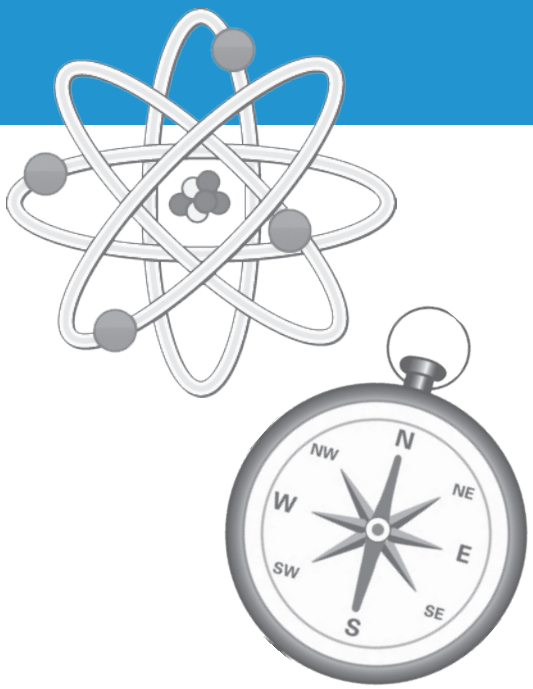
WORDLY WISE
Science & Social Studies™

EFFICACY STUDY

(Randomized Control Study)
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Principal Investigators

Edina Torlaković, Ph.D. (ABD)
Senior Research Scientist
EPS Literacy and Intervention

Kim Collazo, MEd, NBCT
Fifth Grade Teacher
J. R. Ingram Elementary School

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WORDLY WISE SCIENCE & SOCIAL STUDIES™ EFFICACY STUDY SUMMARY

Wordly Wise Science & Social Studies™ is an online instructional program designed to teach students with a wide variety of abilities the specialized vocabulary of Science and Social Studies topics. The program is available for students in grades 4 to 8. Students receive instruction in on-level vocabulary using activities and content-area texts that are written two grade levels below their nominal grade. This ensures that struggling readers can benefit from vocabulary instruction without the stumbling block of difficult context.

EPS Literacy and Intervention believes strongly that its products must demonstrate proven effectiveness in increasing student learning. As such, it conducted an effectiveness study of its *Wordly Wise Science & Social Studies* program.

DESIGN AND METHODS

The goal of the study was to determine the impact of *Wordly Wise Science & Social Studies* on the science and social studies outcomes of fifth grade students. Although not the main focus of the study, the potential for *Wordly Wise Science & Social Studies* to impact general reading ability was also explored. The findings are based on a sample of 119 students and 5 teachers involved in a randomized controlled trial of the *Wordly Wise Science & Social Studies* program. Students were randomly assigned to a treatment or control group. J.R. Ingram Elementary School in Sanford, North Carolina, participated in the study.

The researchers selected the following assessments for data collection: the Gates-MacGinitie Reading Test (GMRT) and the two assessments built into the *Wordly Wise Science & Social Studies* program (i.e., *Wordly Wise Science & Social Studies* Science Test and the *Wordly Wise Science & Social Studies* Social Studies Test). The *Wordly Wise Science & Social Studies* tests were used as the primary outcome measures of the study, as they directly measure the vocabulary that students learn in the program. The GMRT was used to answer the secondary question of this study: whether specialized vocabulary training affected general vocabulary, comprehension, and reading ability.

All grade 5 students were selected for the study. Within each class, the students were randomly assigned to treatment and control groups. The final sample for the study included 119 students in grade 5. A total of 59 (49%) students were randomly assigned to the treatment group and 60 (51%) to the control group. By the end of the study a total of 107 (90% of original sample) students remained in the study. They were divided relatively evenly (52 treatment and 55 control).

For the treatment group, teachers followed the requested guidelines for fidelity in *Wordly Wise Science & Social Studies*. Students used the program three times a week, for thirty minutes each session, over a period of three months (February to May). Across the study site, while treatment students were using *Wordly Wise Science & Social Studies*, teachers exposed the control students to a variety of activities. These activities were "business-as-usual" activities and included non-systematic instruction such as reading informational texts related to science and social studies content; adding notes to outlines designed around the approved science textbook; evaluating data from various activities and lab work; and reading independently chosen books.

RESULTS

There were three research questions that were examined in this study. One class of students included in the current study was identified as gifted by the school district. All analyses were conducted separately for gifted and general population students. This was done to examine whether the gains achieved by students vary by whether or not their district identified them as gifted.

Did general population students in the treatment group demonstrate significant learning gains in specific vocabulary knowledge and in their general reading ability?

Students from the general population achieved significant gains on both the Science and Social Studies *Wordly Wise Science & Social Studies* tests. On the GMRT they also achieved significant gains on the comprehension and overall reading ability components of the test. General population students did not achieve significant gains on the vocabulary component of the GMRT. This finding was not unexpected, since *Wordly Wise Science & Social Studies* is designed to teach students specialized vocabulary on science and social studies topics, which is quite different from the general vocabulary assessed by GMRT. Please note that out of 90 words that students at grade 5 are assessed on by the GMRT, none can be found in *Wordly Wise Science & Social Studies*.

Did gifted students in the treatment group demonstrate significant learning gains in specific vocabulary knowledge and their general reading ability?

Gifted students achieved significant gains on the *Wordly Wise Science & Social Studies* Social Studies test. Although these students achieved gains on the *Wordly Wise Science & Social Studies* Science test, these gains failed to reach statistical significance. On the GMRT, gifted students achieved significant gains on the comprehension and overall reading ability components of the test. Their gains on the vocabulary component of the GMRT did not achieve statistical significance.

How does the performance of gifted and general population students in the treatment group compare to the students in the control group?

For both gifted and general population students who used *Wordly Wise Science & Social Studies,* their gains on the *Wordly Wise Science & Social Studies* Science and Social Studies tests were significantly greater than those of students in the control group. There were no significant differences in the gains achieved by treatment or control students on any component of the GMRT, regardless of whether they were gifted or not.

CONCLUSION

The results of this study indicate that *Wordly Wise Science & Social Studies* is effective in providing specialized vocabulary instruction to students with a wide variety of abilities. In addition, we found that the gains achieved in terms of acquiring specific and specialized vocabulary do not transfer to increases in general vocabulary, comprehension, and overall reading ability. This study revealed that *Wordly Wise Science & Social Studies* is generally effective in increasing both gifted and general population students' knowledge of specific vocabulary and could complement classroom instruction on these topics.

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1. INTRODUCTION

The goal of this study was to determine the impact of *Wordly Wise Science & Social Studies*™ on students' knowledge of science and social studies vocabulary. In addition, we were interested in exploring the broader effects of specialized vocabulary instruction. The study was conducted during the 2011/2012 school year at J.R. Ingram Elementary School in Sanford, North Carolina. This report presents the evaluation design and methods, a description of the *Wordly Wise Science & Social Studies* program, an assessment of program implementation, student performance results, and a discussion of findings.

2. RESEARCH DESIGN

The purpose of this study was to evaluate the effectiveness of *Wordly Wise Science & Social Studies* in helping the general student population and gifted students attain critical science and social studies vocabulary. The study also explored whether specialized instruction would help students improve their general reading ability. The evaluation study employed a Randomized Controlled Trial (RCT) design with random assignment of students to treatment and control groups. Students were randomly selected to participate in an instruction employing either *Wordly Wise Science & Social Studies* or the materials teachers typically used with students (i.e., "business-as-usual" instruction). The study addressed the following overarching evaluation questions:

1. Did general population students in the treatment group demonstrate significant learning gains in specific vocabulary knowledge and general reading ability?
2. Did gifted students in the treatment group demonstrate significant learning gains in specific vocabulary knowledge and general reading ability?
3. How does the performance of gifted and general population students in the treatment group compare to the students in the control group?

2.1 METHODOLOGICAL APPROACH

J.R. Ingram Elementary School is in the small city of Sanford, North Carolina. All students in grade 5, including one gifted class, were pre-tested with the *Wordly Wise Science & Social Studies* Science Pretest, the *Wordly Wise Science & Social Studies* Social Studies Pretest, and the Gates MacGinitie Reading Test (GMRT). Within each classroom, the students were randomly assigned to either a treatment or control group. This ensured randomization of students at the classroom level.

3. METHOD

The study evaluated the efficacy of the *Wordly Wise Science & Social Studies* program in helping gifted and general population students improve their knowledge of science and social studies vocabulary, as well as exploring the broader effects of specialized vocabulary instruction. The program was implemented with groups of ten to twenty students. This section describes different study components, including measures, procedures, settings, and participants.

3.1 MEASURES

To evaluate the impact of using *Wordly Wise Science & Social Studies,* three measures were employed. This section describes these measures in detail. To directly assess the vocabulary words that students who used *Wordly Wise Science & Social Studies* studied, the Science and Social Studies tests that are integrated into the product were employed. To explore the potential impact of specialized vocabulary instruction on more general reading outcomes, the Gates-MacGinitie Reading Test (GMRT) was employed. Please note that there are no specialized vocabulary standardized tests and that for that reason, a general vocabulary test was selected. The test-retest coefficients for all three measures are summarized in Appendix A. All test-retest coefficients were 0.77 or higher, indicating that all outcome measures had satisfactory test-retest reliability.

3.1.1 *Wordly Wise Science & Social Studies* Science and Social Studies Pre-Test and Post-Test

The Science and Social Studies Pre-Test and Post-Test are both part of *Wordly Wise Science & Social Studies.* They were developed by EPS to test the specific vocabulary that students learn in the program. The pre-tests tests are designed to provide a baseline measure of students' vocabulary knowledge; the post-tests are designed to determine what students have learned after they have completed the lessons. The tests consist of fifty multiple-choice questions which evaluate a student's knowledge of the target vocabulary. Ten questions are provided for words from each of the program's five units, per subject per grade. Students receive one point for each correct response and no points for incorrect responses or skipped questions. Therefore, the maximum possible score a student can attain on either test is fifty points.

3.1.2 Gates MacGinitie Reading Test (GMRT)

The GMRT is a norm-referenced, group-administered multiple-choice reading test that can be administered to students from Kindergarten through grade 12. (It is published by Riverside Publishing.) For grades 3 and up, the GMRT consists of two sections: vocabulary and comprehension, whose scores are added to form a total score. For grade 2 students, the test consists of three components: word decoding, word knowledge, and comprehension. Students' scores on these three tests are also added to form a total reading score. The GMRT is widely used and well-recognized in the field. The test evaluates only general vocabulary, comprehension, and overall reading ability (MacGinitie, MacGinitie, Maria, & Dreyer, 2002). In fact, the test authors explicitly excluded any vocabulary words that require knowledge of specific content areas (e.g., science and social studies).

There are two versions of the paper-and-pencil test of equal length and difficulty. By administering different versions of the test in the winter and the spring, students' performance changes during the year can be determined. Raw scores are converted into a variety of scores: normal curve equivalents, national percentile rank, stanines, grade equivalents, and extended scale scores. These norm-referenced scores were derived from a stratified standardization sample of almost 60,000 students from around the United States in 2005/2006.

3.2 PROCEDURES

This section describes procedures followed for various study aspects, including site selection, data collection, teacher training, implementation, test administration, and scoring.

3.2.1 Site Selection

Specific site selection criteria were set up in order to guarantee a student population and settings that were required for the study. These are:

- Implementation of *Wordly Wise Science & Social Studies*
- Teachers' completion of implementation training
- Schools' commitment to implement *Wordly Wise Science & Social Studies* with fidelity: student uses the program three times a week for sessions of thirty minutes each
- Teacher comfort with random assignment of students to groups
- No other research studies occurring.

3.2.2 Study Timeframe

Table 1 presents the timeframe of teacher training and data collection activities. The study orientation was completed in December 2011, and January 2012. Students were administered the *Wordly Wise Science & Social Studies* Science, *Wordly Wise Science & Social Studies* Social Studies, and the GMRT pre-tests at the end of January. They were then randomly assigned to either the treatment or control group. Teachers completed the self-directed professional

development tutorial on how to use and implement *Wordly Wise Science & Social Studies*. Students used in *Wordly Wise Science & Social Studies* for approximately three months from late January/early February to early May. During this time the primary investigator of this study from EPS was available to answer any questions or concerns about the implementation of *Wordly Wise Science & Social Studies*. In early May, students completed alternate forms of the *Wordly Wise Science & Social Studies* Science, *Wordly Wise Science & Social Studies* Social Studies, and GMRT tests.

Table 1: Study Timeframe

Task and Activity	December	January	February	March	April	May
Study Orientation	√	√				
Administration of Pre-Test Student Measures		√				
Assignment of Students into Study Groups		√				
Teacher Training Begins		√				
Student Activity Begins		√	√	√	√	√
Administration of Post-Test Student Measures						√
End of Study						√

3.2.3 Implementation Fidelity

In order to ensure that *Wordly Wise Science & Social Studies* was implemented with fidelity, various implementation-monitoring procedures were used. First, all teachers were required to study the *Wordly Wise Science & Social Studies* documentation and to agree to implement the program three times a week for thirty minutes a session. Second, the primary investigator of this study was available to all teachers by telephone and e-mail to answer any questions about the implementation of the program. Finally, the automated online data collection system was used to confirm that the program had been implemented with the appropriate level of fidelity.

3.2.4 *Wordly Wise Science & Social Studies* Database and Automated Online Data Collection

Wordly Wise Science & Social Studies is an online instructional tool. The implementation fidelity is characterized by the extent to which students use the program. An automatic *Wordly Wise Science & Social Studies* data collection database measures various aspects of implementation. The most important of these are the number of sessions a student completes and the amount of time the student spends actively using the program. All of these indicators are saved every time a student logs in, and the total is updated with the completion of every task.

3.2.5 Implementation Guidelines

There are no strict guidelines concerning the intensity with which *Wordly Wise Science & Social Studies* should be implemented. This was done purposely so that educators, using their professional judgment, could determine how much time is necessary for their students to master the program material. However, EPS curriculum specialists recommend that students use *Wordly Wise Science & Social Studies* for thirty minutes a day three times a week. This level of implementation fidelity was requested from the teachers who participated in this study.

3.2.6 Teacher Training

Teachers participating in the study watched a *Wordly Wise Science & Social Studies* instructional video as a whole group. Components of the program and its implementation were discussed by the teachers as the video progressed. Questions that arose from the training session were passed on to the EPS specialists. The group reconvened to discuss the clarifying responses.

3.3 SETTING

The sample for the study attended J.R. Ingram Elementary School, part of the Lee County Schools district, located in Sanford, North Carolina. See Table 2 for information concerning the school. All the data, with the exception of the information concerning prior performance on state tests, comes from the National Center for Educational Statistics (U.S. Department of Education, 2012) and is from the 2010/2011 school year.[1] Information concerning the school's past performance on state assessments is from North Carolina's Department of Public Instruction, which oversees all public schools in the state and is for the 2011/2012 school year (North Carolina Department of Instruction, 2013).

Table 2: School Characteristics

Geographic Location and City Description	**Small City**
Total student enrolment	670
Percent qualified as low income (free/reduced lunch)	65%
Ethnic breakdown	
Asian	2%
African American	36%
Hispanic	18%
American Indian/Alaskan Native	0.9%
Multiracial	4%
White	39%
Past performance on state wide assessments	**No Recognition; Expected Growth Not Achieved**

The participating school has a high proportion of students who qualify as low income and a highly diverse student body (see Table 2). The school also struggled in their performance on state-wide assessments administered the previous school year.

[1] This was the most recent data available from this organization at the time this report was prepared.

3.4 PARTICIPANTS

The initial sample for the study consisted of 119 students in grade 5. Of those 119 students, 59 and 60 were randomly assigned to the treatment and control groups, respectively. These students were instructed by the five grade 5 teachers in the school. For a variety of reasons, the final analytic sample consisted of 107 students (90% of original sample). Of those 107 students, 55 and 59 were from the treatment and control groups, respectively.

3.4.1 Teacher Participants

All five fifth grade teachers from J.R. Ingram Elementary School participated in the study. Of the 5 teachers, 3 hold Master's degrees and 2 hold Bachelors' degrees. In addition, 2 of the teachers hold National Board Certification. These educators have been teaching for a range of 2.5 to 23 years. They have been working at their current school for a range of 2 to 16 years.

3.4.2 Student Participants

As described above, the final analytic sample for this study consisted of 107 students, with 55 who used *Wordly Wise Science & Social Studies* and 59 who served as controls. All of these students had a pre-test and post-test on either the *Wordly Wise Science & Social Studies* Science or *Wordly Wise Science & Social Studies* Social Studies tests. These criteria ensured that all students including control students had data on at least one primary outcome measure and showed they were involved until the end of the project.

Demographics

Table 3 presents demographic information for students in the treatment and control conditions.

Table 3: Demographic characteristics of students who participated in efficacy study

	Treatment Students (*n*=59)		Control Students (*n*=60)		Total Students (*n*=119)		Chi-Square Results	
Characteristics	Percent	N	Percent	N	Percent	N	Value	Sig.
Gender								
Female	44	24	57	30	45	54		
Male	54	35	46	30	55	65	x^2=1.04	0.31
Ethnicity								
African American	48	25	52	27	44	52		
Hispanic	64	7	36	4	9	11		
White	50	25	50	25	42	50		
Other	33	2	67	4	5	6	x^2=1.55	0.70
Limited English Proficiency (LEP)								
LEP	50	1	50	1	2	2		
non-LEP	50	58	50	59	98	117	x^2=0.00	1.00
Exceptional Children Program (EC)								
EC	47	9	53	10	16	19		
non-EC	50	50	50	50	84	100	x^2=0.04	0.83
Academically/Intellectually Gifted (AIG)								
AIG	52	14	48	13	23	27		
non-AIG	49	45	51	47	77	92	x^2=0.07	0.79

Free or Reduced lunch status was not available at the individual student level; however 65% of the school was eligible for the Free or Reduced Lunch Program.

Attrition

Analyses were conducted to examine the overall sample attrition (the number of participants who did not complete the study for any reason). As indicated earlier, the initial sample comprised 59 treatment and 60 control students. The final analytic sample comprised of 55 treatment and 59 control students. Treatment students were omitted from analyses if they did not spend any or very little time (i.e., less than one hour) using *Wordly Wise Science & Social Studies* or if they were missing test data. Control students were excluded from all further analyses if they did not have any pre-test and post-test data on either the *Wordly Wise Science & Social Studies* Science or *Wordly Wise Science & Social Studies* Social Studies tests. The overall attrition rate was 7% for the treatment group and 2% for the control group. A Fisher exact test revealed that attrition was not significantly ($p = .90$) related to group assignment.

Pre-Test Equivalence

Although student improvement was demonstrated through the use of gain scores throughout this study, the treatment and control group should be equivalent on all outcome measures at the outset of the study. Table 4 displays treatment and control students' pre-test scores on all outcomes for the current study.

Table 4: Pre-Test Performance by Group

	Treatment			Control					
Measure	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**t**	**df**	**p-value**
General									
WWS&SS Science	37	28.38	7.26	43	26.65	7.58	-1.04	78	0.30
WWS&SS Social Studies	38	23.32	6.35	42	21.07	6.78	-1.52	78	0.13
GMRT Vocabulary	38	5.51	1.89	42	4.94	1.91	-1.34	78	0.19
GMRT Comprehension	38	4.33	1.87	42	3.96	1.51	-0.99	78	0.33
GMRT Total	38	4.74	1.57	42	4.32	1.47	-1.24	78	0.22
Gifted									
WWS&SS Science	14	38.00	2.25	12	40.42	2.23	2.74	24	0.01*
WWS&SS Social Studies	14	32.50	7.03	12	35.42	5.35	1.17	24	0.25
GMRT Vocabulary	14	8.64	2.43	12	10.44	2.30	1.93	24	0.07
GMRT Comprehension	14	8.46	3.54	12	10.43	2.00	1.77	24	0.09
GMRT Total	14	8.05	2.58	12	9.93	2.09	2.02	24	0.05

WWS&SS = *Wordly Wise Science & Social Studies* * $p < .05$

Note. When the assumption of equal variance between groups was violated, adjusted *p*-values are reported but design degrees of freedom are reported for simplicity.

As expected, based on the large number of general population students randomly assigned to either the treatment or control group, there were no statistically significant (all $p > .05$) differences on any of the outcome measures at the start of the study (see Table 4). Gifted students assigned to the treatment group had significantly lower *Wordly Wise Science & Social Studies* Science pre-test scores ($p < .05$) than gifted students assigned to the control group. The difference in pre-test performance approached significance (i.e., $p < .10$) for all but one of the other outcome measures. These pre-test differences are most likely attributable to the small number of gifted students included in the current study. With an insufficient number of students, random assignment sometimes fails to achieve groups that perform equally at the onset of a study. Concerns raised by the variance in student performance at the start of the study are mitigated by the fact that all analyses are conducted on gain scores.

4. PROGRAM DESCRIPTION

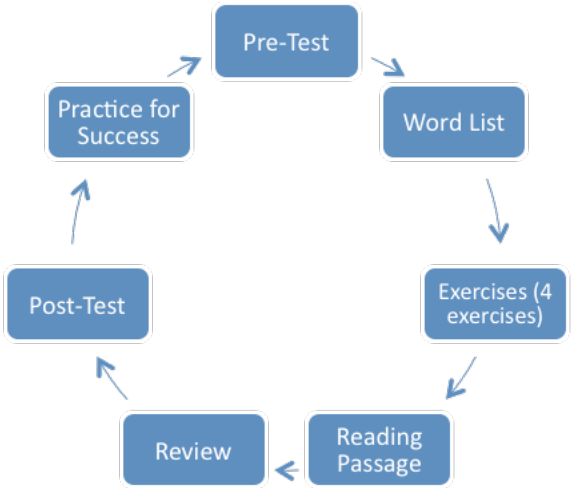
Wordly Wise Science & Social Studies is an online instructional tool designed to help students of all proficiency levels improve their knowledge and understanding of specialized science and social studies vocabulary. The program is published by EPS and is aligned with the Common Core State Standards. The program is designed for students in grades 4 to 8.

At each grade level, five topics in science and five topics in social studies are covered, resulting in ten topics covered per grade level. Students learn grade-level appropriate specialized vocabulary concerning the science or social studies topic they are studying. Audio helps all students master the pronunciation and meaning of the vocabulary words.

Struggling readers are also helped by the fact that the grade-level vocabulary is presented in context that is two grades below their nominal grade. Students are also provided immediate feedback that guides them to the correct answer; remediation activities to help them master words; and word-by-word audio support.

For each of the ten topics, there are ten grade-level content words. Each lesson follows a consistent format with each activity occurring in the same sequence at all levels of the program. In Figure 1, the sequence of activities for each lesson is summarized.

Figure 1: Sequence of Tasks for Each Lesson in *Wordly Wise Science & Social Studies*.



The following describes each component of a *Wordly Wise Science & Social Studies* lesson.

- **Pre-Test**: Prior to starting any *Wordly Wise Science & Social Studies* lesson, students' current knowledge of the ten vocabulary words is assessed. Students answer ten multiple-choice questions that assess whether they know each vocabulary word. The pre-test in conjunction with the post-test give educators the opportunity to assess students' mastery of content vocabulary after each lesson.
- **Word List**: Students are presented with the ten vocabulary words in a virtual word card format. On each card the word is defined, it's part of speech is identified, and a sample sentence using the word in context is given. After studying this information, students "flip" the card and get a quick-check question that tests their knowledge of the word meaning.
- **Exercises**: To advance in the lesson, students must complete four exercises. The exercises may be completed in any order, but they must all be finished to advance in the lesson. The exercises provide students with multiple encounters and an opportunity to apply the information they learned in the word list to achieve mastery.
    - **Get It Together**: Students combine phrases or sentence fragments to form sentences that include the target vocabulary word.
    - **Say What You Mean**: Students are presented with sentences that contain an awkward definitional phrase for a meaning best expressed by a lesson word. They must replace the phrase with the correct word.
    - **It's Your Choice**: Students answer multiple-choice questions concerning the lesson words.
    - **Word Smarts**: A word study exercise that focuses on either word parts (e.g., Greek/Latin roots, prefixes, suffixes) or synonyms/antonyms.

- **Reading Passage**: Students are presented with a nonfiction passage that uses all the lesson words in context. Although the lesson words are on grade level, the contextual text is written at a readability level two grades lower. After reading the passage, students answer a series of cloze questions about the passage using the lesson words in their answers.
- **Puzzle It Out (Review)**: Students complete a crossword puzzle which reviews all the lesson words.
- **Post-Test**: The post-test is structured exactly like the pre-test. Students are presented with ten new multiple-choice questions that test their understanding of the target vocabulary. This test allows educators to evaluate the level of mastery students have achieved and their gains since the pre-test.
- **Practice for Success**: If a student answers a post-test question incorrectly, the student must review the lesson word associated with that question. There are three screens that make up Practice for Success. First, students review the definition of the word and read it in a new context sentence. Second, students complete a review activity—often visually enhanced—that reinforces the meaning. Finally, students are presented a new quick-check question which must be answered correctly before completing the lesson.

These steps and activities form a complete *Wordly Wise Science & Social Studies* lesson and are repeated for all ten topics that are available at each grade level.

5. PROGRAM IMPLEMENTATION

This section provides details on the extent to which treatment students used *Wordly Wise Science & Social Studies*. Information concerning the tasks and activities that control students completed during this time is also described.

5.1 *WORDLY WISE SCIENCE & SOCIAL STUDIES* IMPLEMENTATION

As described in Section 3.2.5, students were required to use *Wordly Wise Science & Social Studies* three times a week for thirty minutes each day for a total of ninety minutes per week. Therefore, the implementation fidelity is characterized by the extent to which students used the program (Table 5). One of the features of *Wordly Wise Science & Social Studies* is the automatic online recording of these fidelity measures within the database. This allowed for the examination of quantitative indices of the extent that *Wordly Wise Science & Social Studies* was used by the students.

Two primary indicators of fidelity were chosen for this study. First, the average number of sessions that students logged into the program every week was calculated. Second, the average amount of time per week that students used the program was examined. If students used the program with perfect fidelity we would expect them to log in on average three times per week and spend ninety minutes per week using the program.

As displayed in Table 5, students in the treatment group logged into the program for an average of two times per week and spent an average of eighty minutes on the program.

Table 5: *Wordly Wise Science & Social Studies* Fidelity Measures by Group

Group	N	Average Sessions Per Week	Average Time on Program Per Week	Fidelity (Session per Week)	Fidelity (Average Time per Week)
General	38	1.93	86.01	64%	96%
Gifted	14	1.96	63.17	65%	70%
Overall	**52**	**1.94**	**79.86**	**65%**	**89%**

Although in general, students only logged into the program twice per week, they appear to have spent a substantial amount of time using the program during those sessions. Specifically, for the entire group implementation, fidelity as measured by average time spent in the program per week was quite high (89%; see Table 5). Two independent t-tests were conducted to examine whether the differences in fidelity for the groups achieved statistical significance. There was no difference in the average number of sessions gifted or control students completed on a weekly basis, $t(50) = -0.22$, $p = .88$. In contrast, gifted students spent significantly less time using the program per week than students from the general population, $t(50) = 2.98$, $p = .004$. This difference between the two groups is not surprising, as gifted students were more likely to complete the lessons more quickly than students from the general population, as they can likely read and respond faster.

5.2 COMPARISON PROGRAM

During the study, students in the control group worked on various assignments and activities related to the typical study of science and social studies. These assignments included reading passages from the district-approved science textbook and from related informational texts. Students completed fill-in-the-blank study guides and worksheets. Additional activities included creating diagrams and drawings based on recent labs, answering questions related to whole-class videos, and reading silently in self-selected fiction and nonfiction books.

6. STUDENT PERFORMANCE RESULTS

In order to address the study questions pertaining to student performance appropriately, various analyses were conducted. First, for all analyses, descriptive statistics were calculated. Second, appropriate inferential analyses were conducted to answer the study questions. To determine whether gifted and general population students who used *Wordly Wise Science & Social Studies* achieved significant gains, paired t-tests were conducted on those students' pre-test and post-test scores on all outcome measures. To compare treatment and control students' learning outcomes, their gains were submitted to independent t-tests.

6.1 *WORDLY WISE SCIENCE & SOCIAL STUDIES'S* IMPACT ON LEARNING

This section presents the learning gains of students who used the *Wordly Wise Science & Social Studies* program in the 2011/2012 school year. Results are presented for student performance on both the primary (i.e., *Wordly Wise Science & Social Studies* Science and Social Studies test) and secondary outcome measure (i.e., GMRT). All analyses were conducted with general population and gifted students.[2]

[2]All effect sizes reported in this section of the report are Cohen's d. The average standard deviation was used as the denominator in calculating the effect size. The effect size estimate was also corrected for dependency based on Morris and DeShon's (2002) equation eight.

Question 1

Did general population students in the treatment group demonstrate significant learning gains in their vocabulary knowledge and their general reading ability?

The gains achieved by general population students were investigated. Both their performance on the *Wordly Wise Science & Social Studies* tests and the GMRT were examined.

6.1.1 General Population Students' Gains on the *WORDLY WISE SCIENCE & SOCIAL STUDIES* Science and Social Studies Tests

To establish whether general population students achieved significant gains on the *Wordly Wise Science & Social Studies* Science and Social Studies tests, their pre-test and post-test scores were submitted to paired t-tests. On average,

general population students achieved statistically significant gains of 6.81 points on the Social Studies test and 2.67 points on the Science test. The results of these analyses are summarized in Table 6, below.

Table 6: Mean Gains for General Population Students on the *Wordly Wise Science & Social Studies* Science and Social Studies Tests

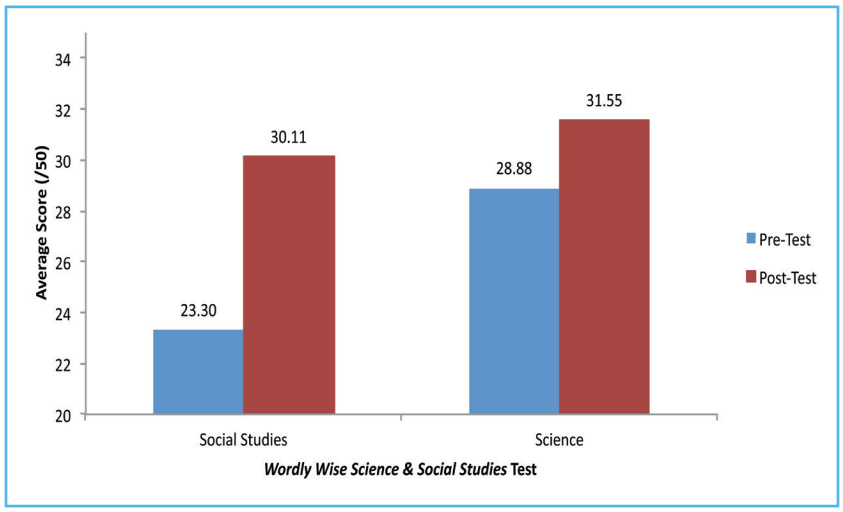
***Wordly Wise Science & Social Studies* Test**	**Gains (Mean)**	**Standard Error**	**t-value**	**df**	**p-value**	**d**
Social Studies	6.81	1.00	6.80	36	<0.01*	1.17
Science	2.67	1.32	2.00	32	0.05*	0.40

* $p \leq .05$

As can be seen in Table 6, general population students' gains on both *Wordly Wise Science & Social Studies* tests were in the expected direction and achieved statistical significance. Based on both the magnitude of the gains and the reported effect sizes, their gains on the Social Studies tests were particularly large.

Students pre-test and post-test scores on the *Wordly Wise Science & Social Studies* tests are summarized in Figure 2, below.

Figure 2: General Population Students' Pre-Test and Post-Test Scores on *Wordly Wise Science & Social Studies* Tests



An interesting pattern observed was the fact that students' Science pre-test scores were substantially higher than their Social Studies pre-test scores (see Figure 2). It is unclear what impact this difference in pre-test scores has on the gains that students achieve after using *Wordly Wise Science & Social Studies*. It may be the case that smaller gains were observed in Science due to the relatively higher performance of students in this subject at the beginning of the study, leaving less room for improvement.

6.1.2 General Population Students' Gains on the GMRT Reading Test

A secondary outcome measure used in the current study to assess the impact of using *Wordly Wise Science & Social Studies* was the GMRT. This measure was secondary, as it assesses students' general vocabulary, comprehension, and overall reading ability (MacGinitie et al., 2002). As *Wordly Wise Science & Social Studies* is a content-specific instructional tool, it was unclear whether students' gains on specialized vocabulary would generalize to general reading ability.

General population students' pre-test and post-test GE scores were submitted to paired t-tests to examine whether their gains were statistically significant.

The results of these analyses are summarized in Table 7.

Table 7: Mean Gains for General Population Students on the GMRT Reading Test

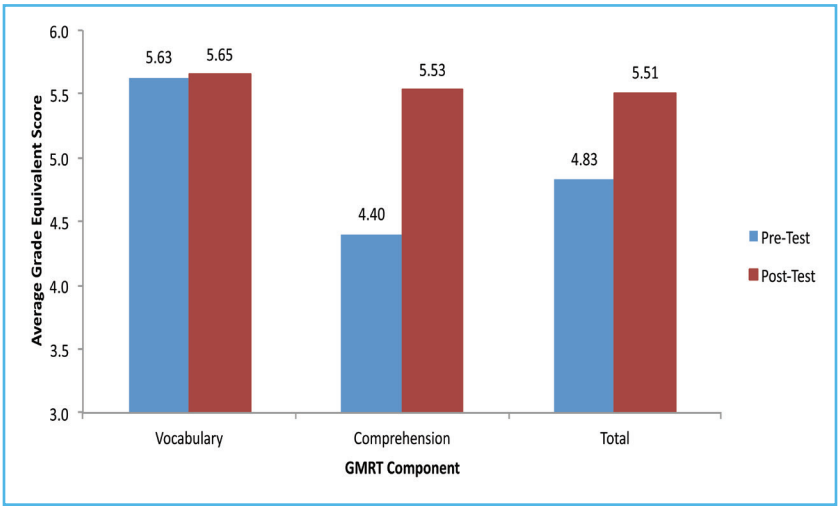
GMRT Component	Gains (Mean)	Standard Error	t-value	df	p-value	d
Vocabulary	0.02	0.18	0.09	34	0.93	0.02
Comprehension	1.13	0.34	3.36	34	<0.01*	0.58
Total	0.69	0.23	2.97	34	<0.01*	0.51

* $p \leq .05$

General population students achieved significant gains in terms of their comprehension and overall reading ability as indexed by the GMRT. As can be seen in Table 7, general population students did not achieve any gains in vocabulary as indexed by the GMRT. Although this may seem contradictory in that *Wordly Wise Science & Social Studies* is designed to teach vocabulary, these results are not necessarily surprising. This is due to the fact that the authors of GMRT specifically avoided testing students in specialized vocabulary (MacGinitie et al., 2002) and *Wordly Wise Science & Social Studies* is designed to teach students highly specialized science and social studies vocabulary.

Average pre-test and post-test GE scores on the GMRT components are summarized in Figure 3.

Figure 3: General Population Students' Average GE Scores on the GMRT



An interesting pattern emerged when average GMRT pre-test and post-test scores were examined (Figure 3). At the start of the study, general population students' comprehension and overall reading abilities scored lower than their actual grade levels. In contrast, their average vocabulary abilities at the start of the study scored above their grade levels. It is unclear based on the available data what impact this may have had on the gains these students achieved.

6.1.3 Summary of General Population Student Gains

Overall, the results of this section were positive. Students from the general population achieved significant gains on the *Wordly Wise Science & Social Studies* Science and Social Studies tests. Furthermore, they achieved significant gains on the comprehension and overall reading ability as indexed by the GMRT. The only outcome measure on which they did not achieve significant gains was the GMRT Vocabulary index. As discussed in detail above, this result was not surprising, as the GMRT Vocabulary section evaluates general, not specialized, vocabulary knowledge.

Question 2
Did gifted students in the treatment group demonstrate significant learning gains in their vocabulary knowledge and their general reading ability?

As indicated previously, some students involved in this study were identified as being gifted by their school district. The learning gains of these students were analyzed separately from those of students from the general population. The results of these gifted students' gains are the focus of the current section.

6.1.4 Gifted Students' Gains on the *Wordly Wise Science & Social Studies* Science and Social Studies Tests

Recall that the primary outcome measure in the current study were the *Wordly Wise Science & Social Studies* Science and Social Studies tests. To establish whether gifted students achieved significant gains on these tests, their pre-test and post-test scores were submitted to a paired t-test. On average, gifted students achieved statistically significant gains of 7.07 points on the Social Studies test. Their gains on the Science test were more modest at 3.07 points and failed to achieve statistical significance. The results of these analyses are summarized in Table 8, below.

Table 8: Mean Gains for Gifted Students on the *Wordly Wise Science & Social Studies* Science and Social Studies Tests

Wordly Wise Science & Social Studies Test	Gains (Mean)	Standard Error	t-value	df	p-value	d
Social Studies	7.07	1.81	3.90	13	<0.01*	1.07
Science	3.07	2.05	1.50	13	0.16	0.53

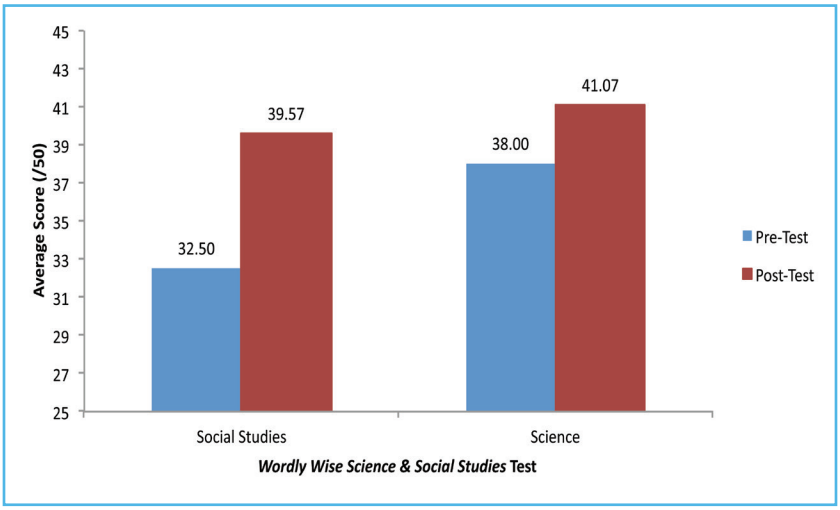
* $p \leq .05$

Based on effect size, gifted students achieved large and significant gains in social studies (see Table 8). In contrast, their gains in science, although moderate based on the effect size, did not quite achieve traditional significance. This is most likely due to the small number of gifted students who participated in this study. In statistics, if a sample size is small, a relatively larger effect is required to achieve statistical significance than if the sample were larger.

Gifted students' pre-test and post-test scores on the *Wordly Wise Science & Social Studies* Science and Social Studies tests are summarized in Figure 4.

It is interesting to note that gifted students scored substantially higher on the *Wordly Wise Science & Social Studies* Science pre-test than on the *Wordly Wise Science & Social Studies* Social Studies pre-test (see Figure 4). The same pattern was also observed with general population students (see Figure 2). This finding may also help explain why the gains in Science were not as large as those the students achieved in Social Studies. They had more room to improve in social studies than in science vocabulary knowledge.

Figure 4: Gifted Students' Pre-Test and Post-Test Scores on *Wordly Wise Science & Social Studies* Tests After Using *Wordly Wise Science & Social Studies*



6.1.5 Gifted Students Gains on the GMRT Reading Test

To determine whether gifted students achieved significant gains on the GMRT, their pre-test and post-test grade equivalent (GE) scores were submitted to paired t-tests.

The results of these tests are summarized in Table 9.

Table 9: Mean Gains for Gifted Students on the GMRT Reading Test

GMRT Component	Gains (Mean)	Standard Error	t-value	df	p-value	d
Vocabulary	1.06	0.73	1.41	13	0.18	0.39
Comprehension	1.26	0.58	2.15	13	0.05*	0.59
Total	1.38	0.41	3.36	13	<0.01*	0.93

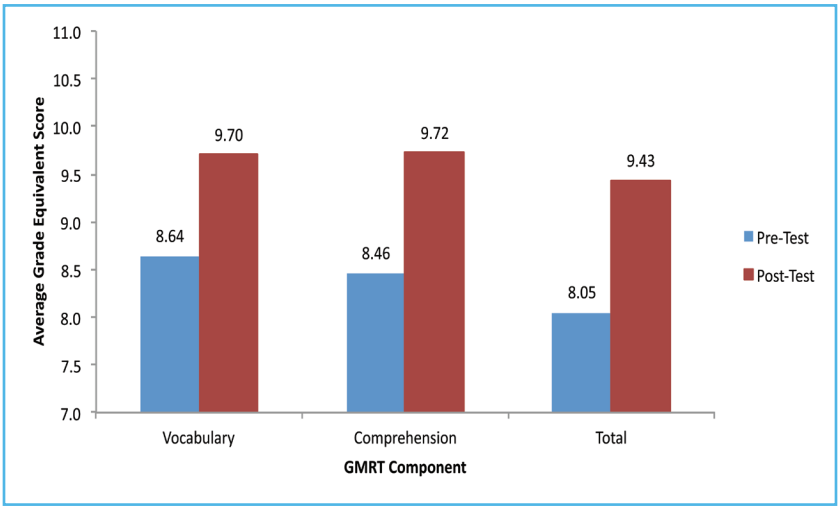
* $p \leq .05$

As can be seen in Table 9, the results of these analyses were mixed. First, in a short period of time, gifted students' average comprehension abilities increased by slightly more than one GE. Although this gain failed to achieve statistical significance, the effect size was indicative of a small to moderate gain. The reason that a gain of over a full grade level failed to achieve statistical significance is most likely attributable to the small sample of gifted students included in the current study. This made the analyses overly conservative.

Even with the small sample size, gifted students' average comprehension and overall reading ability as indexed by the GMRT did improve significantly. The effect sizes indicate that the effect was moderate to large.

Students' average pre-test and post-test GE scores on the GMRT are summarized in Figure 5, below.

Figure 5: Gifted Students' Average GE Scores on the GMRT



As can be seen in Figure 5, the average reading performance of gifted students based on the GMRT was quite high at the start of the study. For all three components of the test, they had average GE scores of eight or more, even though they were only enrolled in grade five.

6.1.6 Summary of Gifted Student Gains

Overall, the results of the analyses on gifted students were mixed. Gains on all measures were in the expected direction. However, only gifted students' gains on the *Wordly Wise Science & Social Studies* Social Studies, GMRT Comprehension, and GMRT Total achieved statistical significance. The lack of gains on the *Wordly Wise Science & Social Studies* Science test was surprising, but may have been due to students' high scores on the test at the start of the intervention. This left little room for improvement on this measure. The lack of significant gains on the vocabulary component of the GMRT is most likely attributable to the small number of gifted students included in this study. This led to overly conservative statistical analyses. Furthermore, the GMRT Vocabulary section is designed to examine general vocabulary (MacGinitie et al., 2002), not specialized vocabulary, which is what students learn when using *Wordly Wise Science & Social Studies*.

6.2 STUDENT LEARNING COMPARISON

This section of the report presents analyses to examine differences between the performance of treatment and control students on the *Wordly Wise Science & Social Studies* Social Studies test, *Wordly Wise Science & Social Studies* Science test, and the GRMT. The purpose is to determine whether using *Wordly Wise Science & Social Studies* resulted in significantly higher performance on these measures than students who continued "business-as-usual" classroom instruction. To examine differences in performance between the two groups, gain scores were calculated and compared using independent t-tests. Average pre-test and post-test scores on all outcome measures for both treatment and control students are summarized in Appendix B.

Question 3
How does the performance of gifted and general population students in the treatment groups compare to that of students in the control group?

6.2.1 General Population Student Learning Comparison

Wordly Wise Science & Social Studies Science and Social Studies Tests

The gains scores from the *Wordly Wise Science & Social Studies* Science and Social Studies tests for general population control and treatment students were compared.

The results of these analyses are summarized in Table 10 and Figure 6.

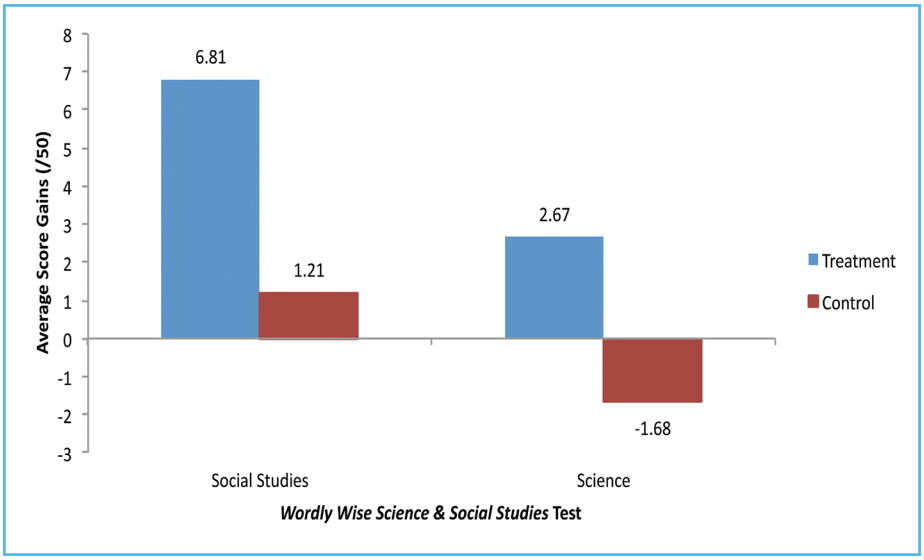
Table 10: *Wordly Wise Science & Social Studies* Science and Social Studies Test Gains by Condition for General Population Students

Wordly Wise Science & Social Studies Test	Treatment Gains	Control Gains	Difference	t	df	p-value	d
Social Studies	6.81	1.21	5.61	-4.75	74	<0.01*	1.10
Science	2.67	-1.68	4.35	-2.83	72	<0.01*	0.68

* $p \leq .05$

Students in the treatment group achieved significantly greater gains on both the *Wordly Wise Science & Social Studies* Social Studies test and the *Wordly Wise Science & Social Studies* Science test than students in the control group (Table 10). The effect sizes indicated that the effect of using *Wordly Wise Science & Social Studies* was moderate to large.

Figure 6: Average General Population Students' Gains on the *Wordly Wise Science & Social Studies* Science and Social Studies Tests by Condition



GMRT

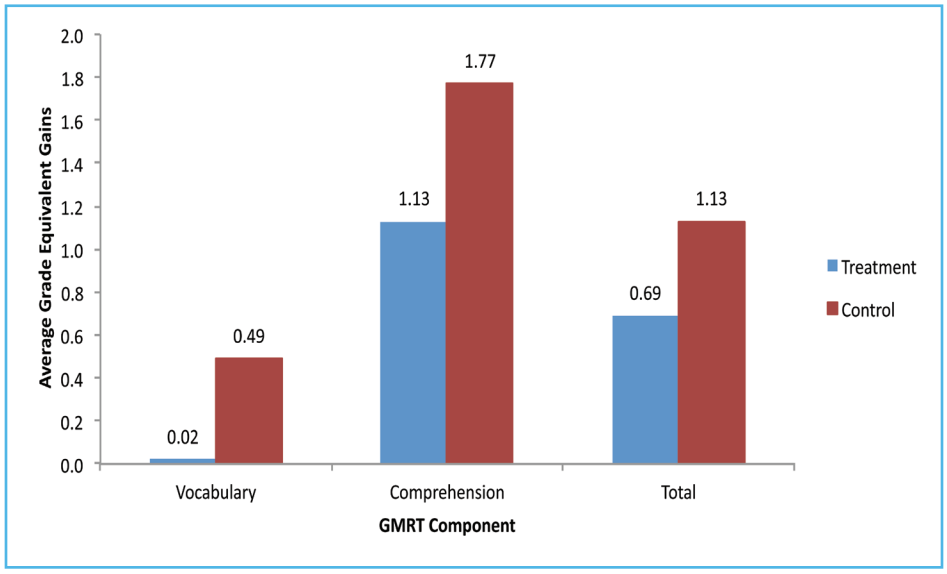
The gain scores from the GMRT for the general population treatment and control students were calculated and compared using independent t-tests. The results of these analyses are summarized in Table 11 and Figure 7.

Table 11: GMRT Gains by Condition for General Population Students

GMRT Component	Treatment Gains	Control Gains	Difference	t	df	p-value	d
Vocabulary	0.02	0.49	0.47	1.47	71	0.15	0.35
Comprehension	1.13	1.77	0.64	1.49	71	0.14	0.35
Total	**0.69**	**1.13**	**0.45**	**1.50**	**71**	**0.14**	**0.35**

* $p \leq .05$

Figure 7: Average General Population Students' Gains on the GMRT by Condition



The gains achieved by treatment and control students did not significantly differ on any component of the GMRT. These results were not surprising as the GMRT is designed to evaluate general vocabulary, comprehension, and overall reading ability. *Wordly Wise Science & Social Studies* is designed to instruct students in specialized vocabulary. It is not designed to improve general reading ability. Therefore, a lack of significant gain differences between the two groups is not surprising.

Summary of General Population Student Learning Comparison

Overall, the results of the analyses with general population students were positive. General population students in the treatment group achieved significantly greater gains than control students on the *Wordly Wise Science & Social Studies* Science and Social Studies tests. As expected, based on the design of *Wordly Wise Science & Social Studies,* these gains did not generalize to more general vocabulary, comprehension, and overall reading ability as indexed by the GMRT.

6.2.1 Gifted Student Learning Comparison

Wordly Wise Science & Social Studies Science and Social Studies Tests

The gain scores from the *Wordly Wise Science & Social Studies* Science and Social Studies tests for gifted treatment and control students were compared. The results of these analyses are summarized in Table 12 and Figure 8.

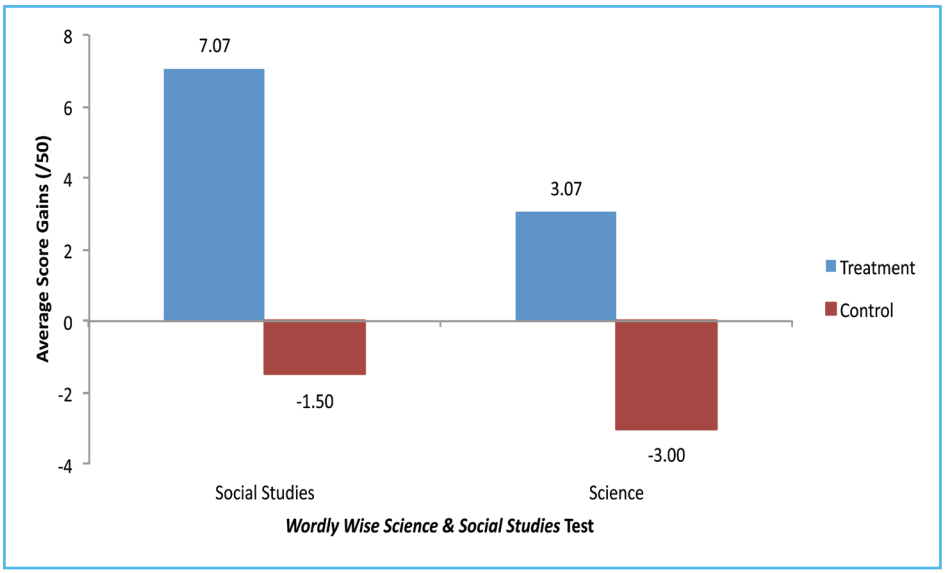
Table 12: *Wordly Wise Science & Social Studies* Social Studies and Science Test Gains by Condition for Gifted Students

Wordly Wise Science & Social Studies Test	Treatment Gains	Control Gains	Difference	t	df	p-value	d
Social Studies	7.07	-1.50	8.57	-4.00	24	<0.01*	1.61
Science	3.07	-3.00	6.07	-2.28	24	0.03*	0.91

* $p \leq .05$

The gains achieved on both *Wordly Wise Science & Social Studies* tests by the treatment group were significantly greater than those achieved by the control group (Table 12). The effect sizes indicate that the magnitude of this difference was large.

Figure 8: Average Gifted Students' Gains on the *Wordly Wise Science & Social Studies* Social Studies and Science Tests



GMRT

The gain scores from the GMRT for gifted treatment and control students were calculated and compared using independent t-tests. The results of these analyses are summarized in Table 13 and Figure 9.

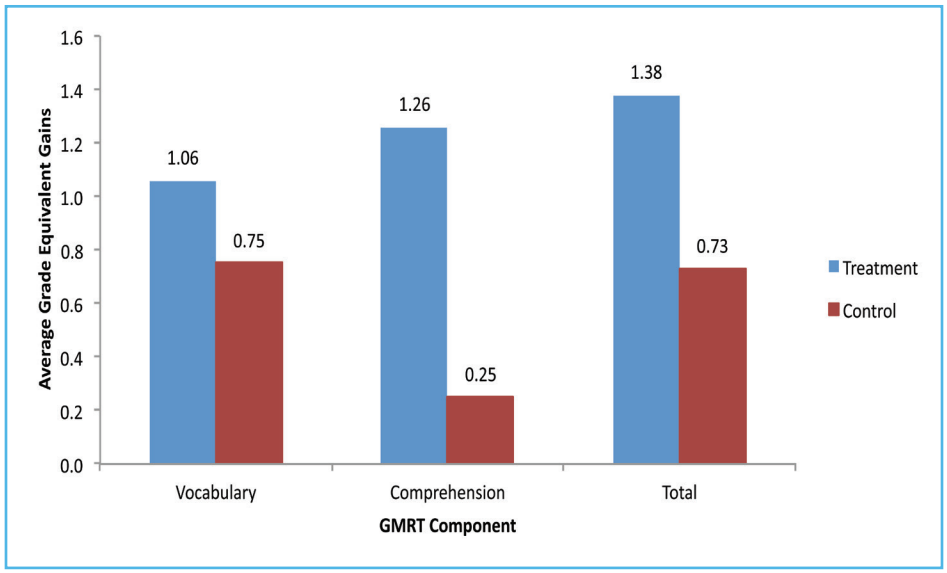
Table 13: GMRT Gains by Condition for Gifted Students

GMRT Component	Treatment Gains	Control Gains	Difference	t	df	p-value	d
Vocabulary	1.06	0.75	0.30	-0.30	23	0.76	0.13
Comprehension	1.26	0.25	1.01	-1.10	23	0.28	0.44
Total	**1.38**	**0.73**	**0.65**	**-1.02**	**23**	**0.32**	**0.41**

* $p \leq .05$

Treatment students made greater gains on all components of the GMRT than control students (Table 13). However, none of these gains reached statistical significance. The reason for this was the large amount of variability in gains among students in each group. This variability is most likely attributable to the fact that *Wordly Wise Science & Social Studies* is not designed to improve general vocabulary, comprehension, and overall reading ability, which the GMRT measures.

Figure 9: Average Grade Equivalent Gains on GMRT by Condition for Gifted Students



Summary of Gifted Student Learning Comparison

Overall, the results of the analyses with gifted students were positive. Treatment students achieved significantly greater gains on the *Wordly Wise Science & Social Studies* Science and Social Studies tests than students in the control group. Although there was a trend for treatment students to achieve greater gains than control students on all components of the GMRT, the difference never achieved statistical significance. As discussed previously, this finding was not surprising due to the nature of the specialized vocabulary taught in *Wordly Wise Science & Social Studies*.

6.3 EFFECT OF PROGRAM COMPLETION ON GAINS

A secondary question that was explored in the current report was the effect of program completion on the gains treatment students achieved. The reason for conducting these analyses was that not all students in the treatment group completed *Wordly Wise Science & Social Studies* in its entirety, since they started working on a new lesson each week regardless of whether or not they completed the previous lesson. Although this is a realistic situation in a school setting, this meant that some students in the treatment group were tested on topics in the *Wordly Wise Science & Social Studies* Science and Social Studies tests that they never studied. Thus, the results in the previous section may underestimate the true impact that *Wordly Wise Science & Social Studies* has on student achievement.

To accomplish this goal, only treatment students' who completed 90% of *Wordly Wise Science & Social Studies* were included in this portion of the report.[3] Average pre-test and post-test scores on all outcome measures for the treatment students who completed 90% of the program or more are presented in Appendix C.

[3] A completion rate of 90% was chosen due to the fact that restricting analyses to students who completed all the components of Wordly Wise Science & Social Studies resulted in the exclusion of too many students from these analyses. Specifically, only 54% of the original treatment students would have been included in the analyses. By specifying a 90% cut-off, 73% of the original sample was retained.

6.3.1 Treatment Student Gains

The pre-test and post-test scores of treatment students on all outcome measures were submitted to paired t-tests to determine if they achieved gains. As was the case in the previous section, students were examined separately based on whether they were identified as gifted or came from the general student population.

The results of these analyses are summarized in Table 14.

Table 14: Gifted and General Population Treatment Student Gains on All Outcome Measures

Student Group/Test	Gains (Mean)	n	Standard Error	t-value	df	p-value	d
General Population							
WWS&SS Social Studies	8.70	27	0.92	9.43	26	<0.01*	1.82
WWS&SS Science	4.28	25	1.20	3.57	24	<0.01*	0.84
GMRT Vocabulary	0.06	26	0.23	0.29	25	0.77	0.06
GMRT Comprehension	1.31	26	0.42	3.10	25	0.01*	0.64
GMRT Total	0.83	26	0.29	2.86	25	0.01*	0.58
Gifted							
WWS&SS Social Studies	8.23	13	1.51	5.46	12	<0.01*	1.89
WWS&SS Science	5.00	13	0.73	6.81	12	<0.01*	2.13
GMRT Vocabulary	1.43	13	0.70	2.03	12	0.07	0.60
GMRT Comprehension	1.22	13	0.63	1.94	12	0.08	0.55
GMRT Total	1.46	13	0.43	3.37	12	0.01*	0.96

WWS&SS = *Wordly Wise Science & Social Studies* * $p \leq .05$

The results of these analyses largely paralleled those conducted above that included all treatment students, regardless of their program completion rate. The only major change was that gifted students who completed 90% or more of the program now achieved significant gains on the *Wordly Wise Science & Social Studies* Science test (Table 14). As expected, the gains of the treatment students who completed 90% or more of *Wordly Wise Science & Social Studies* had gains on the *Wordly Wise Science & Social Studies* tests that were larger than when all students were examined.

The gains of all students and those students who completed 90% of the program or more are summarized in Figures 10 and 11.

As can be seen in Figure 10, students who completed 90% or more of *Wordly Wise Science & Social Studies,* be they gifted or general population students, achieved modestly greater gains on the *Wordly Wise Science & Social Studies* tests. Note that the difference between these gains cannot be compared statistically because the data from the same students can be in both groups. An examination of Figure 11 indicates that *Wordly Wise Science & Social Studies* program completion had little effect on student gains on the GMRT. This finding is not surprising given the lack of impact observed on GMRT gains based on whether a student was in the treatment or control group.

Figure 10: General Population and Gifted Treatment Students' Average *Wordly Wise Science & Social Studies* Test Gains as a Function of Program Completion

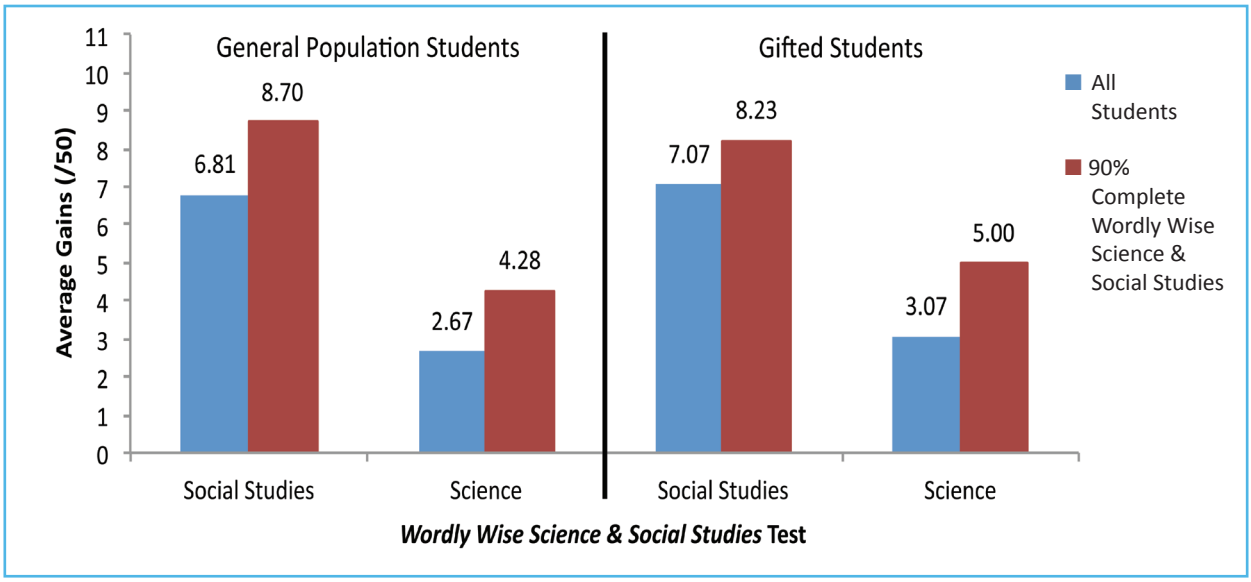
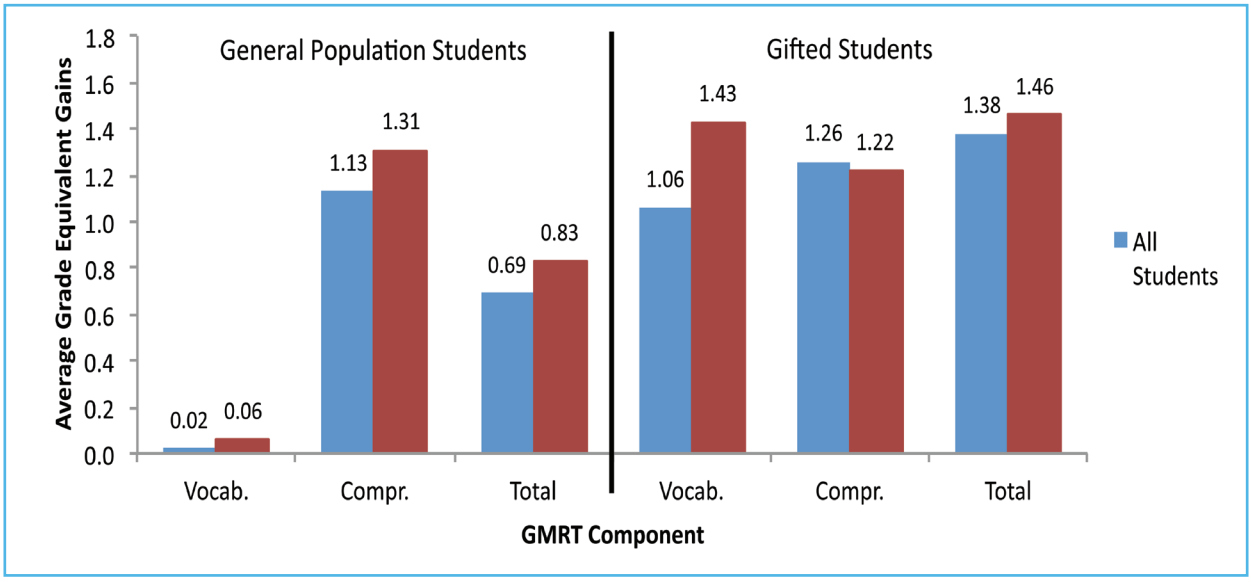


Figure 11: General Population and Gifted Treatment Students' Average GMRT Gains as a Function of Program Completion



6.3.2 Student Learning Comparison

The gains achieved by treatment students who completed 90% or more of *Wordly Wise Science & Social Studies* were compared to the gains achieved by students in the control group. The results of these analyses are summarized in Table 15.

Table 15: Comparison of Gifted and General Population Treatment and Control Student Gains on All Outcome Measures

Student Group / Test	Treatment Gains	Control Gains	Difference	t	df	p-value	d
General Population							
WWS&SS Social Studies	8.70	-1.21	7.50	6.99	64	<0.01*	1.72
WWS&SS Science	4.28	-1.68	5.96	4.34	64	<0.01*	1.08
GMRT Vocabulary	0.07	0.49	-0.43	-1.17	62	0.25	-0.31
GMRT Comprehension	1.31	1.77	-0.45	-0.94	62	0.35	-0.23
GMRT Total	0.83	1.13	-0.30	-0.89	62	0.38	-0.22
Gifted							
WWS&SS Social Studies	8.23	-1.50	9.73	5.39	23	<0.01*	2.18
WWS&SS Science	5.00	-3.00	8.00	4.65	23	<0.01*	1.84
GMRT Vocabulary	1.43	0.75	0.68	0.72	22	0.48	0.30
GMRT Comprehension	1.22	0.25	0.98	1.02	22	0.32	0.61
GMRT Total	1.46	0.73	0.73	1.12	22	0.27	0.46

WWS&SS = *Wordly Wise Science & Social Studies* * $p \leq .05$

In general, the result of these analyses (Table 15) largely paralleled those presented when all treatment students were included in the analyses (see Tables 10-13). Treatment students from either group achieved significantly greater gains on both *Wordly Wise Science & Social Studies* tests than control students. Average gains on all components of the GMRT remained non-significant.

6.3.3 Summary of Effect of Program Completion on Gains

Overall, the results of this section were as expected. When only treatment students who had completed 90% or more of *Wordly Wise Science & Social Studies* were examined, their average gains on the *Wordly Wise Science & Social Studies* Science and Social Studies tests increased. There was little to no effect of program completion on GMRT gains. As this study was only conducted over a single semester and the majority of treatment students (75% of the sample) completed *Wordly Wise Science & Social Studies,* it is not unreasonable to assume that most students could complete the program over the course of an entire academic year.

7. CONCLUSIONS

This study of *Wordly Wise Science & Social Studies* was conducted to examine the efficacy of the program with both gifted and general population students. Students in grade 5 from J.R. Ingram Elementary School located in Sanford, NC, participated in the study. The findings in this report represent a sample of 107 students in grade 5 who were involved in the randomized control trial of the *Wordly Wise Science & Social Studies* as an instructional tool.

In general, the students who participated in *Wordly Wise Science & Social Studies*, when compared to students in the control group, demonstrated significantly greater learning gains on the content-area vocabulary that they learned in the program.

As one would expect, this study revealed that content-area vocabulary study did not extend to general vocabulary, comprehension, and overall reading ability as indexed by the GMRT. Nonetheless, when used in conjunction with a balanced literacy curriculum, the results of the study indicate that *Wordly Wise Science & Social Studies* can help students achieve greater mastery of both science and social studies topics and vocabulary.

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—Edina Torlaković, Ph.D. (ABD) and Kim Collazo, M.Ed.

APPENDIX A

Test-Retest Coefficients for Outcome Measures

Outcome Measure	N	Test-Retest Coefficient
Wordly Wise Science & Social Studies		
Social Studies	102	0.77***
Science	100	0.76***
GMRT		
Vocabulary	98	0.81***
Comprehension	98	0.77***
Total	98	0.86***

*** $p < .001$

APPENDIX B

Pre-Test and Post-Test Scores for All Outcome Measures by Group

Table B1: Pre-Test and Post-Test Scores for All Outcome Measures by Group for General Population Students

	Control						Treatment					
	Pre-Test			Post-Test			Pre-Test			Post-Test		
Outcome Measure	n	M	SD	n	M	SD	n	M	SD	n	M	SD
Wordly Wise Science & Social Studies												
Social Studies	39	21.03	6.65	39	22.23	7.13	37	23.30	6.44	37	30.11	8.48
Science	41	26.63	7.76	41	24.95	7.72	33	28.88	6.73	33	31.55	10.53
GMRT												
Vocabulary	38	5.19	1.82	38	5.68	1.77	35	5.63	1.88	35	5.65	1.54
Comprehension	38	4.07	1.54	38	5.84	1.78	35	4.40	1.92	35	5.53	1.50
Total	38	4.50	1.43	38	5.63	1.40	35	4.83	1.58	35	5.51	1.35

Table B2: Pre-Test and Post-Test Scores for All Outcome Measures by Group for Gifted Students

	Control						Treatment					
	Pre-Test			Post-Test			Pre-Test			Post-Test		
Outcome Measure	n	M	SD	n	M	SD	n	M	SD	n	M	SD
Wordly Wise Science & Social Studies												
Social Studies	12	35.42	5.35	12	33.92	6.17	14	32.50	7.03	14	39.57	5.33
Science	12	40.42	2.23	12	37.42	6.60	14	38.00	2.25	14	41.07	8.28
GMRT												
Vocabulary	11	10.21	2.26	11	10.96	2.34	14	8.64	2.43	14	9.70	3.35
Comprehension	11	10.19	1.92	11	10.44	3.01	14	8.46	3.54	14	9.72	3.07
Total	11	9.65	1.94	11	10.38	2.60	14	8.05	2.58	14	9.43	3.01

APPENDIX C

Pre-Test and Post-Test Scores for All Outcome Measures for Treatment Students Who Completed 90% of *Wordly Wise Science & Social Studies* or More by Student Group

	General Population Students						Gifted Students					
	Pre-Test			Post-Test			Pre-Test			Post-Test		
Outcome Measure	**n**	**M**	**SD**	**n**	**M**	**SD**	**n**	**M**	**SD**	**n**	**M**	**SD**
Wordly Wise Science & Social Studies												
Social Studies	27	24.30	6.62	27	33.00	7.06	13	32.38	7.30	13	40.62	3.78
Science	25	30.08	5.65	25	34.36	8.98	13	38.08	2.33	13	43.08	3.64
GMRT												
Vocabulary	26	5.91	1.79	26	5.97	1.38	13	8.46	2.43	13	9.89	3.41
Comprehension	26	4.60	2.01	26	5.92	1.14	13	8.82	3.43	13	10.04	2.95
Total	26	5.03	1.55	26	5.87	1.09	13	8.22	2.61	13	9.68	2.98

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