTRID3	1.0000 (110) P= .	.7531 (104) P= .000	.8693 (110) P= .000	.6025 (110) P= .000	.4329 (110) P= .000	.4605 (110) P= .000	.3045 (110) P= .001	.4380 (110) P= .000
LETTRID2	.7531 (104) P= .000	1.0000 (113) P= .	.7912 (105) P= .000	.7628 (105) P= .000	.4108 (105) P= .000	.6333 (105) P= .000	.3697 (105) P= .000	.5288 (105) P= .000
WRTLET3	.8693 (110) P= .000	.7912 (105) P= .000	1.0000 (111) P= .	.6674 (111) P= .000	.5230 (111) P= .000	.5733 (111) P= .000	.3640 (111) P= .000	.5178 (111) P= .000
LETSND3	.6025 (110) P= .000	.7628 (105) P= .000	.6674 (111) P= .000	1.0000 (111) P= .	.3700 (111) P= .000	.5716 (111) P= .000	.4341 (111) P= .000	.7474 (111) P= .000
PRINT3	.4329 (110) P= .000	.4108 (105) P= .000	.5230 (111) P= .000	.3700 (111) P= .000	1.0000 (111) P= .	.2478 (111) P= .009	.3295 (111) P= .000	.4753 (111) P= .000
READ3	.4605 (110) P= .000	.6333 (105) P= .000	.5733 (111) P= .000	.5716 (111) P= .000	.2478 (111) P= .009	1.0000 (111) P= .	.4981 (111) P= .000	.4869 (111) P= .000
RHYME3	.3045 (110) P= .001	.3697 (105) P= .000	.3640 (111) P= .000	.4341 (111) P= .000	.3295 (111) P= .000	.4981 (111) P= .000	1.0000 (111) P= .	.4322 (111) P= .000
SONGS3	.4380 (110) P= .000	.5288 (105) P= .000	.5178 (111) P= .000	.7474 (111) P= .000	.4753 (111) P= .000	.4869 (111) P= .000	.4322 (111) P= .000	1.0000 (111) P= .

(Coefficient / (Cases) / 2-tailed Significance)

" . " is printed if a coefficient cannot be computed

- LETTRID3 = letter identification, 3rd test
- LETTRID2 = letter identification, 2nd test
- WRTLET3 = forming letters, 3rd test
- LETSND3 = letter sounds, 3rd test
- PRINT3 = concepts about print, 3rd test
- READ3 = reading words, 3rd test
- RHYME3 = rhyming words, 3rd test
- SONGS3 = learning songs and nursery rhymes, 3rd test

A Study of the Effectiveness of the Waterford Early Reading Program

First-Year Evaluation Results

New London Public Schools

Bill Pukas, Curriculum Director

(860) 447-6000

May 25, 1998

WATERFORD EARLY READING PROGRAM

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WATERFORD EARLY READING PROGRAM

Introductory Information

About the Population

The Winthrop Elementary School is located in New London, Connecticut, an urban environment with a high-percentage of federally-designated “free and reduced lunches.” The school population is a highly transient, largely minority population, with some ESL. Absenteeism and low parent involvement are constant struggles for teachers. The Winthrop school identifies and includes “special needs” children in the kindergarten classroom.

About the Program

The Waterford Early Reading Program is a nationally-recognized early literacy program that uses research-based instructional design and powerful technology advances to deliver courseware whose goal is solid literacy skills for all children regardless of primary language or level of literacy.

In the classroom, students at the Kindergarten level spend 15 minutes a day of student-driven individualized instruction that focuses on three essential skills: letter recognition, phonemic awareness, and print concepts (in a literature context).

In the home, the development of literacy skills is strengthened through the various printed activities that go home with students on a daily basis. Each child participating in the program also received 4 full-length Waterford animated videos and 52 books.

Study Design

In September, the Waterford Early Reading Program was implemented in two half-day kindergarten classes of 24 students each. At the request of the District, a comprehensive study of the program’s effectiveness was designed to include the following elements:

- 1) Testing of both experimental and control population
- 2) Pre-Testing, Mid-Year, and Post-Testing of both populations
- 3) Focus on Basic Skills (knowledge of alphabet, letter sounds, and print concepts)
- 4) Teacher Surveys
- 5) Parent Surveys

Evaluation Instrument

Student mastery of pre-reading skills was evaluated using the Adams-Gough Reading Inventory, selected by the Curriculum Director, and administered using the help of parent volunteers and teaching staff. In one-on-one interviews with students (each lasting about 20 minutes), each child was asked to perform a variety of pre-literacy tasks. Scores were calculated in terms of percentage scores (ex: correctly reciting all 26 letters of the alphabet = 100%).

Selection of the Control School

Harbor School was selected by the District based on demographics and classroom similarity. The Harbor School classroom includes two half-day kindergarten classrooms of 24 children each. In pre-tests, Harbor School kindergartners tested stronger than the Winthrop School. The Harbor School had recently implemented an intensive phonics program to teach basic phonemic awareness and letters.

Evaluation Dates

Three evaluation dates were selected: November 1997, February 1998, and May 1998.

Limitations/Exceptions of This Study

1. Exclusion of Special Needs Students

There are no special needs children in the Harbor classroom. In order to provide a comparable sample, it was decided to exclude Winthrop's special needs students from this study. This reduced the total number of eligible students for this study by 1/3.

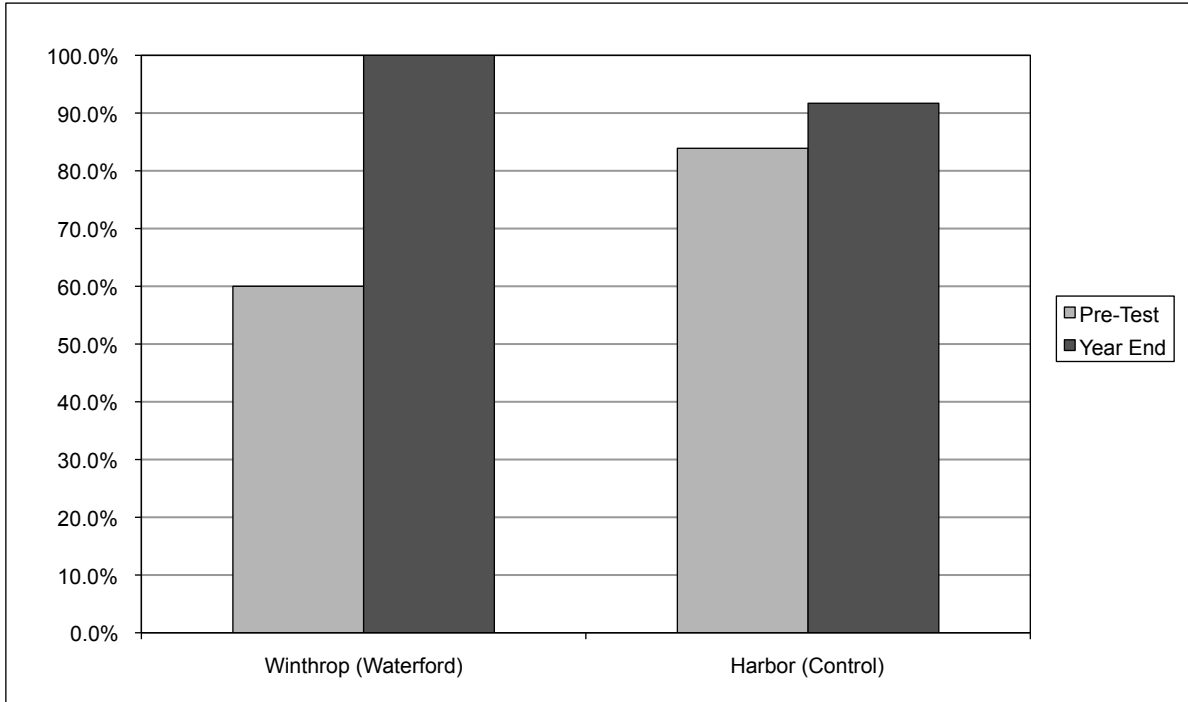
2. Transiency

The Winthrop School has a high level of transience. By year's end, only 18 of the students that had begun the Waterford Program were still available for testing. Although a number of students had begun the Program mid-year, they were excluded from post-testing because no pre-test was available.

Comparison of Skill Development

Write First Name

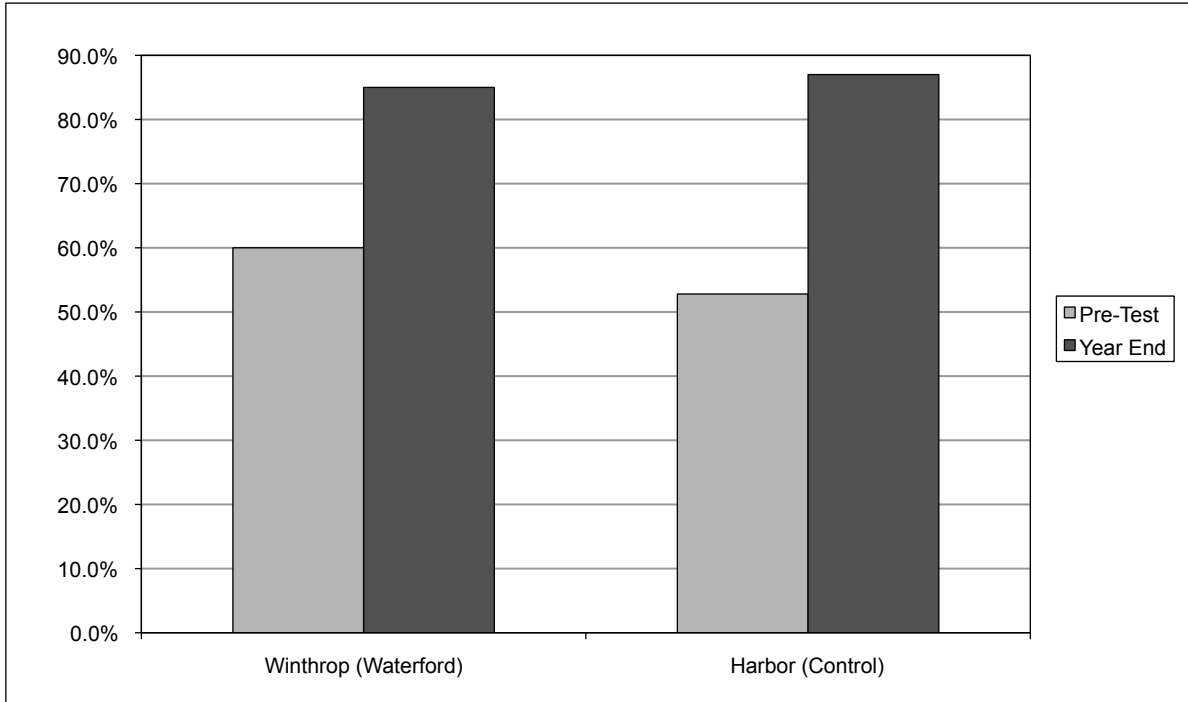
	<u>Pre-Test</u>	<u>Year End</u>	<u>%Improvement</u>
Winthrop (Waterford)	60.0%	100.0%	66.7%
Harbor (Control)	83.9%	91.7%	9.3%



Comparison of Skill Development

Spell First Name

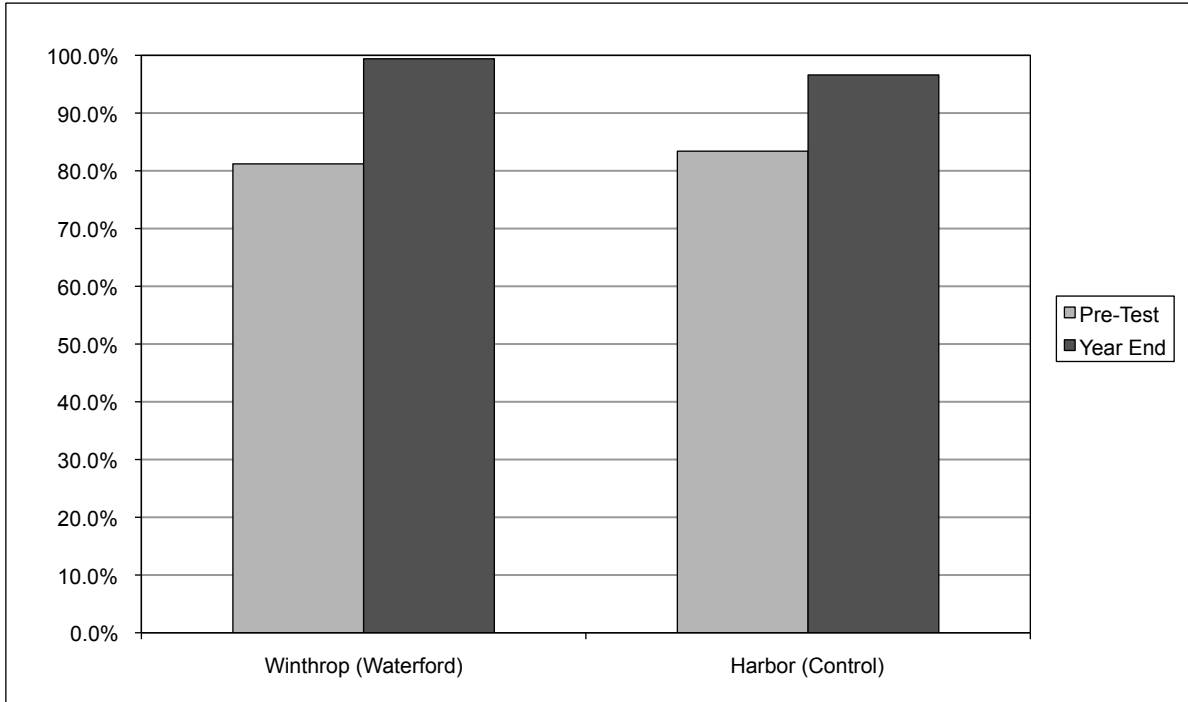
	<u>Pre-Test</u>	<u>Year End</u>	<u>%Improvement</u>
Winthrop (Waterford)	60.0%	85.0%	41.7%
Harbor (Control)	52.8%	87.0%	64.8%



Comparison of Skill Development

Recite Alphabet From Memory

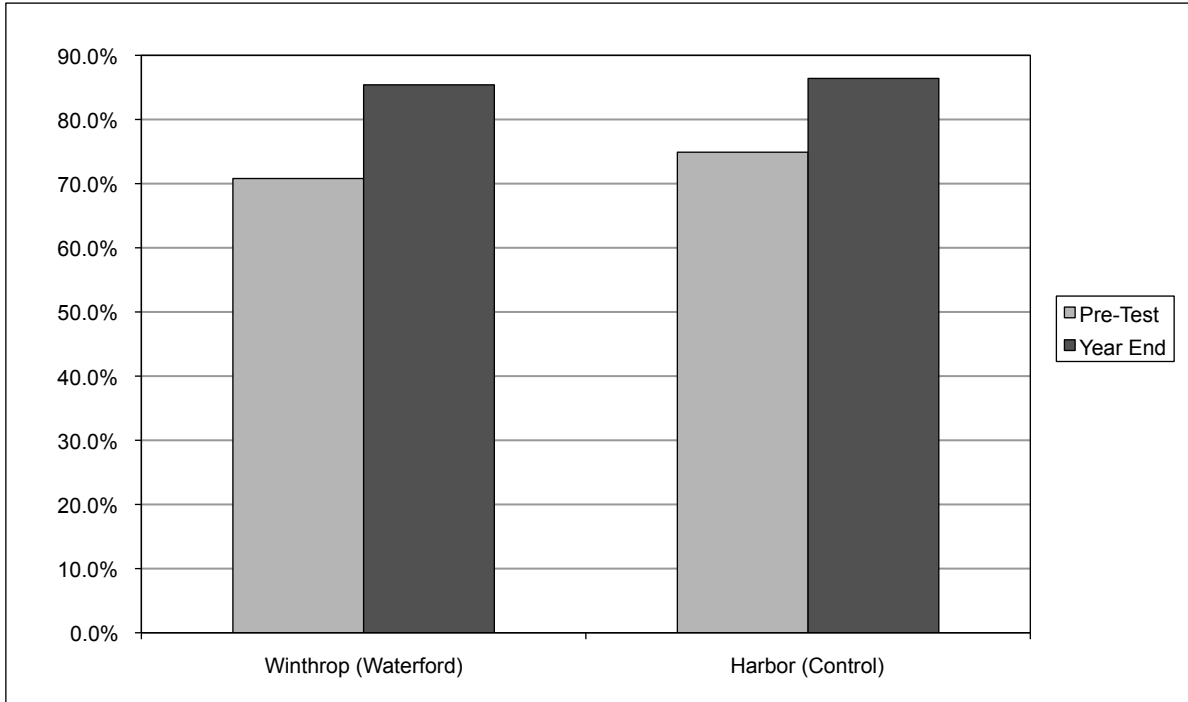
	<u>Pre-Test</u>	<u>Year End</u>	<u>%Improvement</u>
Winthrop (Waterford)	81.2%	99.4%	22.4%
Harbor (Control)	83.4%	96.6%	15.8%



Comparison of Skill Development

Recognize Capital Letters

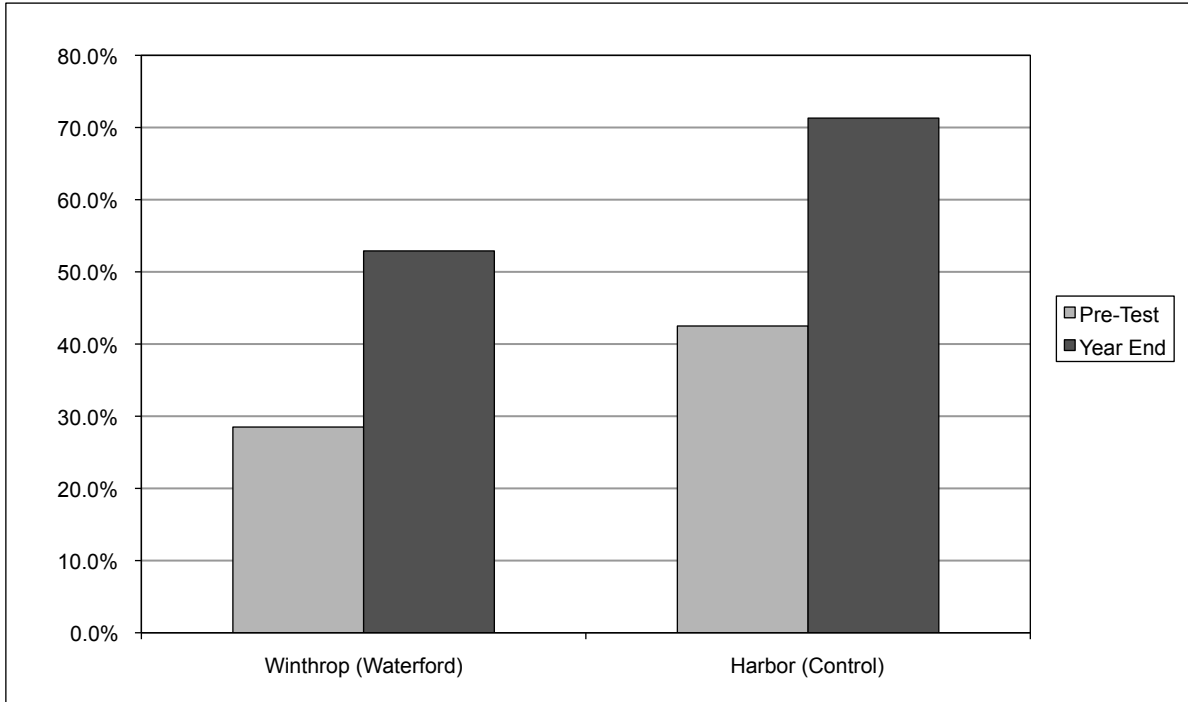
	<u>Pre-Test</u>	<u>Year End</u>	<u>%Improvement</u>
Winthrop (Waterford)	70.8%	85.4%	20.6%
Harbor (Control)	74.9%	86.4%	15.4%



Comparison of Skill Development

Recognize Letter Sounds

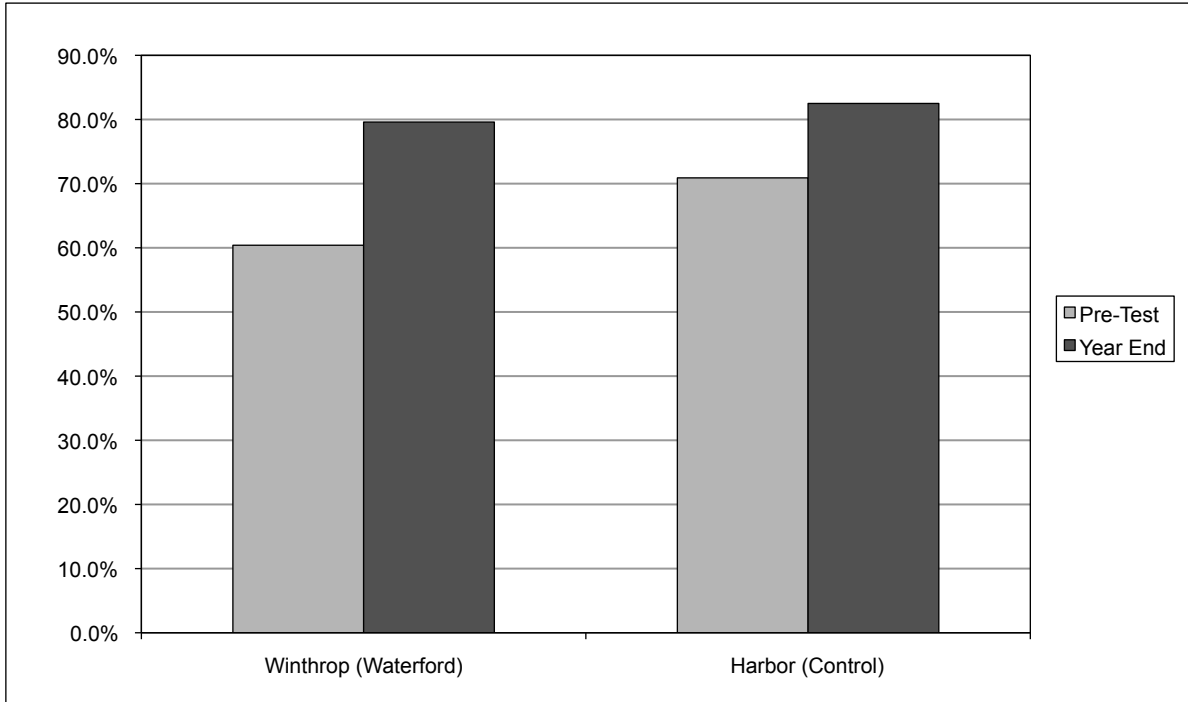
	<u>Pre-Test</u>	<u>Year End</u>	<u>%Improvement</u>
Winthrop (Waterford)	28.5%	52.9%	85.6%
Harbor (Control)	42.5%	71.3%	67.8%



Comparison of Skill Development

Recognize Lowercase Letters

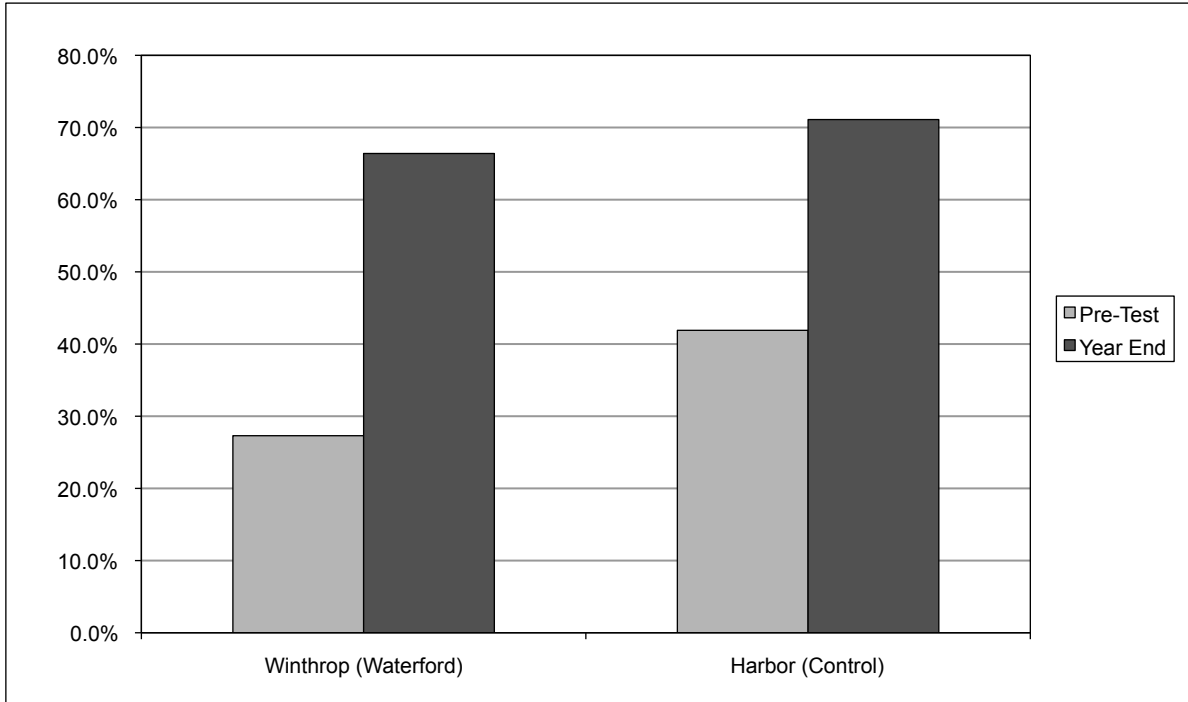
	<u>Pre-Test</u>	<u>Year End</u>	<u>%Improvement</u>
Winthrop (Waterford)	60.4%	79.6%	31.8%
Harbor (Control)	70.9%	82.5%	16.4%



Comparison of Skill Development

Form Capital and Lowercase Letters

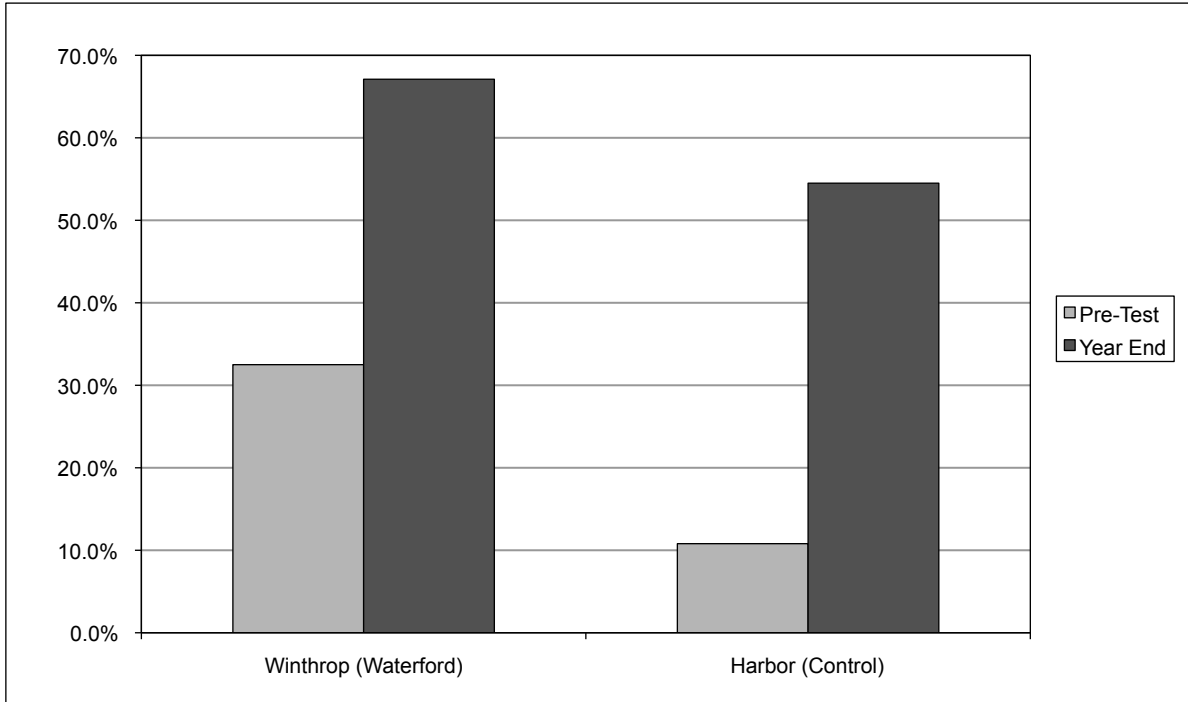
	<u>Pre-Test</u>	<u>Year End</u>	<u>%Improvement</u>
Winthrop (Waterford)	27.3%	66.4%	143.2%
Harbor (Control)	41.9%	71.1%	69.7%



Comparison of Skill Development

Recite Nursery Rhymes from Memory

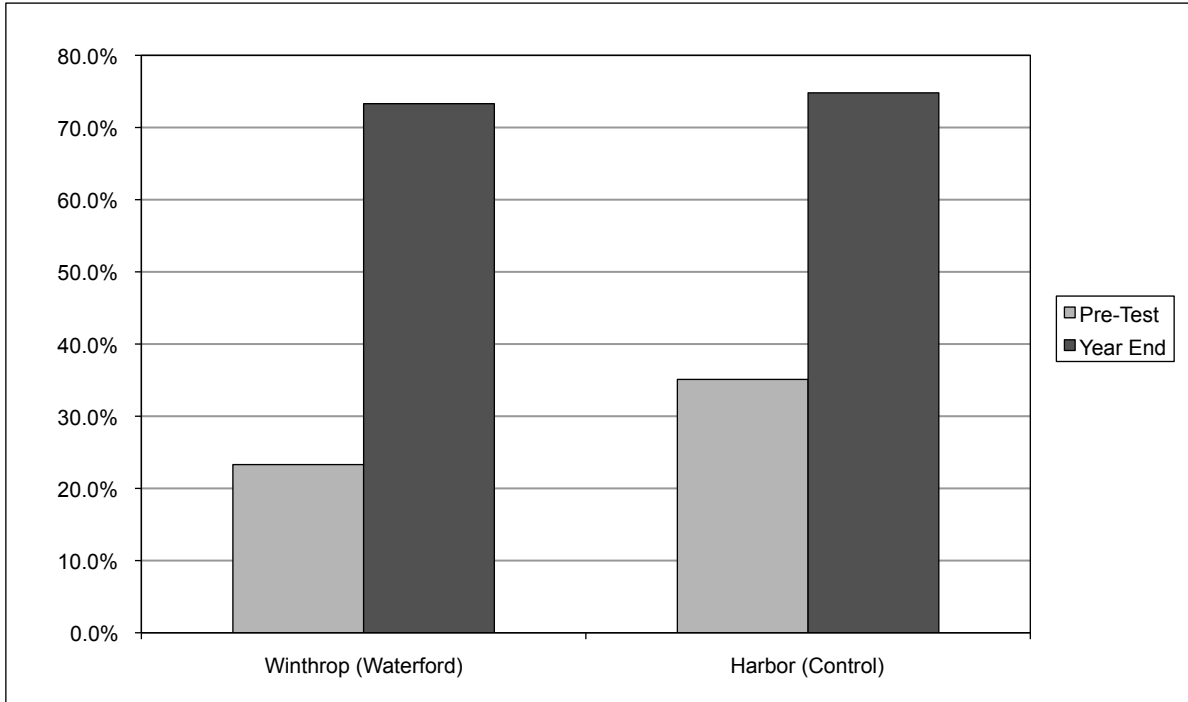
	<u>Pre-Test</u>	<u>Year End</u>	<u>%Improvement</u>
Winthrop (Waterford)	32.5%	67.1%	106.5%
Harbor (Control)	10.8%	54.5%	404.6%



Comparison of Skill Development

Identify Rhyme

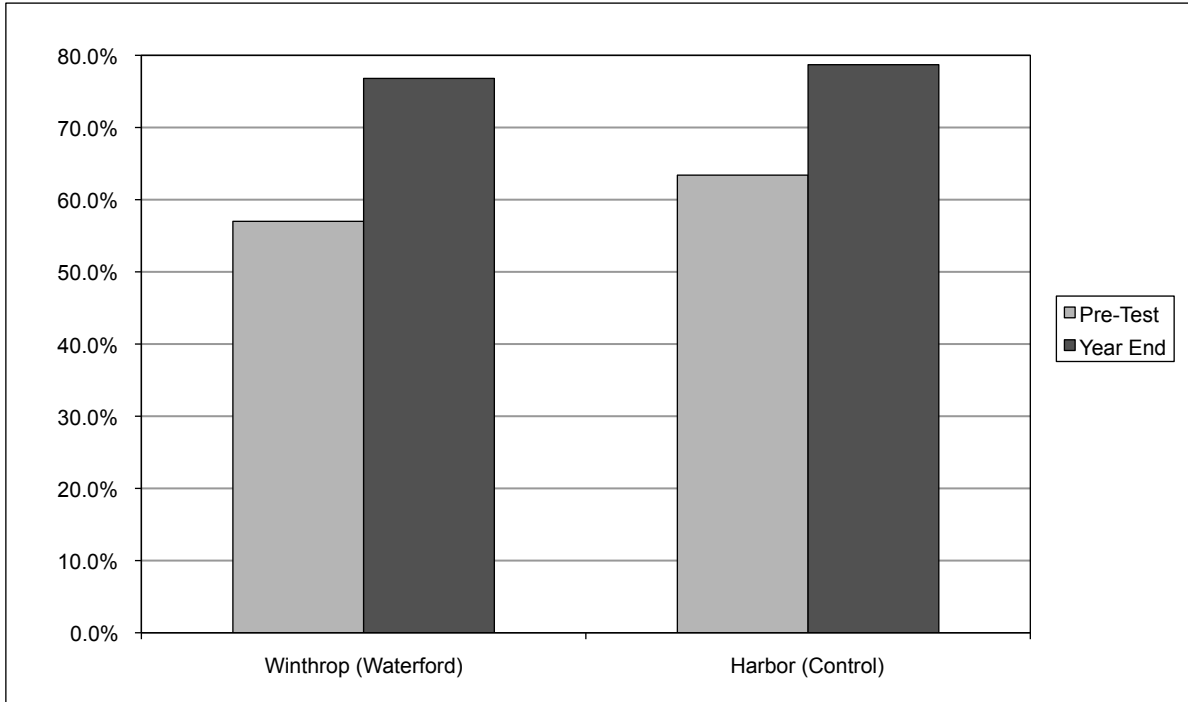
	<u>Pre-Test</u>	<u>Year End</u>	<u>%Improvement</u>
Winthrop (Waterford)	23.3%	73.3%	214.6%
Harbor (Control)	35.1%	74.8%	113.1%



Comparison of Skill Development

Identify Initial Sounds

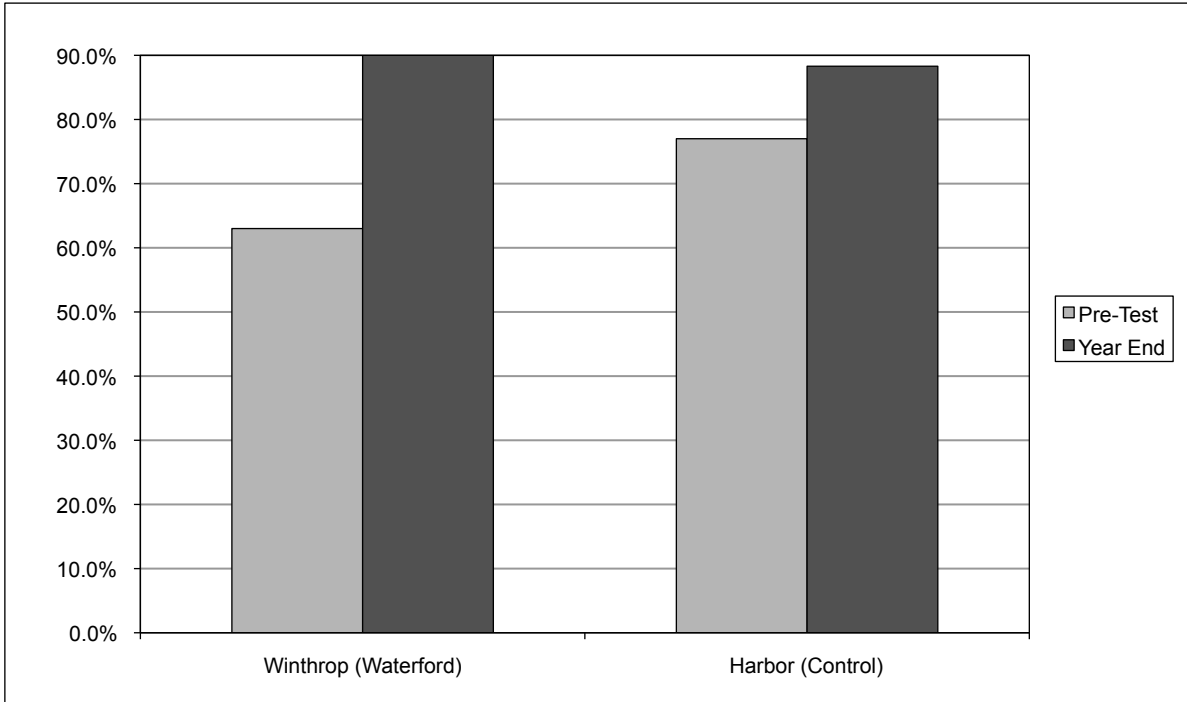
	<u>Pre-Test</u>	<u>Year End</u>	<u>%Improvement</u>
Winthrop (Waterford)	57.0%	76.8%	34.7%
Harbor (Control)	63.4%	78.7%	24.1%



Comparison of Skill Development

Identify Print Concepts

	<u>Pre-Test</u>	<u>Year End</u>	<u>%Improvement</u>
Winthrop (Waterford)	63.0%	90.0%	42.9%
Harbor (Control)	77.0%	88.3%	14.7%



Comparison of Skill Development

Waterford Site vs. Control Site

Winthrop School

(Waterford Site)

	Pre-Test (11/7/97)	Year End (5/25/1998)	%Improve
1. Write Name	60.0%	100.0%	66.7%
2. Spell Name	60.0%	85.0%	41.7%
3. Recite Alphabet from Memory	81.2%	99.4%	22.4%
4. Recognize Uppercase Letters	70.8%	85.4%	20.6%
5. Match sounds with letters	28.5%	52.6%	84.6%
6. Recognize Lowercase Letters	60.4%	79.6%	31.8%
7. Correctly Form Letters	27.3%	66.4%	143.2%
8. Knowledge of Nursery Rhymes	32.5%	67.1%	106.5%
9. Identify Rhymes	23.3%	73.3%	214.6%
10. Identify Initial Sounds	57.0%	76.8%	34.7%
11. Understanding Print Concepts	63.0%	90.0%	42.9%
Total Average Score	51.3%	79.6%	55.2%

Harbor School

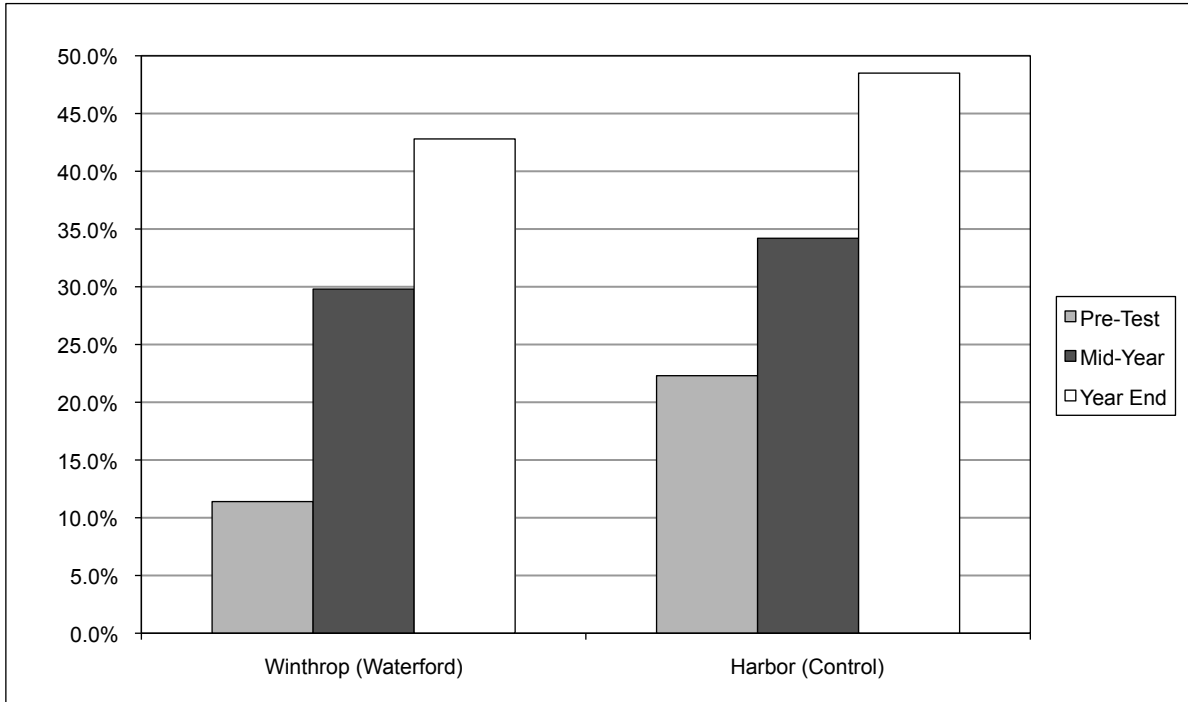
(Control Site)

	Pre-Test (11/7/97)	Year End (5/25/1998)	%Improve
1. Write Name	83.9%	91.7%	9.3%
2. Spell Name	52.8%	87.0%	64.8%
3. Recite Alphabet from Memory	83.4%	96.6%	15.8%
4. Recognize Uppercase Letters	74.9%	86.4%	15.4%
5. Match sounds with letters	42.5%	71.3%	67.8%
6. Recognize Lowercase Letters	70.9%	82.5%	16.4%
7. Correctly Form Letters	41.9%	71.1%	69.7%
8. Knowledge of Nursery Rhymes	10.8%	54.5%	404.6%
9. Identify Rhymes	35.1%	74.8%	113.1%
10. Identify Initial Sounds	63.4%	78.7%	24.1%
11. Understanding Print Concepts	77.0%	88.3%	14.7%
Total Average Score	57.9%	80.3%	38.7%

Comparison of Overall Pre-Literacy Scores - Bottom 1/3 Students

Waterford Site vs. Control Site

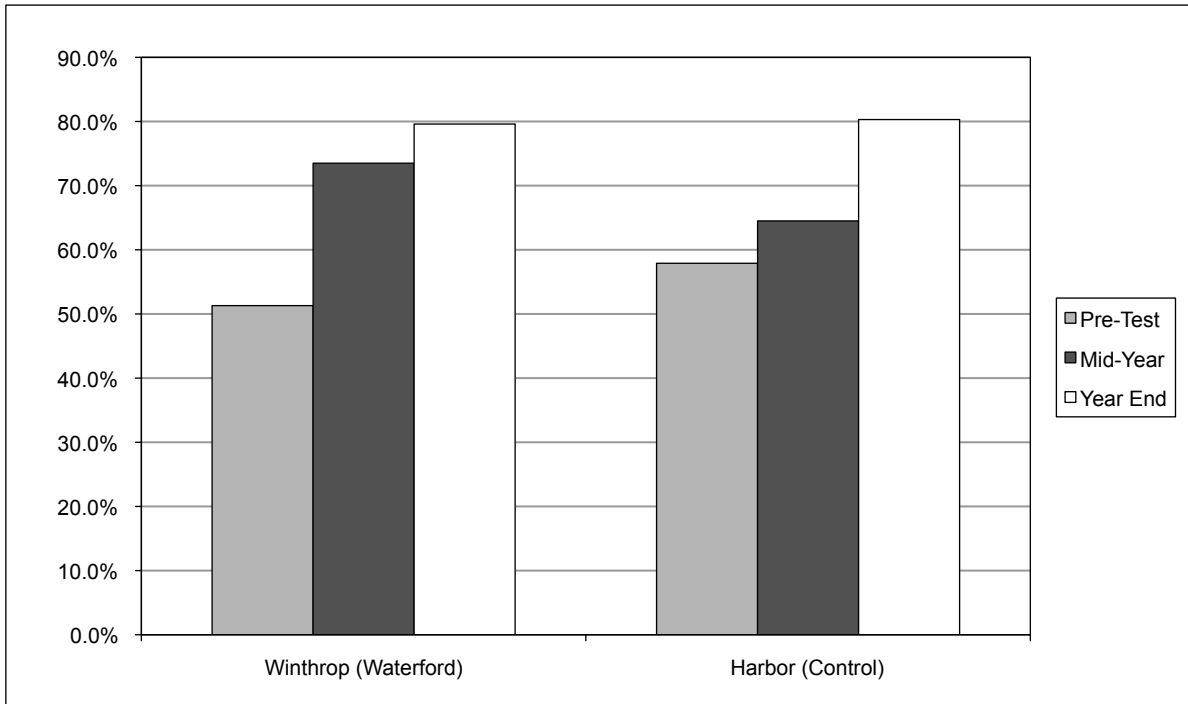
	<u>Pre-Test</u>	<u>Mid-Year</u>	<u>Year End</u>	<u>%Increase</u>
Winthrop (Waterford)	11.4%	29.8%	42.8%	274.0%
Harbor (Control)	22.3%	34.2%	48.5%	117.4%



Comparison of Overall Pre-Literacy Scores

Waterford Site vs. Control Site

<u>School</u>	<u>Pre-Test</u>	<u>Mid-Year</u>	<u>Year End</u>	<u>Avg. Incr.</u>
Winthrop (Waterford)	51.3%	73.5%	79.6%	55.2%
Harbor (Control)	57.9%	64.5%	80.3%	38.7%



Winthrop School (Waterford Site)
Ranked Lowest to Highest Based on Pre-Test

1. Includes only those children available for pre- and post-testing
2. Children identified as 'special needs' not included in this evaluation

Student	Time on WERP (minutes)	Pre-Test (11/7/97)	Mid-Year (2/4/98)	Post-Test (5/25/98)	%Improve
Tyler	1330	7.7%	38.1%	56.1%	631.4%
Shanequa	1168	10.0%	32.2%	77.1%	673.3%
Andrew	1315	11.1%	31.3%	40.9%	269.1%
Zechariah	1359	17.9%	51.8%	73.7%	311.5%
Edgardo	1211	33.4%	55.2%	51.5%	54.2%
Liana	1513	49.8%	55.9%	92.9%	86.6%
Kimberly	1008	58.7%	68.4%	73.6%	25.4%
Celso	1401	59.3%	72.3%	81.8%	38.0%
Jessie	1130	59.8%	63.7%	87.9%	47.0%
Kendra	1472	61.9%	80.0%	96.5%	55.9%
Anthony	1220	65.0%	79.1%	86.2%	32.6%
German	1331	65.5%	90.3%	93.3%	42.6%
Michael	1420	71.3%	84.9%	85.3%	19.6%
Joshua	1464	72.1%	80.5%	92.7%	28.6%
Shaun	1485	72.7%	82.7%	92.7%	27.6%
Shamonique	1675	91.9%	97.1%	99.1%	7.9%
Ricky	1465	93.0%	94.9%	97.0%	4.3%
Antasia	1550	97.6%	97.9%	97.9%	0.3%

Harbor School (Control Site)*Ranked by Lowest to Highest Based on Pre-Test*

1. Includes only those children available for pre- and post-testing
2. Children identified as 'special needs' not included in this evaluation

Student	Time on WERP (minutes)	Pre-Test (11/7/97)	Mid-Year (2/4/98)	Post- Test (5/25/98)	%Improve
Aaron	0	9.3%	11.9%	21.0%	125.8%
Kevin	0	20.3%	19.3%	22.8%	12.3%
Luis	0	20.8%	34.1%	51.5%	148.0%
Josephine	0	28.2%	35.5%	76.3%	170.4%
Tandi	0	28.9%	43.1%	77.0%	166.3%
Darrell	0	34.6%	70.5%	96.6%	179.3%
Heidi	0	35.1%	71.3%	75.3%	114.8%
Jasmin	0	35.4%	51.3%	66.7%	88.3%
Harold	0	38.0%	23.4%	51.7%	36.0%
William	0	39.2%	83.9%	91.1%	132.6%
Dante	0	43.0%	29.3%	90.4%	110.5%
Andrew	0	43.2%	36.5%	68.0%	57.6%
Tiffany	0	43.5%	33.0%	87.1%	100.4%
Nadine	0	46.6%	47.2%	66.2%	42.1%
Taji	0	49.0%	64.1%	72.3%	47.6%
Tricia	0	50.5%	74.7%	90.5%	79.4%
Melissa	0	53.7%	50.5%	88.6%	65.1%
Geoffrey	0	59.3%	86.0%	97.7%	64.8%
Brian	0	61.9%	68.2%	88.7%	43.2%
Luis	0	64.6%	62.6%	94.8%	46.7%
Devaney	0	67.4%	74.7%	85.6%	27.0%
James	0	67.4%	74.7%	92.9%	37.8%
Emily	0	69.5%	80.6%	97.9%	40.9%
Pierre	0	70.4%	89.6%	96.5%	37.2%
Salvatore	0	71.7%	80.5%	85.8%	19.7%
Jason	0	72.1%	93.9%	94.6%	31.2%
Jasmyn	0	72.7%	65.1%	83.9%	15.5%
Tiffany	0	73.9%	95.6%	95.1%	28.6%
Camille	0	75.8%	95.1%	97.4%	28.5%
Craig	0	77.5%	65.2%	88.0%	13.6%
Kara	0	80.4%	91.5%	94.6%	17.6%
Katelyn	0	82.0%	95.1%	97.6%	19.0%
Tiffany	0	85.8%	78.8%	96.3%	12.2%
Ashlyn	0	87.2%	91.5%	97.4%	11.7%
Juanita	0	89.7%	89.6%	95.5%	6.5%
Gina	0	89.9%	89.0%	95.1%	5.8%
Kenneth	0	90.6%	90.6%	91.8%	1.4%

WATERFORD EARLY READING PROGRAM

Parent Response

One week before the conclusion of the study, parents of children using the WATERFORD EARLY READING PROGRAM received a short two-question survey. Out of the 43 students using the program, 4 responses (10%) were received. This low level of parent response is typical of the Winthrop School population.

1. What comments has your child shared with you about his/her work with the WATERFORD computers?

(Parent #1) Michael loves working on the computer. He especially loved bringing home the certificates and stories. He misses it when he doesn't get a turn every day. He has checked out the First Grade classroom and noticed that they don't have any computers and said, "I want to stay in Kindergarten!" because First Grade doesn't have any computers.

(Parent #2) They have not said anything. But they love the computer, Rusty and Rosy.

(Parent #3) Yasmenia has shared that she loves working with the computers and she loves bringing home her own work with the alphabet.

(Parent #4) He has showed me everything he has done on the computer. He is very excited that he can use a computer at school. He seems proud of himself, and I am too, that he is learning so well.

2. Please share your opinion of the program's content and its effects on your child.

(Parent #1) The Waterford project's content has been well thought-out. It treats each individual student at his/her level. It uses positive reinforcement with computer assisted instruction to teach readiness skills. The teachers can track each student's progress and it gets reinforced at home with videotapes and booklets. Michael watches the tapes with his younger brother and so John knows the songs, etc. Michael tries to read the little books to me and John. I can't think of a better way to utilize computers at school, mainly because the focus was not on keyboarding. It was on teaching skills and concepts reinforcing those skills. I'm not saying that computers are a replacement for teachers, but this particular program was perfect for the needs of students who began school at many different levels. It used all modalities, auditory, kinetic, and visual to teach. I wish the program could continue up through First and Second Grade. Follow the students who started this year and continue into First Grade, reinforcing and teaching Reading skills, continue assessing progress at the end of the year. I hypothesize that fewer of the students in Michael's class would need Reading Recovery, etc.

(Parent #2) I think the program was wonderful. They have learned a lot more that way. I think if they didn't have the program, the learning process would have been a lot longer.

(Parent #3) The content of the program's so great because it makes a child want to learn and it makes it easier on the child. The pictures, the bold prints, etc. Plus it helps parents help themselves, too.

(Parent #4) I think the use of computers with young children is great. He has made a lot of nice pictures. I think he has learned a lot of things, especially letters, sounds, etc. He also has use of a computer at home. I think that helps him along in learning faster.

WATERFORD EARLY READING PROGRAM

Teacher Survey

One week before the conclusion of the study, both of the teachers using the WATERFORD EARLY READING PROGRAM were asked to complete a short four-question survey describing their experience during the year.

- 1. What observations have you made on your students this year as they have progressed through the WATERFORD PROGRAM? Discuss specifically their knowledge of letters, sounds, and stories.**

(Teacher #1) As a whole, I think the children were more confident in letters and sound recognition. They are also forming letters more confidently and aren't afraid to sound out words. They have a good sound foundation to begin First Grade. I loved how the children could print out their own take-home books. This provided follow-through at home. It helped the parents become active participants in their child's learning.

(Teacher #2) A specific observation, and I've noticed this recently, is where a child is trying to read a word, another child will sound it out in hope that the first child will figure it out. I have children sounding out short vowel sounds. It's interesting to hear them doing that skill. Students who seem to be quiet during group time do come to life on the computer when a nursery rhyme or song is playing.

- 2. How has this progress compared to that of students in your previous classes?**

(Teacher #1) I have noticed that many of the children know most of their upper and lower case letters. They seem to have a good working knowledge of rhyming and their sight words. I see more risk takers. I am looking forward to the siblings coming to kindergarten after they have been home watching the videos and reading the stories. Also, I think it helped the special needs students and the Hispanic children. The consistency and repetition is so vital for this population.

(Teacher #2) Not able to comment, only my second year.

- 3. Discuss your opinion of the overall program and how it has been implemented in your classroom. Please specifically address the classroom activities, take home materials, and management issues.**

(Teacher #1) I found the program to be engaging and motivating and it provoked quality instruction. The children's parents and siblings all seemed to enjoy the tapes and books. It took a few weeks to become familiar with the program and adjust to the program. After the staff as well as the children became more comfortable with the program, we were able to build on the activities within the classroom curriculae.

(Teacher #2) The program is a good supplemental tool. The children enjoy singing or saying the rhymes. The children also like to see their work processed, so they can bring it home. The positive aspects of the program are: children can work at their own pace, the instructional time between students and teachers is increased because while there are three students on the computer, the teacher can take a little more time with each of the other students.

4. What changes would you recommend for future implementations of the WATERFORD EARLY READING PROGRAM?

(Teacher #1) I would like to see the program offered to all children! I would also like to see a pre-school program implemented.

(Teacher #2) I would change the set-up of the computers. The computers are a distraction while I am teaching the rest of the class. Though I cannot change the location of the computers [due to location of outlets], I would certainly rearrange positions at the table. I would recommend more inservice, training. One day is not enough. I believe their needs to be a chart showing what the symbols mean on the computer so that each teacher can talk about them to the student before they go on the computer.

WATERFORD EARLY READING PROGRAM

Conclusions from Year One Evaluation

1. The Waterford Early Reading Program made a significant difference in the development of basic pre-literacy skills when compared with the control classroom.
2. The overall rate of literacy skill improvement in the Waterford Classroom was 43% greater than the control. In some cases this rate of improvement was **7 times greater than the control**, enabling a classroom with relatively weak scores to out-perform (or match) the scores of a stronger control classroom in each of 11 pre-literacy skills.
3. The rate of improvement among the bottom 1/3 of students in the Waterford Classroom was **more than double** the bottom 1/3 in the control school. These children showed gains as high as 600%.
4. Teachers and parents were both pleased with success and improvement that they saw in the classroom and in the home. They would like to see the program extended into First Grade.