

**A Final Report for the Evaluation of
Renaissance Learning's *Accelerated Reader*
Program**

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EXECUTIVE SUMMARY

Educators understand the importance of helping students become effective readers, and they are increasingly recognizing the role of appropriate reading practice in contributing to effective reading skills. Renaissance Learning's *Accelerated Reader* program seeks to provide students with opportunities to engage in appropriate reading practice through the use of guided independent reading. In guided independent reading, teachers help students choose appropriate reading materials, monitor student progress with those materials, and provide appropriate instruction as needed. *Accelerated Reader* is a computer program that facilitates these practices in the classroom with ongoing progress-monitoring assessment and tools to promote guided independent reading. With *Accelerated Reader*, students read a book and then take a quiz to assess their comprehension of the book. Next, the program generates detailed reports about their progress. Students receive immediate feedback on how well they perform, and teachers can use the results to monitor progress, guide instruction, and help students set reading goals.

Renaissance Learning understands how important it is to demonstrate the effectiveness of its programs through sound research. Therefore, it worked with Magnolia Consulting, an external, independent consulting firm specializing in educational research and evaluation, to conduct an efficacy study of *Accelerated Reader* over the 2009–2010 school year. For this study, Renaissance Learning recruited school participants and managed student assessments. Magnolia Consulting conducted the random assignment process, administered teacher measures, conducted all site visits, analyzed all data, and completed all reporting for the study.

STUDY DESIGN & METHODS

This study of *Accelerated Reader* included 19 teachers and 344 first- through fourth-grade students across three schools. The study was a randomized control trial, in which evaluators

randomly assigned teachers to treatment or control groups. Teachers in the treatment group implemented *Accelerated Reader* over the study period, and teachers in the control group implemented only their regular curriculum materials. The overall purpose of the study was to evaluate the efficacy of *Accelerated Reader* in improving students' learning in reading. Therefore, the study compared learning gains of students in the treatment and control groups. In addition, the study examined teachers' use of the *Accelerated Reader* program as well as their perceptions of the program.

This study involved a mixed-methods design, which included the collection of qualitative and quantitative data throughout the study period. The *STAR Reading* served as the student assessment for all students, and the *Accelerated Reader* quiz data provided an additional measure for treatment-group students. Teacher measures included an online implementation log, site-visit classroom observations, and site-visit interviews.

ACCELERATED READER PROGRAM IMPLEMENTATION

Key Question:
How do teachers implement the Accelerated Reader program?

In general, teachers using *Accelerated Reader* for this study implemented it with high fidelity, using the program for an average of almost five days per week. Most teacher logs (96%) revealed that teachers reported independent reading practice among their students for 30–45 minutes per day. Teachers generally engaged in the important preparation steps for *Accelerated Reader* fully or partially, and most teachers reported implementing specific *Accelerated Reader* routines (such as immediately recognizing students who score at least 85% on their quizzes, checking students' logs before they take quizzes, and reviewing reports as soon as students completed quizzes) an average of 4–5 days per week. On average, teachers also indicated that students engaged in important *Accelerated Reader* activities

(such as keeping a daily log of reading practice, using their zone of proximal development to guide book selection, and taking the quizzes within 24 hours of finishing books) an average of 4–5 days per week.

Teachers varied in the degree to which they used goal-setting activities for motivating student learning. About two thirds of logs (67%) revealed that teachers shared *Accelerated Reader* reports with students at least weekly, but only about one third (34%) revealed that teachers recorded goals using the student reading plan at least weekly. Teachers also varied in how they spread the joy of reading in their classrooms, with all teachers reading good books aloud. Teachers frequently mentioned using certificates, class recognition, verbal praise, and stickers to recognize and motivate students.

Key Question:
What are teachers' perceptions of the quality and utility of the Accelerated Reader program?

The online logs and interviews provided teachers with a way to share feedback about the *Accelerated Reader* program. Teachers were mixed in the perceived ease of implementation, with just less than half (44%) reporting that it was somewhat or very easy to implement and just more than half (51%) reporting that it was somewhat to very difficult to implement. Implementation difficulties included issues related to time, scheduling, program setup, and technology. Teachers thought the training they received was helpful, and many teachers would have appreciated additional training.

Teacher also shared their perceptions regarding the effectiveness of *Accelerated Reader* in meeting students' needs. In general, teachers reported that the materials were at least somewhat adequate in meeting the needs of below-level, on-level, and advanced readers, and all teachers reported that the program was somewhat to very effective at improving student's reading comprehension. Teachers praised the program for helping students enjoy reading, increasing comprehension,

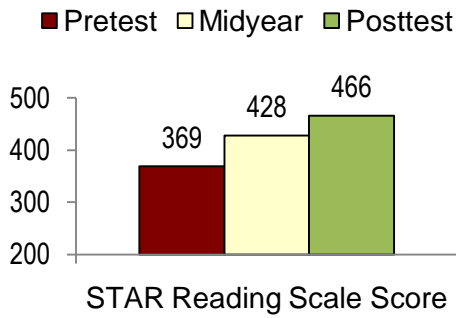
providing feedback, and allowing them to share success. Many teachers also indicated that students found the materials engaging. Teachers also shared feedback about areas for improvement, with a few teachers expressing concern that students with lower motivation and lower reading skills might experience more difficulty with the program. When asked if they would like to continue using the program next year, all teachers indicated that they would like to continue using it.

Comparisons of material use and instructional practice in treatment and control classrooms revealed that, on average, treatment teachers reported using various core program components to a greater extent than did control teachers. Treatment teachers also spent more time assessing students, focusing on reading motivation and enjoyment, and setting up specific routines and responsibilities for their students.

STUDENT LEARNING RESULTS

Key Question:
Do students who participate in the Accelerated Reader program demonstrate learning gains in reading over the study period?

The findings from the *STAR Reading* assessment revealed that, as a group, students who used *Accelerated Reader* over the study period demonstrated significant learning gains on the *STAR Reading* assessment. Furthermore, the average pretest to posttest learning gain corresponded to a large effect size ($d = 0.99$). In addition, students participating in *Accelerated Reader* over the study period demonstrated significant learning gains by midyear, corresponding to a large effect size ($d = 0.57$). These findings suggest that participating in the *Accelerated Reader* program was associated with significant learning gains, as evidenced by the *STAR Reading* among first-, second-, third-, and fourth-grade students.

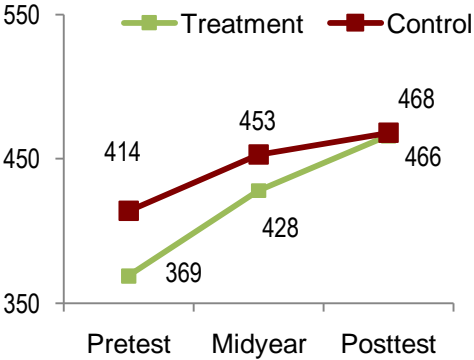


Key Question:
Are variations in student participation levels in Accelerated Reader associated with differential learning gains?

On average, *Accelerated Reader* usage data revealed that students were engaged in the program for more than 30 minutes per day. In addition, most students generally passed their *Accelerated Reader* quizzes, with first-grade students answering an average of 88% of the items correctly, second-grade students answering an average of 90% of the items correctly, and third- and fourth-grade students answering an average of 91% of items correctly. Examination of whether the time students spent engaged in the program or whether their success on *Accelerated Reader* quizzes was associated with differential *STAR Reading* gains revealed no significant relationship. Therefore, students participating in the program demonstrated comparable gains, regardless of the amount of time they spent engaged in the program and regardless of their success on the *Accelerated Reader* Quizzes.

Key Question:
How does the reading performance of students who participate in the Accelerated Reader program compare to that of students who do not use the program?

Comparisons of learning gains among treatment- and control-group students revealed that, on average, students participating in *Accelerated Reader* gained significantly more (as evidenced by their *STAR Reading* scores) than did students who did not use the program. The effect size corresponding to the differential gain was moderate ($d = 0.38$) for pretest to posttest gains. At midyear, the learning gains of treatment and control students were comparable. Although the gains still favored treatment students, the difference between groups was not significant and corresponded to a small effect size ($d = 0.14$).



Overall, the findings of this efficacy study of *Accelerated Reader* revealed that teachers implemented *Accelerated Reader* with fidelity over the study period. They also liked many things about the program, including its benefits for facilitating reading comprehension skills and the way it provides feedback for teachers and students. Students used the program for an average of approximately 30 minutes per day, and they demonstrated large learning gains, on average, over the study period. Furthermore, the learning gains of students who used the program were significantly larger than those of students who did not use the program. This finding suggests that using *Accelerated Reader* in addition to teachers' regular core reading materials contributed to greater learning gains than using only teachers' regular core reading materials.

ACKNOWLEDGEMENTS

This efficacy study of Renaissance Learning's *Accelerated Reader* program represents a joint effort among Magnolia Consulting, Renaissance Learning, and study participants from three schools. Magnolia Consulting appreciates the efforts and time of everyone who made this study possible and is especially grateful to the teachers, administrators, and students who participated in the study throughout the 2009–2010 school year. Magnolia Consulting also sincerely appreciates the staff at Renaissance Learning for its commitment to demonstrating the effectiveness of its programs through rigorous research. Finally, we would like to express our appreciation to the entire Magnolia Consulting team for its support of this study.

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INTRODUCTION

Educators agree that learning to read effectively is one of the most critical skills for elementary school children to master. Children who can read effectively are able to understand the material they read for school, and reading success is associated with subsequent academic and vocational success (Slavin, Karweit, & Madden, 1989). Today's educators appreciate the role of appropriate reading practice in strengthening students' reading skills, but research suggests that certain types of reading practice might be more beneficial than others. Specifically, research suggests that one way to improve students' reading skills is through guided independent reading practice (Borman & Dowling, 2004; Nunnery, Ross, & McDonald, 2006). Guided independent reading is a multistep process in which teachers help students choose reading materials that correspond to their current reading level, monitor students' progress with such materials, and provide instruction to students as needed (Renaissance Learning, 2008).

Renaissance Learning understands the importance of guided independent reading practice, and therefore, it developed *Accelerated Reader*, a computerized progress-monitoring assessment and practice tool that facilitates guided independent reading practice in the classroom. *Accelerated Reader* is not a comprehensive core reading program, but rather a supportive program that can accompany core or supplemental reading programs. Teachers can use the feedback from *Accelerated Reader* to guide their instruction and monitor students' reading progress. Specifically, *Accelerated Reader* provides teachers not only with information about what students have read, but also about the degree to which they understand the material they read. The program also helps students and teachers set goals to facilitate reading success for all students.

Accelerated Reader involves three key steps. First, students read a book that corresponds to their reading level and interest. Next, students take an *Accelerated Reader* quiz to assess their reading comprehension for the specific book they have read. The program scores the quiz, logs the results, and creates detailed reports about student progress. Students receive immediate feedback regarding their comprehension of the materials they read, and teachers can use the feedback to monitor students' reading practice, direct students' selection of reading material, and to guide instruction. The *Accelerated Reader* reports can also provide valuable information to administrators and parents regarding students' reading progress.

Renaissance Learning has shown an ongoing commitment to demonstrating the effectiveness of *Accelerated Reader* through rigorous research. For the 2009–2010 school year, it contracted Magnolia Consulting, LLC, an external, independent consulting firm specializing in educational evaluation, to provide technical assistance with an efficacy study of *Accelerated Reader*. For this study, Magnolia Consulting provided assistance with the study design and implementation. In addition, Magnolia Consulting conducted all data analyses and reporting. This final report provides details about the study design and methods, teachers' implementation and perceptions of *Accelerated Reader*, student performance results, and a discussion of findings.

RESEARCH DESIGN

This study evaluated the efficacy of the *Accelerated Reader* program in improving students' reading skills and compared the reading performance of students who used *Accelerated Reader* over the study period to that of students who did not use the program. This study also sought to examine the degree to which teachers implemented the program as well as teachers' perceptions of the program. Magnolia Consulting and Renaissance Learning conducted this study over the 2009–2010 school year with first-, second-, third-, and fourth-grade students and teachers across three schools. The study addressed the following key evaluation questions:

1. How do teachers implement the *Accelerated Reader* program?
2. What are teachers' perceptions of the quality and utility of the *Accelerated Reader* program?
3. Do students who participate in *Accelerated Reader* demonstrate gains in reading over the study period?
4. To what extent do students use *Accelerated Reader* during the study? Are variations in participation levels associated with differential learning gains among students who use the program?
5. Are variations in how teachers implement *Accelerated Reader* associated with differential learning gains among students who use the program?
6. How does the reading performance of students who use *Accelerated Reader* compare to that of students who do not use the program?

METHODOLOGICAL APPROACH

This study used a randomized control trial (RCT) design. Within each participating school, evaluators randomly assigned teachers to treatment and control groups. Teachers in the treatment group used *Accelerated Reader* throughout the study period, and teachers in the control group did not use the program. The students who participated in this study were nested in classrooms, which created a nested data structure. Therefore, evaluators used multilevel modeling for data analyses, when appropriate, which allowed evaluators to control for student-level and classroom-level sources of variance that could affect student outcomes.¹ Accounting for student- and classroom-level variance is important in nested designs such as this design because students who share a classroom also share many experiences associated with factors specific to that classroom, which could impact how they respond to particular instructional programs (Borman et al., 2005). Using multilevel modeling enables evaluators to account for the interdependence among the data when conducting analyses.

When appropriate, evaluators calculated effect sizes to examine the magnitude of students' learning gains.² In addition, evaluators also used descriptive and nonparametric analytic techniques to present

¹ Examples of student-level variance include factors related to student demographics and initial reading ability. Examples of classroom-level variance include factors such as teacher degree and program implementation.

² An effect size is a unit of measurement that expresses the difference in outcome for the average treatment participant from the average control student. Effect sizes indicate the strength of the increase or decrease in achievement of students in the treatment group, and they are expressed in standard deviation units. For example, an effect size of 1.0

participant characteristics, provide a description of the degree to which teachers implemented *Accelerated Reader*, and to facilitate an understanding of learning gains among treatment- and control-group students.

MEETING RESEARCH & EVALUATION STANDARDS

Magnolia Consulting seeks to uphold the highest standards in research and evaluation and uses the U.S. Department of Education, Institute of Education Sciences, National Center for Education and Regional Assistance, What Works Clearinghouse (WWC) (U.S. Department of Education, 2010) procedures and standards to guide its design and analytical decisions. The WWC does not conduct evaluation studies, but it synthesizes findings from various studies and evaluates the strength of collective evidence of various treatment interventions.

The WWC's *Procedures and Standards Handbook: Version 2.0* (U.S. Department of Education, 2008) guides their review process, and to the extent possible, it guided this study's procedures. The following is a summary of the degree to which the current WWC standards are reflected in specific components of this study (see Appendix A for additional information).

1. Study Design: This study used an RCT in which Magnolia Consulting randomly assigned participating teachers to treatment and control groups. Teachers in treatment groups used the *Accelerated Reader* program with their students over the study period, and teachers in control groups did not use the program. In addition to using random assignment to treatment and control groups, evaluators examined pretest group equivalence and used relevant covariates in analyses when appropriate.
2. Attrition: This study experienced no school attrition, no teacher attrition, and less than 1% student attrition.
3. Establishing Equivalence in Randomized Control Trials (RCT) with Attrition and Quasi-Experimental Designs (QED): Evaluators statistically controlled for baseline differences in reading performance in analyses when appropriate.
4. Confounding Factor: This study did not include design components that aligned exactly with the treatment or control groups. There were multiple schools, teachers, and students in each study condition.
5. Reasons for Not Meeting Standards: Additional ways in which this study addressed the WWC standards relate to the study assessments, outcome of interest, and appropriate statistical control. This study used the *STAR Reading* Assessment, a reliable and valid measure of student reading achievement, as an outcome measure. The primary outcome of interest, student reading achievement, was not overaligned with the *Accelerated Reader* program. Although there was a pretest group difference in *STAR Reading* performance, evaluators statistically controlled for this difference in analyses of treatment- and control-group differences. Program implementation measures suggested that treatment teachers generally implemented *Accelerated Reader* appropriately.

would indicate that the mean score in the treatment group was 1.0 standard deviation higher than the mean score in the control group.

6. WWC Corrections and Adjustments: In this study, there was no mismatch between the unit of assignment and the unit of analysis. Evaluators used hierarchical linear modeling (HLM) analyses to account for the nested data structure. Therefore, the WWC will not need to make statistical adjustments for clustering. Appendix A provides additional information about the WWC evidence standards and the ways in which this evaluation addressed each standard.

MEASURES

This study incorporated quantitative and qualitative methods to (a) determine whether students who used the *Accelerated Reader* program demonstrated significant gains in reading throughout the study period, (b) compare the reading gains of treatment students to control students, (c) examine the extent to which students participated in the *Accelerated Reader* program, (d) examine the extent to which teachers implemented the *Accelerated Reader* program with fidelity, and (e) determine whether variations in student participation and teacher implementation impact student achievement.

This section of the report details student and teacher measures used to address the evaluation questions.

Student Measures

For this study, teachers administered the *STAR Reading* assessment and *Accelerated Reader* quizzes to assess students' reading achievement throughout the study. These assessments demonstrate high reliability in their sensitivity to determining reading achievement scores and progress. Teachers administered the *STAR Reading* assessment to all treatment- and control-group students on three occasions, and treatment students completed the *Accelerated Reader* quizzes throughout the study period.

STAR Reading

STAR Reading is a norm-referenced and criterion-referenced assessment that aligns well with the *Accelerated Reader* program. Students in Grades K–2 answer 25 vocabulary-in-context questions and students in Grades 3 and higher answer 20 vocabulary-in-context questions and respond to five text passages. The 25-item assessment takes 10 to 15 minutes to complete and is a computer-adaptive test, providing a level of test difficulty appropriate for each student's ability level. Split-half reliability of the assessment is high, ranging from 0.89–0.90 in Grades 1–5. Test-retest reliability of the assessment is also high, ranging from 0.84–0.91 in Grades 1–5. The National Center on Response to Intervention rates the *STAR Reading* highly as a screening and progress monitoring tool. The *STAR Reading* assessment provides scaled scores, grade equivalents, instructional reading levels, percentile ranks, normal curve equivalents, and zone of proximal development (ZPD) scores.

In the present study, treatment teachers had access to *STAR* data during the study and could use it as a progress-monitoring tool. Control teachers were not instructed to access reports in *STAR Reading*.

Accelerated Reader Quizzes

The *Accelerated Reader* program provides several types of computer quizzes, including:

- Reading Practice (5–20 items)
- Other Reading (5–20 items)
- Literacy Skills (12–24 items)
- Vocabulary Practice (5–15 items)

Reading Practice quizzes determine students' understanding of independent reading books. Other Reading quizzes provide teachers with opportunities to assess how well students understood other types of books (e.g., textbooks). Literacy Skills quizzes can be used to assess student reading difficulties and strengths. Finally, Vocabulary Practice quizzes allow for students to demonstrate their understanding of previously learned and new vocabulary words. Typically, students take an average of 20 quizzes per 9 weeks. Reliability of aggregated quiz scores is high, ranging from .84 to .98 for a combined set of 20 quiz scores ranging in length from 5 to 10 items. Reliability is higher with increasing numbers of items in a quiz and increasing numbers of combined quiz scores.

Teacher Measures

Evaluators used several different data collection techniques to assess implementation and teacher perceptions in treatment and control classrooms. All treatment teachers participated in spring onsite classroom observations and interviews. Treatment teachers also completed three online implementation logs. One comparison teacher at each of the three schools participated in a spring classroom observation and interview. Comparison teachers also completed one online implementation log. The teacher data yielded through these techniques provided important information on reading instruction in treatment and control classrooms. The use of differing teacher measures allowed evaluators to triangulate data using multiple methods, collect data throughout the study period, and to acquire data from all participants. The combined techniques provide support to the validity of the study's results (Erickson, 1986).

Classroom Observation Protocol

To enhance the reliability and validity of classroom observations, evaluators created observation protocols based on the following constructs:

- classroom environment
- instructional and assessment practices
- procedures associated with the use of *Accelerated Reader* (treatment classrooms only)

Evaluators developed slightly different protocols for treatment and control classrooms, such that the treatment observation protocol included additional items specific to procedures associated with the *Accelerated Reader* program. In each protocol, evaluators subdivided each larger construct into smaller constructs with a checklist and observational notes of specific classroom observations. The classroom environment construct dealt with the availability of materials, arrangement of classrooms, and classroom displays. The instructional and assessment practices construct dealt with teacher and student reading practices, type of teacher instruction, teacher support, and student engagement during classroom instruction. Finally, the construct related to procedures associated with the use of

Accelerated Reader materials covered student and teacher routines, teacher support, and classroom engagement during *Accelerated Reader* time.

To confirm interrater reliability between both evaluators, evaluators received training on how to use the protocols, practiced using the protocols together at one school, and compared and reconciled observations with one another following the first observation.

Interview Protocols

At each of the onsite visits, evaluators conducted interviews with all treatment teachers and with one control teacher from each school. Interviews generally lasted for 15 to 20 minutes. To structure the nature of interviews, evaluators created specific interview protocols. The questions in the interviews focused on the following areas:

- the observed lesson
- reading instruction and perceptions of materials
- assessment and student impacts
- support, professional development, and training

Implementation Logs

Treatment teachers completed three online implementation logs designed to measure their use of *Accelerated Reader* program materials and components and to assess program perceptions. Teachers responded to questions in each of the following categories:

- getting Started with the *Accelerated Reader* program
- implementation of routines, responsibilities, and progress monitoring
- setting goals and motivating students
- program impacts and perceptions
- use of core reading programs

Control teachers completed one online implementation log designed to measure their use of core reading materials and their engagement in practices endorsed by the *Accelerated Reader* program. Specifically, control teachers responded to questions in each of the following categories:

- reading materials and practices
- assessment and leveling practices
- motivating students and setting goals
- program perceptions
- parent involvement

Teacher implementation logs fulfilled several purposes in this study. First, the data from treatment-teacher logs afforded evaluators the opportunity to measure teachers' implementation fidelity. Specifically, aggregated log data yielded an opportunity to calculate fidelity scores for each treatment teacher, which allowed evaluators to examine implementation fidelity across treatment teachers and to compare fidelity to the model classroom guidelines created by Renaissance Learning. Second, the implementation logs allowed evaluators to monitor any teacher issues or concerns and

respond accordingly. Finally, the implementation logs provided data that allowed evaluators to compare the nature of reading instruction across treatment and control classrooms.

STUDY PROCEDURES

This section of the report describes the study procedures associated with site selection and assignment to groups, data collection, and ensuring implementation fidelity of the *Accelerated Reader* program.

Site Selection and Group Assignment

For this study, Renaissance Learning conducted all procedures regarding site selection. Site selection efforts resulted in three participating schools and 19 teachers, each of whom had not ever implemented *Accelerated Reader*. Once Renaissance Learning recruited the three participating schools, Magnolia Consulting randomly assigned the 19 participating teachers to treatment and control groups. Specifically, within each grade, Magnolia Consulting evaluators randomly assigned half the participating teachers to the treatment group and approximately half the participating teachers to the control group. Evaluators used random selection procedures in the SPSS program to ensure that the process was completely random.

Study Timeframe

As indicated previously, this study took place during the 2009–2010 school year. Renaissance Learning conducted study recruitment in the summer of 2009, and Magnolia Consulting randomly assigned teachers to treatment and control groups in the fall of 2009. Renaissance Learning oversaw the administration of all student measures in the fall, winter, and spring of the 2009–2010 school year. Magnolia Consulting administered treatment-teacher implementation logs in the fall, winter, and spring, as well as control. Finally, Magnolia Consulting analyzed data during the summer of 2010. Table 1 presents an overview of the study timeframe.

Table 1
Timeline of Study Activities

STUDY ACTIVITY	Summer 2009	Fall 2009	Winter 2009– 2010	Spring 2010	Summer 2010
Site recruitment	RL				
Random assignment to treatment and control groups		MC			
Administration of student measures		RL	RL	RL	
Administration of treatment-teacher implementation logs		MC	MC	MC	
Administration of comparison-teacher survey				MC	
Site visits				MC	
Data review and analysis					MC

Implementation Fidelity

To ensure the validity of this study’s findings, Renaissance Learning and Magnolia Consulting took several steps to make sure treatment teachers implemented *Accelerated Reader* appropriately throughout the study period. At the onset of the study, Renaissance Learning conducted a training seminar with treatment teachers. In addition, each school received periodic training visits from Renaissance Learning throughout the study. This training helped ensure that teachers understood how to implement *Accelerated Reader* appropriately. In addition, Magnolia Consulting, in collaboration with Renaissance Learning, developed online self-report implementation logs to monitor teachers’ implementation of the program. These logs provided teachers with a way to share feedback about their use and perceptions of the program and allowed Magnolia Consulting to monitor the degree to which teachers implemented the program. Furthermore, Magnolia Consulting conducted spring site visits to all participating schools. During site visits, evaluators observed teachers’ implementation of *Accelerated Reader* and interviewed teachers about their use and perceptions of the program. These site visits provided an additional opportunity for evaluators to monitor program implementation fidelity and to gain insights into teachers’ perceptions of the program.

SETTINGS

Renaissance Learning requested recruited schools to participate in the study. Three schools elected to participate, all of which are private Catholic schools and are part of the National Catholic Educational Association (NCEA). All schools are located in a large city in the North-Central region of the United States. Each school serves more than 300 students. School A has a student-teacher ratio of about 11:1, and Schools B and C have student-teacher ratios of 15:1. Schools A and C are more ethnically diverse than School B (see Table 2).

Table 2
Site Characteristics

	School A	School B	School C
Geographic location and city description*	Eastern North-Central; City, Large	Eastern North-Central; City, Large	Eastern North-Central; City, Large
Total student enrollment	344	327	337
Student/Teacher ratio	11.1	15.1	15.1
Ethnic breakdown			
Caucasian	62%	97%	43%
African American	22%	0%	1%
Asian/Pacific Islander	5%	1%–2%	27%
Hispanic	11%	1%–2%	19%
Other	0%	0%	11%

PARTICIPANTS

This section of the report describes the study’s teacher and student demographic information, attrition, and the equivalency between the treatment and control groups. Evaluators conducted chi-square (χ^2) and *t*-test analyses to determine if there were differences in student characteristics and attrition between the two groups. The study’s original sample included 19 teachers and 346 students recruited from three schools (see Table 3). Two students, both of whom were in the control group, did not meet criteria for inclusion in the final analytical sample, resulting in a final sample of 344 students (see Table 3).

Table 3
Analytic Sample Size by School and Condition

	Schools			Total
	A	B	C	
Control				
Teachers	3	2	4	9
Students	50	43	62	155
Treatment				
Teachers	3	3	4	10
Students	54	65	70	189
Total Sample				
Teachers	6	5	8	19
Students	104	108	132	344

Demographics

Evaluators examined several participant demographic characteristics for this study. The following sections describe teacher and student characteristics for the final analytic sample.

Teacher Participants

For the final analytic sample, evaluators examined teachers' reported highest degree earned.³ Table 4 reveals that, for the overall sample, 74% of the teachers reported a bachelor's degree as their highest degree earned, and the remaining 26% reported having a master's degree.

Table 4
Teacher Highest Degree by Group

	Sample size		
	Control <i>N</i> (%)	Treatment <i>N</i> (%)	Total <i>N</i>
Highest degree			
Bachelor's	6 (67%)	8 (80%)	14
Master's	3 (33%)	2 (20%)	5

Student Participants

Evaluators also examined various student demographic characteristics for the final overall analytic sample. These characteristics include gender, ethnicity, socioeconomic status, English proficiency, special education status, and migrant student status. Evaluators conducted descriptive statistics for students with available demographic data. Therefore, summaries of each characteristic might not reflect the total number of students included in the final analytic sample. Table 5 summarizes the student demographic information for the overall sample and for control and treatment groups separately.

³ Evaluators attempted to collect other teacher data, such as years teaching, as well, but several teachers did not provide these data.

Table 5
Student Demographic Characteristics by Group and Tests of Equivalence

	Sample size			Test of equivalence		
	Control N (%)	Accelerated Reader N (%)	Total N ^a	χ^2 (df)	p value	ϕ^b
Gender						
Male	78 (50.3%)	88 (46.6%)	178	0.48(1)	.49	-.04
Female	77 (49.7%)	101 (53.4%)	166			
Ethnicity						
African American	6 (3.9%)	5 (2.7%)	11	1.46(1) ^c	.23	.07 ^c
Hispanic	18 (11.6%)	19 (10.2%)	37			
Caucasian	97 (62.6%)	130 (69.5%)	227			
Asian	20 (12.9%)	24 (12.8%)	44			
Other	14 (9.0%)	9 (4.8%)	23			
Section 504 status						
Section 504	3 (1.9%)	2 (1.1%)	5	NA ^d	NA	NA
Not Section 504	152 (98.1%)	185 (98.9%)	337			
Free or reduced lunch (FRL) status						
Receiving FRL	3 (3.2%)	3 (2.5%)	6	NA ^d	NA	NA
Not receiving FRL	90 (96.8%)	116 (97.5%)	206			
English proficiency						
Learner	0 (0%)	0 (0%)	0	NA ^d	NA	NA
Proficient	155 (100%)	170 (100%)	325			
Special education						
Special ed.	3 (1.9%)	0 (0%)	3	NA ^d	NA	NA
Not special ed.	152 (98.1%)	187 (100%)	339			

^aSummed totals for each demographic characteristic that are less than 344 reflect missing data for that variable.

^b ϕ (phi) represents a statistical concept, the effect size, which measures the strength of the relationship between variables. In this case, it measures the strength of relationship between a given characteristic and group membership.

^cAnalysis of equivalence computed on students identified as Caucasian in comparison to all other students.

^dAnalysis of equivalence not computed because assumptions necessary to conduct this significance test not met.

Attrition

The overall attrition rate for this study was extremely low, with losses of less than 1% for the student sample and 0% for the teacher sample. As previously stated, the student sample originally included 346 students. Evaluators excluded two students, both of whom were assigned to the control condition, from the final analytic sample, resulting in a final sample of 344 students. Evaluators eliminated one student because of excessive absences and the other due to a lack of sufficient test data.

Group Equivalency

When examining the effects of a specific program on a given outcome, it is important to determine whether treatment and control groups have similar characteristics at the onset of the study. Evaluators conducted chi-square analyses to explore differences in proportions of certain characteristics between the treatment and control groups and *t*-test analyses for differences in group means. To determine the magnitude of any group differences, evaluators also computed effect sizes. For chi-square analyses, evaluators computed ϕ , which measures the degree of relationship between a given characteristic and group membership. For *t*-test analyses, evaluators computed Cohen's *d*, which describes how many standard deviation units separate the two group means. Larger numbers indicate a stronger relationship for both estimates of effect size. Estimates of .30 and .50 for ϕ and Cohen's *d*, respectively, are generally accepted as indicating a moderately strong relationship.

Teachers

Evaluators examined group differences in the teachers' reported demographic characteristics. Table 4 shows that the data did not meet the assumptions necessary to conduct a chi-square analysis to test group equivalence for the teachers' highest degree earned. At a descriptive level, however, the groups were approximately equivalent.

Students

Evaluators examined group differences for each reported student demographic characteristic and in the students' fall *STAR Reading* scores.

Equivalency in Student Characteristics

As shown in Table 5, chi-square analyses indicated group equivalence for two demographic characteristics: gender and ethnicity. The control and treatment conditions did not differ with regard to these characteristics. For the remaining student characteristics, however, the demographic data did not meet the assumptions necessary to conduct chi-square analyses to test group equivalence. At a descriptive level, the groups appear highly similar in terms of these demographic characteristics, suggesting that they are equivalent.

Differences in Baseline Reading Achievement

Evaluators conducted a *t*-test analysis to examine any potential differences in reading achievement, using students' baseline *STAR Reading* scaled scores (SS). Results indicate significant group mean

differences in these scores [$t(335) = 1.96, p = .05$], with students in the control group scoring higher ($M = 417.91, SD = 199.11$) than students in the treatment group ($M = 372.27, SD = 221.84$). The effect size associated with this significant difference (Cohen's $d = 0.22$) is relatively small but sufficient to warrant concern that the groups might not have had similar prior reading achievement levels. Therefore, evaluators statistically controlled for this pretest difference in analyses examining group differences in student learning.

Attrition

Typically, it is important to establish group equivalency in attrition rates. However, given the very low attrition rate for this study of less than 1%, evaluators could not conduct meaningful analyses to test for group differences.

PROGRAM DESCRIPTION

This section of the report describes the *Accelerated Reader* program and associated materials.

Accelerated Reader is progress-monitoring reading software for teachers and students that provides immediate feedback on student progress in reading. As a supplementary reading tool, it is not meant to replace core reading instruction. Instead, the intent of the program is to support independent reading in the classroom and core reading instruction. In the program, students receive daily time to practice reading at differentiated reading levels for a specified time, with teacher guidance. Students in the program read books within their ZPD (Vygotsky, 1978). In the program, the ZPD refers to the range of book levels that will be engaging and challenging for students without being stressful.

The program itself does not determine reading ability levels. Instead, it provides feedback on students' understanding of text and can track how much students read and student comprehension over time.

In the *Accelerated Reader* program, there are three basic steps:

1. Students read a book during daily independent reading time.
2. Students take an *Accelerated Reader* computer quiz on the book. The quiz assesses students' understanding of important literary features. The *Accelerated Reader* software provides immediate feedback on performance and includes reports on student achievement and growth.
3. Teachers can use *Accelerated Reader* reports to monitor student performance and to guide students in choosing appropriate books and reflecting on and revising their own instruction. Additionally, teachers can measure academic learning in reading using points.

The program offers various techniques for determining the difficulty and interest level of books with associated *Accelerated Reader* quizzes. Book levels are the student reading ability levels expected for understanding the text. Interest levels are based on the content of the book, and they indicate the appropriate age level of the book based on its content. Points are based on the difficulty of a book and number of pages. Students receive points after taking each quiz, and points are awarded based on the percentage of questions students answer correctly. Renaissance Learning does not advise creating a competitive environment where students try to receive the most points in the class, as they suggest that this technique could lead to cheating or choosing books that are too easy or too difficult. Instead, they suggest that teachers work with students to create their own individualized point goals.

PROGRAM IMPLEMENTATION AND PERCEPTIONS

This section of the report details how treatment and control teachers implemented and perceived their reading programs. Evaluators collected program implementation data through online logs and onsite visits.

Evaluators requested three online implementation logs from treatment teachers over the study. These logs provided feedback on teachers' use and perceptions of the *Accelerated Reader* program and detailed their core-reading program use. The treatment-teacher implementation and perception findings represent the average responses, across teachers, during the study period. Overall, evaluators received 27 out of 30 treatment logs over the study period, for a total response rate of 90%. One teacher did not complete the third log, and another teacher did not complete the first or third log.

Evaluators requested one online implementation log from control teachers during the study period. This log provided feedback on teachers' use and perceptions of their current reading programs. The findings pertaining to control-teacher implementation and perceptions represent the average responses, across teachers, over the course of the study period. Overall, evaluators received eight out of nine possible logs over the study period, for a total response rate of 89%.

COMPARISON OF CORE READING PROGRAMS IN TREATMENT AND CONTROL CLASSROOMS

The following section details treatment and control teacher's core reading programs, including the specific programs and extent of use.

Core Reading Program Instructional Practices

All schools reported using Scott Foresman as their core reading program. Teachers from one school reported using district-provided reading materials in addition to Scott Foresman, with one control teacher reporting use of Houghton Mifflin materials. Treatment teachers used core reading program materials for an average of 7.16 years (Range 5–10), and control teachers used core reading materials for an average of 2.36 years (Range 0.67–7.50). In 63% of treatment logs and in 50% of control logs, teachers reported supplementing their core program with a variety of materials. Commonly referenced supplemental materials included:

- additional novels/books ($n = 10$)
- leveled readers/big books/textbooks/guided reading materials ($n = 3$)
- worksheets ($n = 2$)
- graphic organizers or story maps ($n = 2$)

On average, daily reading blocks in treatment classrooms were 72.60 minutes (Range 40–180)⁴ and daily reading blocks in control classrooms were 56.88 minutes (Range 40–90). Across treatment and

⁴ Treatment teachers responded to the question, "How long is your reading block?" under a section entitled "Core Reading Program." As a result, some teachers included the time students spent in *Accelerated Reader*, and others did not include this time.

control classrooms, teachers spent the greatest number of days each week on comprehension skills and strategies and vocabulary and the fewest days each week on phonemic awareness and phonics (see Figure 1). Although treatment classrooms seemed to spend more days each week on all reading program components, the classrooms cannot be directly compared due to differences in the number of survey administrations.

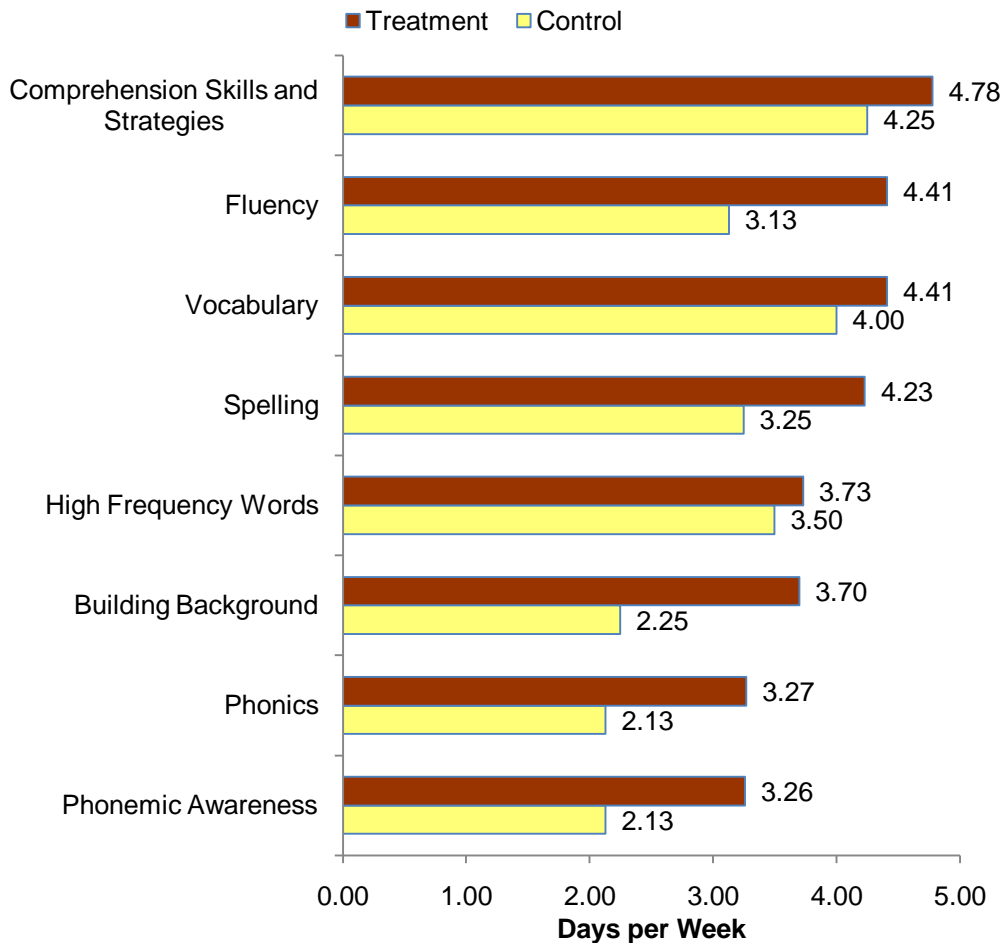


Figure 1. Comparison of treatment and control teachers' weekly coverage of core reading program components.

IMPLEMENTATION OF *ACCELERATED READER* IN TREATMENT CLASSROOMS

The present section of the report details treatment teachers' use of *Accelerated Reader* in their classrooms. It includes a description of their use of program materials, program instructional practices, and implementation fidelity. Information for this section comes from three teacher logs and onsite classroom observations and interviews.

Accelerated Reader Material Use

To assess how teachers used materials, treatment teachers detailed the extent to which they used the overall program and provided specific information on various planning and preparation techniques associated with program implementation.

In each of the three logs, treatment teachers reported the number of days per week they used *Accelerated Reader*. On average, teachers used the program for 4.89 days each week (Range: 4–5 days) and reported using the program with all students in the classroom. In addition, on average, teachers reported spending 102.59 minutes (Range 10–420 minutes⁵) each week planning and preparing for the *Accelerated Reader* lessons. Across logs, most teachers (96%) reported that their daily schedule allows for 30–45 minutes of independent reading practice. Only one teacher (4%) reported less than 30 minutes of daily independent reading practice; however, in other logs, the same teacher reported having 45 minutes for independent reading.

Overall, in 82% of logs, teachers reported spending at least 10 minutes reading to students every day, and they reported spending less than 10 minutes on the remaining 18% of logs. With regard to reading with students, 93% of teacher logs revealed that teachers reported reading with students every day for at least 10 minutes, and 7% of logs indicated that teachers read with students for less than 10 minutes.

Teachers rated their confidence in getting started with various *Accelerated Reader* materials on a scale ranging from 1, *Not confident at all*, to 5, *Extremely confident*. Overall, teachers expressed the most confidence in their abilities to help students select appropriate books based on the student's ZPD, book, and interest levels ($\chi = 4.37$) and teaching students how to use their ZPD when selecting books ($\chi = 4.26$). Teachers felt least confident in their ability to set realistic, individualized goals with each student ($\chi = 3.33$), exhibiting moderate levels of confidence in this area. For complete results, see Appendix D, Figure D1.

To implement the program effectively, teachers need to engage in various preparatory steps. In all three logs, teachers rated their use of various preparatory and planning components related to the *Accelerated Reader* program. Teachers indicated whether they used each component *Fully* (2), *Partially* (1), or *Not at all* (0). Treatment classrooms provided daily computer access for student quizzing ($\chi = 1.93$) and ensured that there were enough quizzes for students ($\chi = 1.92$). In contrast, teachers *partially* to *fully* ensured that there were enough books for students, depending on the classroom ($\chi = 1.48$). For detailed results, see Appendix D, Figure D2.

Accelerated Reader Instructional Practices

To assess teachers' use of instructional practices, treatment teachers described the extent to which teachers and students engaged in routines and responsibilities, the degree to which teachers involved parents, set goals, and motivated students.

⁵ One teacher reported spending 420 minutes on the first log. It is possible that this included time spent setting up the classroom for *Accelerated Reader*.

Implementing Routines, Responsibilities, and Progress Monitoring

Treatment teachers rated the extent to which they engaged in several daily activities on a 5-point scale ranging from 1, *to no extent*, to 5, *to a great extent*. Across all teacher routines and responsibilities, on average, teachers reported engaging in each activity *to much extent* or *to great extent* (see Figure 2). Treatment teachers often immediately recognized students who scored at least 85% on their quizzes ($\chi = 4.85$), indicating that teachers engaged in this activity *to a great extent*. In contrast, teacher's lowest mean rating pertained to reading to students every day for 10–15 minutes ($\chi = 3.96$), indicating that teachers read to students, on average, *to much extent*.

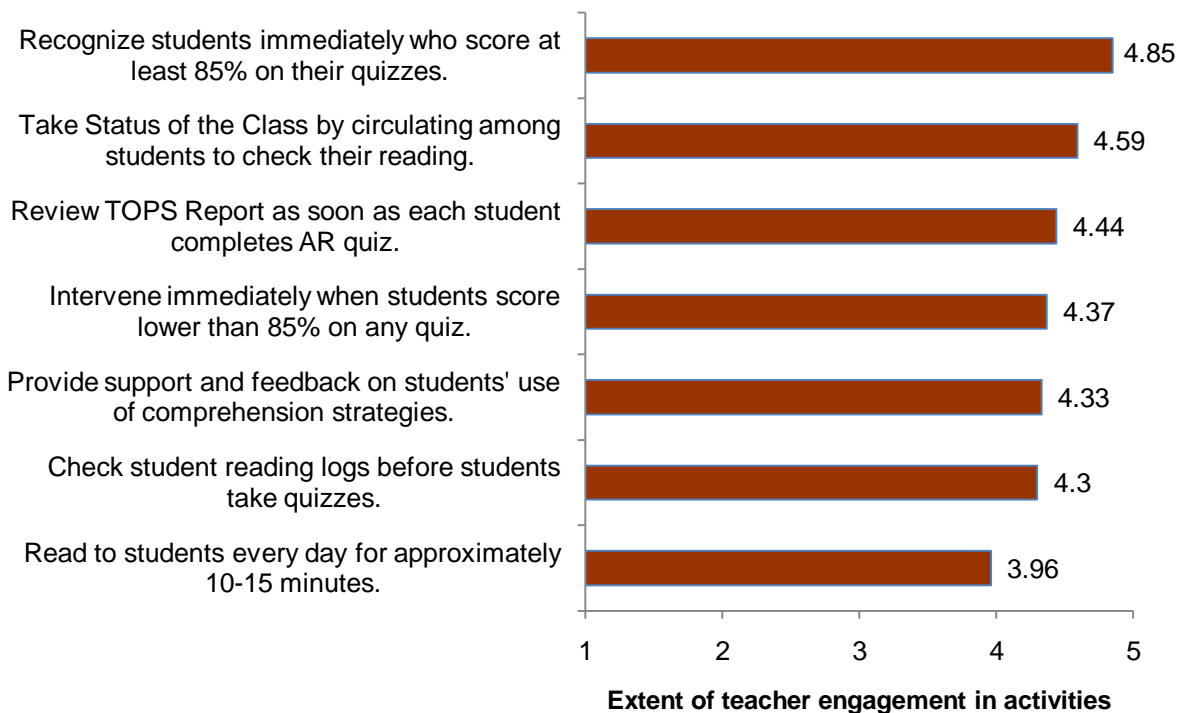


Figure 2. Teachers' ratings of self-engagement in routines and responsibilities associated with the *Accelerated Reader* program ($n = 27$).

Teachers also rated the extent to which students engaged in *Accelerated Reader* activities on a scale ranging from 1, *to no extent*, to 5, *to a great extent* (see Figure 3). Similar to their ratings of teacher engagement, teachers' ratings of student engagement reflected engagement *to much extent* or *to great extent*. Teachers noted that, on average, students kept a log of daily reading practice *to a great extent* ($\chi = 4.85$). In contrast, teachers had the lowest mean rating for student review of TOPS reports ($\chi = 4.04$), suggesting that students review these reports *to much extent*.

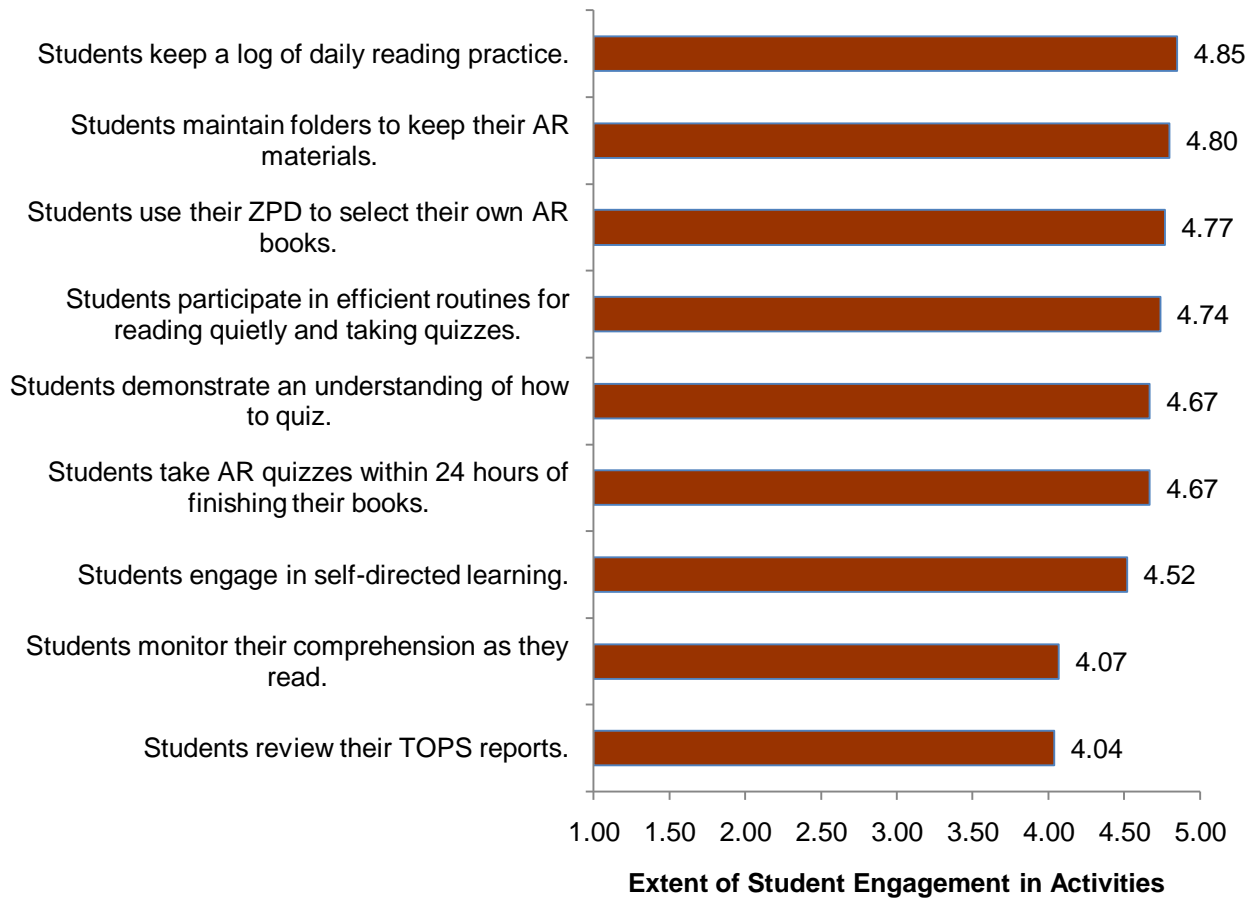


Figure 3. Teachers' ratings of student engagement in routines and responsibilities associated with the *Accelerated Reader* program ($n = 27$).

In their logs, teachers also reported their frequency of use of various *Accelerated Reader* components. Overall, 100% of logs indicated that teachers used student reading logs weekly or daily. In addition, 96% of logs noted that teachers used student record reports weekly, biweekly, or daily. In contrast, no teachers reported use of vocabulary practice components. Table D1 in Appendix D presents a full breakdown of teachers' use of various *Accelerated Reader* components.

Within the *Accelerated Reader* program, teachers have the opportunity to involve parents in instruction. A small percentage of teachers used this component across all log reporting periods. Teachers reported that parents have access to Home Connect, and parents receive TOPS reports in a take-home folder in 26% and 15% of logs, respectively. A small handful of teachers mentioned that certificates are taken home to parents ($n = 2$), or folders are shared with parents at conference time ($n = 2$).

In classroom observations of treatment classrooms, evaluators confirmed the use of various teacher and student routines during *Accelerated Reader* time. Evaluators frequently observed teachers checking student books before students read and observed students being given opportunities to read before using the *Accelerated Reader* software. Several teachers used colored note cards to determine when

students needed help. Students held these cards or put them at the end of their desk to note when they needed help or were ready to take a quiz. While some students in a class used *Accelerated Reader* software, other students read independently, and classrooms remained on task for most of the period.

Setting Goals and Motivating Students

In their online logs, treatment teachers reported their use of goal-setting activities and techniques for motivating students in the classroom.

Beginning with goal setting, teachers reported how often they used different goal-setting activities (see Table 6). On average, in 67% of logs, teachers reported sharing *Accelerated Reader* reports with students on *weekly* or more frequently. In contrast, in 34% of logs, teachers reported recording goals using the student reading plan on *weekly* or more frequently.

Table 6
Frequency of Use of Accelerated Reader Goal-Setting Activities

	Daily		Biweekly		Weekly		Monthly		Not at all	
	%	#	%	#	%	#	%	#	%	#
Adjust goals that are too challenging or too easy.	19%	5	15%	4	23%	6	23%	6	19%	5
Record goals using the student reading plan.	4%	1	11%	3	19%	5	44%	12	22%	6
Share <i>Accelerated Reader</i> reports with students to make success visible.	33%	9	4%	1	30%	8	7%	2	26%	7
Encourage students to chart their own progress.	48%	13	-	-	11%	3	7%	2	33%	9

Teachers provided feedback on how they spread the joy of reading in their classroom. All teachers reported reading good books aloud, and 82% of logs indicated that teachers introduced students to interesting books through informal book talks. Additionally, in 56% of logs, teachers reported organizing small-group discussion for students to share personal responses to books, and 44% noted using *Accelerated Reader* BookFinder to help match students and books. Additional common teacher responses related to sharing the joy of reading included sharing books ($n = 3$) and using the Battle of the Books program ($n = 2$).

Recognition and motivation are key parts of the *Accelerated Reader* program. In the implementation logs, teachers reported their use of various recognition and motivation techniques. Overall, the largest percentage of teachers reported using Reader Certification (82%), and the smallest percentage reported use of a Family Reading Night (4%). One other frequently mentioned method for recognizing and motivating students was giving students stickers on their folder for 100% ($n = 2$). Treatment teachers followed different methods for recognizing students who reached their individualized goals, including

- using certificates ($n = 11$)
- class recognition or verbal praise ($n = 8$)
- stickers ($n = 6$)

- charts on the wall (e.g., might include student pictures) ($n = 3$)
- individual conversations or praise ($n = 3$)
- prizes/rewards ($n = 2$)

Evaluators observed some examples of goal setting and teacher motivation during classroom observations. With regard to goal setting, one teacher spent time showing students how to look at their goals and progress, and another teacher informally assessed second-grade students who scored below 100% on their last *Accelerated Reader* quiz. This teacher did not allow students to take their next quiz until they had correctly answered questions concerning six story-related components. With respect to student motivation, several teachers recognized students immediately when they scored well on quizzes, with stickers or high fives. Another teacher spent time printing independent reader certificates and conveyed that they would spend time at the end of class giving out certificates and acknowledging student performance.

Implementation Fidelity

This section compares treatment teachers' use of the program to *Accelerated Reader* model classroom guidelines. To assess the degree to which treatment teachers implemented the program with fidelity, evaluators created an implementation fidelity score. Evaluators calculated scores for each teacher by averaging teacher performance across 29 variables that mapped onto *Accelerated Reader's* model classroom guidelines. The possible range of scores was from 0.13 (no fidelity) to 1.13 (very high fidelity). These 29 variables dealt with classroom preparation and setup, time spent using the program, teacher and student routines and responsibilities, and use of instructional, goal-setting, and motivational components. The implementation grand mean was 96%, indicating that, on average, teachers implemented the program with high fidelity. Interestingly, implementation fidelity varied by school (see Table 7); however, it should be noted that all schools evidenced high levels of program fidelity by achieving percentages over 80%.

Table 7
School Means for Implementation Fidelity

School	Overall
School A	0.86
School B	1.06
School C	0.97

TREATMENT TEACHERS' PERCEPTIONS OF *ACCELERATED READER*

To assess teachers' perceptions of the *Accelerated Reader* program, treatment teachers described ease of implementation, usefulness of program training, the adequacy of materials in meeting student needs, as well as their perceptions of student engagement and interest in the program.

Overall Perceptions

Overall, teachers offered divided perceptions on the ease of *Accelerated Reader* implementation. Forty-four percent believed it was *somewhat easy* to *very easy* to implement, and 51% thought it was *somewhat difficult* to *very difficult* to implement. One teacher selected *other* and noted that she is still trying to build her *Accelerated Reader* library.

In their explanations of implementation ease ratings, teachers overwhelmingly referenced implementation issues related to time (44%). Teachers expressed some issues with scheduling due to the study starting midyear and trying to fit in the program during the day. One teacher also commented that the initial setup was time-consuming, and two others commented on the time-consuming nature of monitoring student use of the program and providing students with individualized guidance. During classroom interviews, several teachers commented on the difficulty of setting up the program, books, and computers to get everything ready for successful program implementation.

Several other teachers mentioned technology-related issues (19%), citing that computers were too slow or that they experienced difficulty in finding *Accelerated Reader* tests or reports in the quiz software. Finally, two other teachers commented on the number of books and noted the difficulty in finding enough space for all the books or finding enough books to meet student needs.

Recent research (Tschannen-Moran & McMaster, 2009) suggests that teachers' self efficacy for teaching instruction might decrease temporarily when they are first learning to implement a new program. The teachers in this study had never implemented *Accelerated Readers*. Therefore, it is possible that they were experiencing typical difficulties associated with using a new program for the first time.

Program Training

Overall, 100% of teachers felt the *Accelerated Reader* training was *somewhat* (52%) or *very* (48%) helpful. Several teachers offered feedback on specific training aspects that were particularly helpful in preparing for implementation. Six teachers addressed the benefits of having a trainer model the program and provide hands-on learning. Two of the six teachers expressed specific benefits of being walked through reports, setting up goals, and helping with book selection. Teachers also commented on the benefits of having a trainer readily available to help ($n = 2$) and the advantage of seeing a program overview ($n = 1$).

In their open-ended feedback, teachers also offered several suggestions for improving the training. Three teachers wanted more information, either from the program manual or within the training book. Two teachers requested more time for the training, with one teacher suggesting breaking down the training into multiple sessions. Two teachers requested that the training take place at the beginning of the year as opposed to midyear. Finally, one teacher requested additional one-on-one time with the trainer, preferably in their classrooms.

Student Learning Needs and Achievement

Treatment classrooms offered feedback on the adequacy of program materials in meeting the needs of student groups present in their classrooms (see Table 8). Overall, 100% of treatment classrooms felt the materials were at least *somewhat adequate* for on-level and advanced students. Additionally,

89% of teachers believed the materials were at least *somewhat adequate* for below-level students, and 83% thought the materials were at least *somewhat adequate* for significantly below-level students. Sixty-nine percent of teachers believed the materials were at least *somewhat adequate* for English language learners, and teachers with special education students believed the materials were *very inadequate* to *inadequate* in meeting student needs.

Table 8
Adequacy of Accelerated Reader Materials in Meeting Student Needs

	Very inadequate		Inadequate		Somewhat adequate		Adequate		Very adequate	
	%	#	%	#	%	#	%	#	%	#
Significantly below-level	6%	1	12%	2	47%	8	18%	3	18%	3
Below-Level	7%	2	4%	1	37%	10	30%	8	22%	6
On-Level	-	-	-	-	11%	3	48%	13	41%	11
Advanced	-	-	-	-	7%	2	30%	8	63%	17
Special education	25%	1	75%	3	-	-	-	-	-	-
English language learners	8%	1	23%	3	31%	4	23%	3	15%	2

Teachers offered divided perceptions on whether students consistently maintained an average percent correct of at least 85% on *Accelerated Reader* quizzes. Forty-two percent of logs indicated that students *did* maintain an average of 85%, and 42% indicated students *somewhat* maintained an 85% average. Finally, 15% of teacher logs indicated students *did not* consistently maintain an 85% average.

Overall, 100% of teachers rated the program materials as *somewhat* to *very effective* at improving students’ reading comprehension, on a 4-point scale ranging from 1, *not effective at all*, to 4, *very effective* (Figure 4).

■ Very effective ■ Effective
■ Somewhat effective ■ Not effective at all

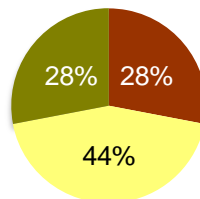


Figure 4. Teachers’ ratings of *Accelerated Reader* effectiveness at improving students’ reading comprehension ($n = 25$).

In open-ended feedback, teachers mentioned several program strengths related to meeting student needs. Several teachers commented that the program fosters an enjoyment of reading (22%). One teacher explained, “They are reading at a level that is comfortable for them, and it has motivated

them to read because they are allowed to select their own books and interest level.” Another teacher commented on the influence of rewards in the program, writing that students are excited to read and “seem to be motivated to do well by using the stickers and charts for immediate recognition.”

Other common themes included evidence of increased student comprehension (11%), giving feedback to students and teachers on progress (11%), and providing recognition to students, allowing them to share success (11%). Teachers noted that students “have learned to read for comprehension,” and that the program “gives feedback right away.” One teacher also commented that students “enjoy the recognition they get for doing a good job.”

Finally, some teachers noted that the program has other strengths, including helping students to be independent readers (7%), providing books on student interest and reading levels (7%), providing a daily challenge to students through the use of personalized goals (7%), and holding students accountable (7%). One teacher commented on accountability, stating, “Students pay better attention as they read independently if they know there will be instant accountability.”

In their classroom interviews, all teachers expressed the common belief that the program has led to increased reading comprehension. One teacher explained,

It [the program] has definitely raised their awareness that they need to slow down to really understand what they're reading so they can do well on quizzes... Those students who were not strong at reading have become stronger because it has helped them enjoy reading more.

Teachers generally indicated that the program is appropriate for advanced and low-level readers, but one teacher noted that this depends on the availability of books at specific levels. One teacher noted that the *Accelerated Reader* program helps students set individualized goals, offering the following example, “One of my boys recently got three 100s in a row after a slump of 80s. I told him he was moving closer to putting a star on his goal chart. His response: “That’s what I’m shooting for!” Interestingly, one first-grade teacher also commented on the benefits of the program for understanding student reading levels, stating that

I have children in my class that can read at a 3rd grade and 5th grade level, and I would not have known this if it weren't for this program because other things we use wouldn't have shown this. I'm impressed with that.

In their open-ended log responses, teachers provided feedback on areas where the program has not been effective in meeting student needs. Common issues involved students with lower levels of motivation (15%) and lower-level readers (15%). With respect to student motivation, teachers noted that the independent nature of the program makes it difficult for students with lower levels of motivation to succeed. These teachers added that some students are “not consistent in their achievement of passing,” and many are not interested in reading for 30 to 45 minutes. Treatment teachers also commented that lower-level readers experience some difficulty in matching correct ZPDs, reaching point goals, and in taking the time to “read more effectively.” One teacher explained that lower-level students need their book as a constant reference point to remember specifics, but cannot do this with the program or quizzes, adding, “Some students even achieve low scores when they stay at the low end of their ZPD.” In classroom interviews, another teacher provided an example of a lower-level student who needs to highlight important words in questions or go back to

the book to seek answers due to a restricted memory span. This same teacher noted that this student is unable to use notes in the program.

In their logs, two first-grade teachers commented on the difficulty of using the program with their students, noting that their level of students are emerging readers and “need a great deal of assistance.” In classroom interviews, one first-grade teacher commented that students are often pretending to be reading or experience difficulty in choosing books because they already read everything of interest to them.

Student Engagement and Interest

Treatment classrooms provided feedback on their observations of student engagement and interest in the *Accelerated Reader* activities. Because of teachers’ reports of student engagement across three occasions and responses being aggregated across teachers, total percentages do not add to 100% (see Table 9). Overall, treatment classrooms perceived the largest group of students (70%) to be *highly engaged* in program activities.

Table 9
Percentage of Treatment Students at Different Levels of Engagement

Level of engagement	Average percent
High engagement	69.96%
Average engagement	25.88%
Low engagement	11.00%

During classroom observations at one school, an evaluator noted that students showed high levels of engagement. The evaluator observed students running to the computer to complete a quiz, smiling after doing well on a quiz, and in some cases, dancing when they made 100%. Teachers also corroborated the observation that students are excited when they do well on quizzes.

In classroom interviews, teachers offered feedback on heightened levels of student interest and engagement. Teachers indicated that students enjoy picking out their own books, with one teacher explaining the benefits of allowing students to choose their own book,

They love to be able to say, “I picked the book out.” It gives them ownership. It’s not the teacher saying they have to do it. They like the idea that they can be more independent and take ownership.

Teachers commented that student interest has improved, with one teacher offering the following example of how reading interest has transferred beyond the classroom,

I think that my kids have become a lot more interested/confident. Their parent says, “I always wanted them to read,” and now they want to read at home too. I wish my own children could have started it at this age. The program is giving them independence to feel confident in it.

In classroom interviews, all treatment teachers indicated they would like to continue using the program next year.

CONTROL TEACHERS' USE OF PRACTICES SIMILAR TO THOSE ENDORSED BY *ACCELERATED READER*

The following section of the report details the degree to which control teachers engaged or did not engage in the types of practices endorsed by the *Accelerated Reader* program.

Material Use

The following section details how control teachers used their reading programs and briefly compares material use in control classrooms to *Accelerated Reader* material use.

Control teachers reported spending time each day teaching reading. On average, teachers spent 60 minutes (Range 30–90) planning and preparing for their reading program each week. With regard to reading software, only one control teacher reported using reading software programs with all students in their classroom, but did not specify the specific program. Additionally, similar to the use of reading logs in the *Accelerated Reader* program, 75% of control teachers reported that students keep reading logs or journals.

All control teachers indicated that every student in their classroom engages in daily independent reading as part of their reading curriculum. Fifty percent of teachers indicated that students have *less than 30 minutes* for independent reading and 50% indicated that students have *30 minutes* for independent reading practice.

Most control teachers (88%) reported reading to students as part of their reading curriculum. Teachers spent 10–15 minutes reading to students (71%) or more than 15 minutes (29%). Additionally, 100% of control teachers reported reading with students as part of their reading curriculum. Most teachers (63%) spent more than 15 minutes reading with students. Twenty-five percent read with students for 10–15 minutes, and 13% read with students for less than 10 minutes every day.

Instructional Practices

Control teachers completed an online survey to provide information regarding how they used instructional practices similar to those used in *Accelerated Reader*, including their use of assessment and leveling practices in addition to techniques for motivating students and setting goals.

Assessment and Leveling Practices

Control teachers offered feedback on their use of various assessment and leveling practices within their current reading programs. Most teachers (75%) spent the most time assessing their students informally or formally weekly. Additionally, teachers spent time assessing their students formally and informally through the use of assessments on the following basis:

- daily (63%)
- at the end of each lesson/unit (38%)
- at the beginning of the year (25%)
- quarterly (13%)

Control teachers had their own approaches for assessing student achievement and performance. Two teachers (25%) noted that their reading program includes specific progress reports (e.g., rubrics, running records) to examine student achievement. Three teachers (38%) reported meeting with students individually to check their reading progress. To determine when students needed extra help, teachers reported using various formal ($n = 5$) (e.g., reading comprehension scores, oral reading skills, test scores) and informal ($n = 3$) (e.g., questions about reading, observations) assessments. Control teachers used the results of their assessment practices in a variety of ways, including:

- modifying instructional strategies (88%)
- reteaching aspects of the lesson (88%)
- adjusting grouping students (63%)
- incorporating different materials (63%)
- conducting additional assessments (25%)
- recommending outside help (13%)

Only a small handful of teachers ($n = 2$) used some type of leveling system to ensure that students read books at their level. One teacher described her system as encouraging students to count words they did not know and then using this number to determine if the book is too difficult. One of the two teachers noted that students are aware of their level and noted that the classroom has a wide variety of books available. Additionally, teachers indicated that they determine when a student should change reading levels by performance on formal (e.g., book reports) and informal assessments (e.g., reading with students).

In some classrooms, students participated in self-monitoring of their own performance and achievement. Specifically, three teachers (38%) noted that students in their classroom participated in self-monitoring of their own reading achievement throughout the school year, through use of journals and reading logs, rubrics, and games.

Similar to the use of student book selection in the *Accelerated Reader* program, control teachers indicated that all students in control classrooms select their own books for independent reading and 75% of teachers reported assisting students with this process. Teachers stated that they assist students by ensuring they are reading at the appropriate level ($n = 4$), requiring the book to be approved ($n = 1$), and allowing students book choice based on interest ($n = 1$).

To compare levels of parent involvement, evaluators asked control teachers about the degree to which they involve parents in instruction. Only three control teachers (38%) indicated that they involve parents. Teachers involved parents by sending home weekly reading logs, books, or newsletters for parents to review. In addition, one classroom asked parents to help students practice their weekly vocabulary words and invited parents to the classroom to read to the students.

Motivating Students and Setting Goals

Control teachers provided details on the methods they use to motivate students and set goals within their current reading programs. Control teachers practiced various techniques to spread the joy of reading in their classrooms. Similar to treatment classrooms, all teachers reported reading good books aloud, and 88% of logs reported introducing students to interesting books through informal book talks. Additionally, 13% of control teacher's logs revealed that teachers organized small-group discussion for students to share personal responses to books. Other teacher responses included allowing students to read or share with friends ($n = 2$) and offering book clubs ($n = 1$).

Control teachers also practiced a variety of techniques for recognizing and motivating students in reading. Five teachers mentioned reading to students, with one teacher explaining, "Sometimes I will read a couple pages of my own personal book so they know I enjoy to read also," and another commenting that they read "interesting and quality literature" to students. Additional themes included using stickers or charts for achievement ($n = 2$), positively reinforcing students when they check out books or read every day ($n = 2$), asking students to share interesting books they read ($n = 2$), and using weekly reading logs ($n = 2$).

With respect to goal setting, 50% of control teachers set specific goals for reaching achievement with their students. Teachers offered different approaches to reading achievement; however, all involved setting some type of benchmark or objective. In one classroom, students had individual goals, and in another class, students needed to read a specific number of chapters or pages each week. Another teacher asked students to read a story fluently and to provide evidence that they comprehend the story. Three teachers used formal (e.g., reading journal) and informal assessments (e.g., vocabulary or reading review, questions about story) to monitor student progress toward these goals, and all four teachers noted that they adjust goals that are too challenging or too easy.

CONTROL TEACHERS' PERCEPTIONS OF THEIR READING PROGRAMS

In the online survey, control teachers described the adequacy of their current reading materials in meeting student needs. In addition, control teachers rated levels of student engagement and interest.

Student Learning Needs and Achievement

Similar to treatment classrooms, control teachers rated the adequacy of their reading program materials in meeting student needs. Overall, 100% of teachers felt their materials were *adequate* in meeting the needs of on-level students, and 87% felt the materials were at least *somewhat adequate* in meeting the needs of advanced and below-level students. In contrast, only 60% of teachers believed the materials were *adequate* for English language learners (see Table 10).

Table 10***Adequacy of Comparison Program Materials in Meeting Student Needs***

	Very inadequate		Inadequate		Somewhat adequate		Adequate		Very adequate	
	%	#	%	#	%	#	%	#	%	#
Significantly below-level	-	-	38%	3	38%	3	25%	2	-	-
Below-Level	-	-	13%	1	50%	4	25%	2	13%	1
On-Level	-	-	-	-	-	-	50%	4	50%	4
Advanced	-	-	13%	1	38%	3	38%	3	13%	1
Special education	33%	1	-	-	33%	1	-	-	33%	1
English language learners	20%	1	20%	1	-	-	60%	3	-	-

All teachers believed their reading materials were at least *somewhat effective* at improving their students' reading comprehension. Specifically, 75% believed they were *effective*, and 25% thought they were *somewhat effective*.

Comparison teachers provided feedback on the strengths of their reading programs in meeting student needs. Each teacher provided a different type of strength offered by the program, such as detailed lessons, reinforcement of concepts, leveled texts, skills and strategies, and engaging stories. One teacher commented on the benefit of using “five leveled texts that included a variety of stories, including fiction and nonfiction,” adding that these, “appeal to the students since the stories are real books by authors they are familiar with.” Other teachers expressed pleasure in the use of novels and a variety of stories that help to “keep the students interested.”

One teacher offered some feedback on areas in which their current program did not meet student needs, writing that lower-level students need additional reading resource classes, “to get the comprehension/vocabulary work that meets their level.” Another teacher commented that the current reading program needs more technology, a better-guided reading component, and better materials for gifted students.

Student Engagement and Interest

Control teachers provided feedback on their observations of student engagement and interest in their current reading program (see Table 11). Overall, treatment teachers perceived the largest group of students (52%) to be highly engaged in program activities, which is comparably lower to the group of highly engaged students in treatment classrooms (see Table 11).

Table 11
Percentage of Control Students at Different Levels of Engagement

Level of engagement	Average percent
High engagement	52.00%
Average engagement	35.63%
Low engagement	12.38%

IMPLEMENTATION SUMMARY AND CONCLUSIONS

For this study, treatment teachers used the *Accelerated Reader* program in their classrooms along with their regular materials, and control teachers used only their regular materials. Therefore, in comparison to control teachers, treatment teachers had an additional level of support, software, routines, and responsibilities. The study findings suggest that treatment students experienced a higher level of reading support by having additional materials and additional time in the day spent on reading. The measurable difference in the amount of time teachers spent using various core program components is evident in Figure 1 at the beginning of this section. In comparison to control teachers, treatment teachers also spent more time assessing students, focusing on reading motivation and enjoyment, and setting specific routines and responsibilities.

Treatment teachers and students enjoyed the *Accelerated Reader* program. Teachers offered positive feedback on the results of the program, and students demonstrated high levels of engagement and interest. Treatment teachers were more likely to classify their students as *highly engaged* than were control teachers (72% and 52%, respectively).⁶ Although treatment teachers generally liked *Accelerated Reader*, they also expressed some concerns related to student needs, with some teachers questioning whether student needs were met at lower reading levels, and in some cases, at lower grades.

Despite these differences in program resources available to treatment and control teachers, control teachers were also generally pleased with their reading programs. Control teachers noted that their current programs generally met student needs and offered myriad benefits related to using their core reading materials and components. Control teachers also found ways to encourage independent reading and to instill a joy for reading, while at the same time assessing their students along the way. Both treatment and control classrooms appreciated their programs, but it is important to recognize the differing nature of reading instructional materials and time spent on reading in their classrooms.

⁶ It is important to note that treatment teachers shared feedback on student engagement on logs three times throughout the study, and control teachers shared feedback on student engagement on logs only once.

STUDENT PERFORMANCE RESULTS

Evaluators conducted many analyses to address overarching evaluation questions regarding student learning in reading. Specifically, evaluators conducted descriptive, inferential, and multilevel modeling analyses, as well as the calculation of effect sizes. This portion of the report begins with a description of the learning gains of students who participated in *Accelerated Reader* and concludes with a section that compares their learning gains to those demonstrated by students who did not use *Accelerated Reader* throughout the study. This section of the report combined findings across first, second, third, and fourth grade. Appendix F breaks out main findings by first through third grade and by fourth grade.

LEARNING GAINS AMONG *ACCELERATED READER* PARTICIPANTS

The following portion of the report provides an overview of *Accelerated Reader* program participants' learning gains, as evidenced by scores on the *STAR Reading* assessment, over the study period. When appropriate, the study breaks out findings by grade and by subgroup.

Key Question:

Do students demonstrate significant learning gains during the study period? If so, what is the magnitude of the gains?

Descriptive Findings Regarding Student Learning Gains

Evaluators examined *Accelerated Reader* participants' pretest, midyear, and posttest scores on *STAR Reading* to explore their learning gains over the 2009–2010 school year. Figures 5–8 display the mean pretest, midyear, and posttest scores by grade. These figures reveal that, on average, treatment students' *STAR Reading* grade equivalent scores increased from pretest to posttest. Furthermore, by the end of the study period, on average, first-, second-, third-, and fourth-grade students who participated in the *Accelerated Reader* program demonstrated end-of-year *STAR Reading* scores that corresponded to grade equivalents exceeding typical grade equivalent scores of students in their respective grades.

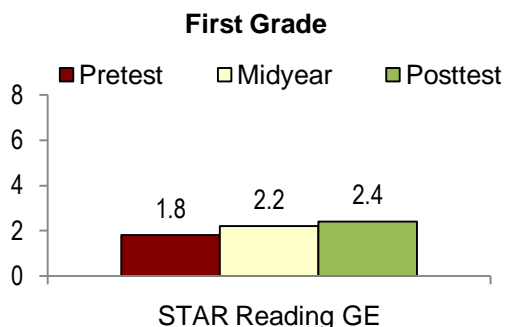


Figure 5. Pretest, midyear, and posttest *STAR Reading* grade-equivalent scores for first-grade *Accelerated Reader* participants ($n = 57$).

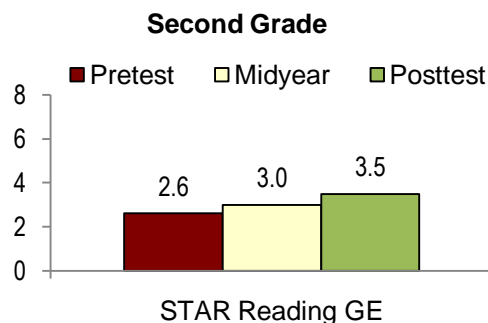


Figure 6. Pretest, midyear, and posttest *STAR Reading* grade-equivalent scores for second-grade *Accelerated Reader* participants ($n = 36$).

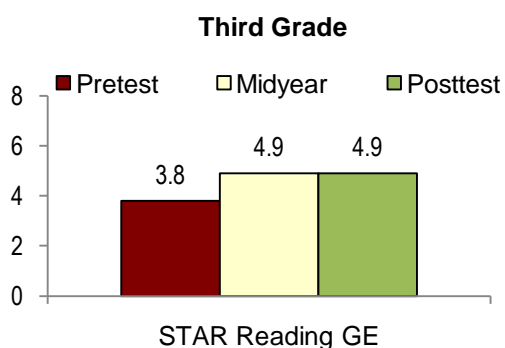


Figure 7. Pretest, midyear, and posttest *STAR Reading* grade-equivalent scores for third-grade *Accelerated Reader* participants ($n = 51$).

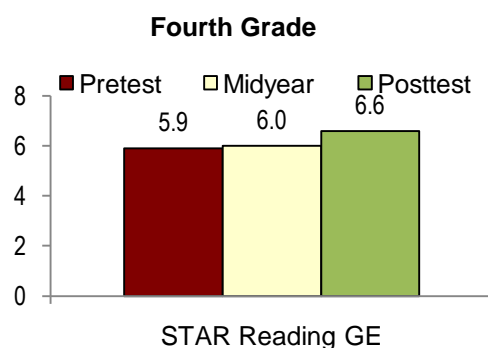


Figure 8. Pretest, midyear, and posttest *STAR Reading* grade-equivalent scores for fourth-grade *Accelerated Reader* participants ($n = 37$).

The *STAR Reading* assessment also yields an Instructional Reading Level, a criterion-referenced score that provides an estimated grade level corresponding to the level of materials on which students should receive instruction. For any particular student, the Instructional Reading Level represents the highest grade level at which they would be likely to answer at least 80% of items correctly. Table 12 displays the Instructional Reading Levels corresponding to the pretest, midyear, and end-of-year mean scale scores for first-, second-, third-, and fourth-grade students who participated in *Accelerated Reader* over the study period. Examination of the levels reveals that students' Instructional Reading Levels increased over the study period. These scores also indicate that, on average, first-grade *Accelerated Reader* participants' end-of-year Instructional Reading Levels corresponded to a second-grade level, and second-grade participants' end-of-year Instructional Reading Levels corresponded to a third-grade level. Likewise, third-grade participants' end-of-year Instructional Reading Levels corresponded to a fourth-grade level, and fourth-grade participants' end-of-year Instructional Reading Levels corresponded to a sixth-grade level.

Table 12
Instructional Reading Levels Corresponding to Treatment Students' Mean STAR Reading Scale Scores at Pretest, Midyear, and Posttest

First grade	Treatment
Pretest	1.0
Midyear	1.9
Posttest	2.2
Second grade	Treatment
Pretest	2.7
Midyear	3.1
Posttest	3.5
Third grade	Treatment
Pretest	3.7
Midyear	4.4
Posttest	4.4
Fourth grade	Treatment
Pretest	5.3
Midyear	5.3
Posttest	6.1

Multilevel Modeling Analyses Examining Student Learning Gains from Pretest to Posttest

The students in this study were nested in classrooms, which created a hierarchical data structure. Therefore, evaluators used multilevel modeling to examine whether students participating in the *Accelerated Reader* program demonstrated significant learning gains in reading over the study period. These analyses sought to determine whether the general sample of *Accelerated Reader* participants, rather than specific subgroups within the sample, demonstrated gains. Therefore, the analysis did not include any covariates. Table 13 displays the results of this analysis, which indicated that, as a group, students participating in *Accelerated Reader* for the 2009–2010 school year demonstrated significant learning gains as measured by the *STAR Reading* assessment. Furthermore, the average pretest to posttest gain corresponded to a large effect size ($d = 0.99$).

Table 13
Mean STAR Reading Pretest to Posttest Gains for Treatment Students

Outcome variable	Coefficient	Standard error	t value	Approx. df	p value	Effect size
STAR Reading scale score	97.65	7.26	13.45	9	<.001*	0.99

* Significant at the .05 level.

Multilevel Modeling Analyses Examining Student Learning Gains from Pretest to Midyear

Evaluators used multilevel modeling to examine whether students participating in the *Accelerated Reader* program demonstrated significant learning gains in reading by the middle of the school year. Because this analysis sought to determine whether the general sample of *Accelerated Reader* participants, rather than specific subgroups within the sample, demonstrated significant learning gains by midyear, it did not include covariates. Table 14 displays the results of this analysis, which indicated that, as a group, students participating in *Accelerated Reader* for the 2009–2010 school year demonstrated significant learning gains by midyear. Furthermore, the average pretest to midyear gain corresponded to a large effect size ($d = 0.57$).

Table 14
Mean STAR Reading Pretest to Midyear Gains for Treatment Students

Outcome variable	Coefficient	Standard error	t value	Approx. df	p value	Effect size
STAR Reading scale score	59.21	10.49	5.64	9	<.001*	0.57

* Significant at the .05 level.

Key Question:
Are variations in *Accelerated Reader* participation levels associated with differential learning gains?

Students' Learning Gains Based on Their Use of *Accelerated Reader* and Performance on *Accelerated Reader* Quizzes

The *Accelerated Reader* program provides data regarding students' use of the program as well as information regarding students' success on the quizzes associated with the program. For student engagement, the program estimates the time per day a student is engaged in reading practice, which is based on their *STAR Reading* scores and the points they earn in *Accelerated Reader*. On average, student diagnostic reports revealed that *Accelerated Reader* students' mean engagement level was 36.80 ($SD = 17.80$), suggesting that students were engaged in reading practice for more than 30 minutes per day, in general. *Accelerated Reader* also provides information about students' performance on the quizzes they take, including the percentage of quizzes they pass and the average percent of items they answered correctly. Figure 9 displays the percentage of quizzes that first-, second-, third-, and fourth-grade *Accelerated Reader* participants passed, on average, and reveals that students generally passed most quizzes they took. Figure 10 displays the percent of quiz items *Accelerated Reader* participants answered correctly and reveals that, as a group, participants usually answered most quiz items correctly.

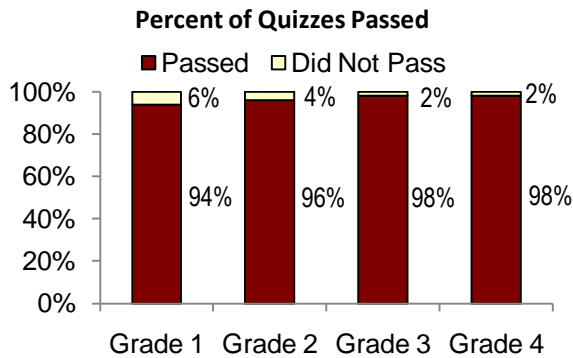


Figure9. Average percent of quizzes passed for Accelerated Reader participants in Grade 1 (n = 58), Grade 2 (n = 36), Grade 3 (n = 56), and Grade 4 (n = 39).

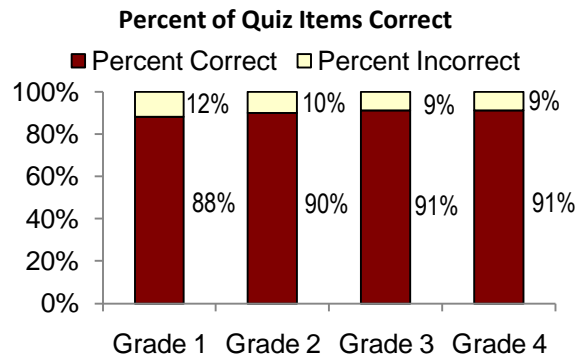


Figure10. Average percent of quiz items answered correctly for Accelerated Reader participants in Grade 1 (n = 58), Grade 2 (n = 36), Grade 3 (n = 56), and Grade 4 (n = 39).

The reports generated by *Accelerated Reader* yield information about how many points students earn. Points are based on the reading level of materials students read and the number of words in each book. Students earn a percentage of each book's points based on how many quiz items they answer correctly. Figure 11 displays the number of points *Accelerated Reader* participants earned over the study period.

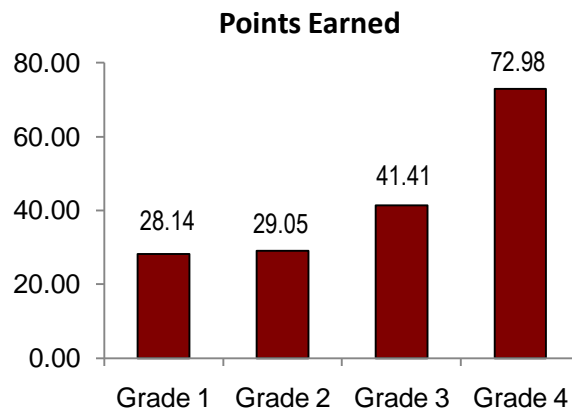


Figure11. Average points earned for Accelerated Reader participants in Grade 1 (n = 58), Grade 2 (n = 36), Grade 3 (n = 56), and Grade 4 (n = 39).

To examine whether usage and quiz performance variables were associated with differential learning gains among *Accelerated Reader* program participants, evaluators conducted multilevel modeling analyses with learning gains (measured by the *STAR Reading* assessments) as the outcome variable and the following variables as predictor variables: (a) students' time spent engaged in the program, as

measured by the *Accelerated Reader* built-in monitoring systems; (b) the percentage of *Accelerated Reader* quizzes a student passed; (c) the average percent of items correct on the *Accelerated Reader* quizzes students took throughout the study; and (d) the total *Accelerated Reader* points students earned through taking the *Accelerated Reader* quizzes. Table 15 displays the results of these analyses, which reveal that although there was a positive association between all assessed dosage and quiz variables and mean *STAR Learning* gains among *Accelerated Reader* participants, none of these relationships was significant. These findings suggest that students participating in *Accelerated Reader* demonstrated comparable gains, regardless of the time they spent engaged in the program and regardless of their success on the *Accelerated Reader* quizzes.

Table 15
Relationship of Accelerated Reader Dosage and Quiz Variables and Mean STAR Reading Gains for Treatment Students

Predictor variable	Coefficient	Standard error	t value	Approx. df	p value
Time engaged in program	0.16	0.42	0.38	182	.71
Percentage of quizzes passed	1.35	0.88	1.54	182	.13
Average percent correct	1.68	0.98	1.72	182	.09
Total points earned	0.08	0.21	0.41	182	.69

Key Question:
Are variations in student characteristics, teacher characteristics, and schools associated with differential learning gains among students who use *Accelerated Reader*?

Learning Gains of Subgroups based on Student Demographic Characteristics

As part of the data collection efforts for this study, Magnolia Consulting gathered student demographic information, including data regarding gender, ethnicity, socioeconomic status (eligibility for free and reduced-price lunch was the proxy), English proficiency, and special education status. In this sample of students, very few students were classified as special education students, as eligible to receive free or reduced-price lunch, or as having limited English proficiency. Therefore, the student demographic subgroup multilevel modeling analyses only addressed gender and ethnicity. Table E2, in Appendix E, displays the results of the analyses, which revealed that although there were no significant differences in learning gains between males and females, the small effect size ($d = -0.25$) favored females. There were also no significant differences in learning gains between Caucasian students and non-Caucasian students, but the small effect size ($d = 0.09$) favored Caucasian students. Because subgroup analyses divide the sample, caution is warranted when interpreting findings.

Learning Gains Based on Initial Reading Performance

Evaluators also used multilevel modeling to determine whether initial *STAR Reading* performance was significantly associated with learning gains over the study period. Table 16 displays the results of this analysis. Findings revealed that among *Accelerated Reader* participants, initial *STAR Reading* performance was significantly associated with pretest to posttest learning gains. Specifically, on average, students who demonstrated lower pretest *STAR Reading* performance demonstrated significantly greater learning gains over the study period, compared to students with relatively higher pretest *STAR Reading* performance.

Table 16
Relationship Between Pretest STAR Reading Performance and Learning Gains Among Accelerated Reader Participants

Outcome variable	Coefficient	Standard error	t value	Approx. df	p value
<i>STAR Reading</i> scale score gain	-0.08	0.03	-2.46	182	.02*

* Significant at the .05 level.

Learning Gains of Subgroups Based on Grade

Evaluators also examined whether there were differential gains by student grade level by conducting a one-way between-groups analysis of variance. Multilevel modeling was not appropriate for this analysis because of the small numbers of teachers in each grade in the treatment group.⁷ The mean gains indicated that, on average, students in Grade 1 gained the most ($M = 110.97$, $SD = 75.36$), followed by students in Grade 4 ($M = 104.42$, $SD = 147.36$), Grade 2 ($M = 92.69$, $SD = 61.34$), and Grade 3 ($M = 81.29$, $SD = 97.46$). However, findings from the analysis of variance revealed that these differences were not statistically significant [$F(3, 180) = 0.92$, $p = .43$]. This finding suggests that *Accelerated Reader* might be equally effective at contributing to learning gains for all grades assessed.

Learning Gains of Subgroups Based on School

To examine whether there were differential gains by school, evaluators conducting a one-way between-groups analysis of variance. As with the previous analysis, multilevel modeling was not appropriate for this analysis, in this case because of the small numbers of teachers in each school in the treatment group.⁸ The mean gains indicated that, on average, students in School A gained the most ($M = 99.13$, $SD = 142.30$), followed by students in School B ($M = 97.55$, $SD = 58.25$), and School C ($M = 96.56$, $SD = 87.69$). However, findings from the analysis of variance indicated that the differences by district were not statistically significant [$F(2, 181) = 0.01$, $p = .99$]. This finding suggests that *Accelerated Reader* was associated with comparable gains, regardless of the school in which it was implemented.

⁷ Because the analysis divided the sample and did not account for the nested data structure, readers should use caution when interpreting results.

⁸ Because the analysis divided the sample and did not account for the nested data structure, readers should use caution when interpreting results.

Learning Gains Based on Teacher Characteristics

Evaluators used multilevel modeling to determine whether two teacher-level variables—type of college degree and the degree to which teachers implemented *Accelerated Reader* with fidelity—were associated with differential learning gains among *Accelerated Reader* participants. Table 17 reveals that whether a teacher held a bachelor’s degree versus a higher degree was not significantly associated with student learning gains measured by the *STAR Reading* assessment. Likewise, the degree to which a teacher implemented *Accelerated Reader* was not significantly associated with student learning gains. Together, these findings suggest that the teacher variables measured in this study were not significantly associated with student learning gains, suggesting that the *Accelerated Reader* program might be equally effective for students regardless of whether their teachers hold a bachelor’s degree versus a higher-level degree and regardless of the degree to which teachers implement the program. It is important to note, however, that in this study, teachers generally implemented the program with fidelity. Therefore, it is possible that the lack of significance in the relationship between implementation fidelity and student learning gains is because of the lack of variation in teachers’ level of implementation fidelity.

Table 17
Relationship of Teacher Variables and Mean STAR Reading Gains for Treatment Students

Predictor variable	Coefficient	Standard error	t value	Approx. df	p value	Effect size
Bachelor’s degree (vs. higher degree)	2.06	18.17	0.11	8	.91	0.02
Implementation fidelity	15.19	84.83	0.18	8	.86	n/a

COMPARISONS OF STUDENT LEARNING GAINS BY TREATMENT AND CONTROL GROUP

The following section of the report compares the learning gains of *Accelerated Reader* program participants to those of students who did not participate in the program over the study period. When appropriate, the report breaks out findings by grade and by subgroup.

Key Question:

How do the reading gains of students who used the *Accelerated Reader* program over the study period compare to those of students who did not use the program?

Descriptive Findings

To facilitate comparisons of treatment- and control-group students’ pretest, midyear, and posttest performance on the *STAR Reading* assessment, evaluators calculated descriptive statistics. Figures 12–15 display the mean scale scores on the *STAR Reading* for treatment- and control-group students. Examination of these scores suggests that, for the first-grade sample, control students seemed to outperform treatment students at pretest, midyear, and posttest. For the second-grade sample,

control students seemed to outperform treatment students at pretest and midyear, but by the end of the year, treatment students appeared to outperform control students, on average. For the third- and fourth-grade samples, treatment students appeared to outperform control students, on average, at pretest, midyear, and posttest.

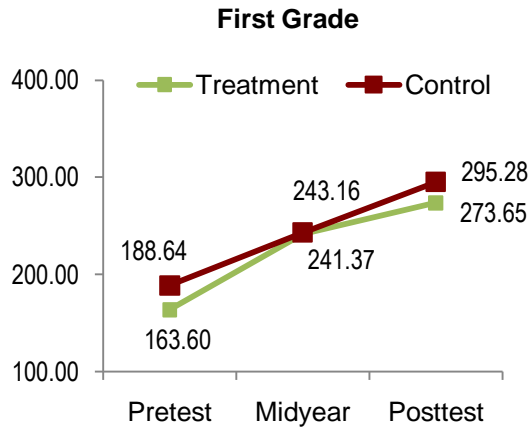


Figure 12. First-grade *STAR Reading* scale scores for treatment-group ($n = 57$) and control-group ($n = 25$) students.

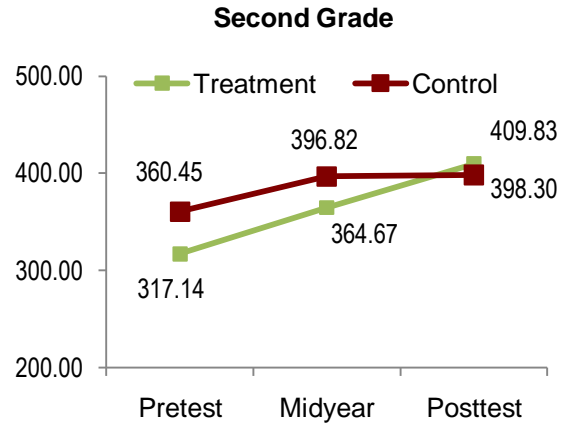


Figure 13. Second-grade *STAR Reading* scale scores for treatment-group ($n = 36$) and control-group ($n = 33$) students.

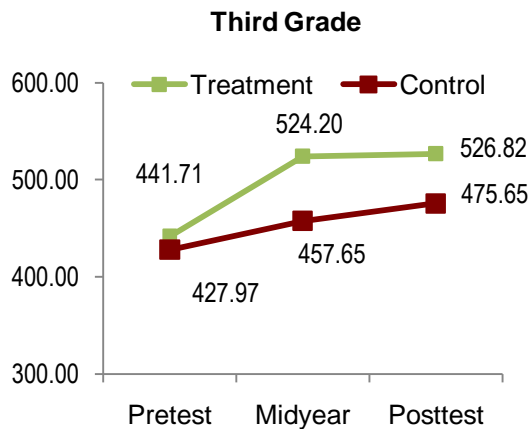


Figure 14. Third-grade *STAR Reading* scale scores for treatment-group ($n = 51$) and control-group ($n = 31$) students.

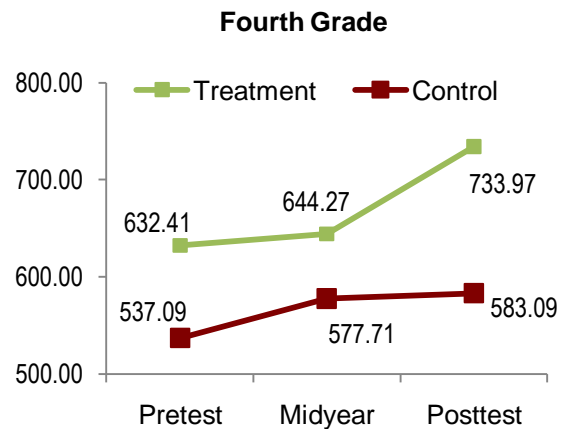


Figure 15. Fourth-grade *STAR Reading* scale scores for treatment-group ($n = 37$) and control-group ($n = 56$) students.

As discussed previously, the *STAR Reading* assessment also yields an Instructional Reading Level score that provides an estimated grade level corresponding to the level of materials on which students should receive instruction. Table 18 displays the Instructional Reading Levels corresponding to the pretest, midyear, and end-of-year mean scale scores for first-, second-, third-, and fourth-grade treatment- and control-group students. These scores suggest that, on average, the Instructional Reading Levels of treatment increased more throughout the study period than did the Instructional Reading Levels for control students.

Table 18***Instructional Reading Level Corresponding to Treatment and Control Students' Mean STAR Reading Scale Scores at Pretest, Midyear, and Posttest***

First grade	Treatment	Control
Pretest	1.0	1.4
Midyear	1.9	1.8
Posttest	2.2	2.4
Second grade	Treatment	Control
Pretest	2.7	3.1
Midyear	3.1	3.4
Posttest	3.5	3.4
Third grade	Treatment	Control
Pretest	3.7	3.6
Midyear	4.4	3.8
Posttest	4.4	4.0
Fourth grade	Treatment	Control
Pretest	5.3	4.5
Midyear	5.3	4.7
Posttest	6.1	4.8

Multilevel Modeling Analyses Examining the Effect of *Accelerated Reader* on Student Learning Gains From Pretest to Posttest

As indicated previously, the students in this study were nested in classrooms, creating a hierarchical data structure. Therefore, evaluators used multilevel modeling to examine whether students participating in the *Accelerated Reader* program demonstrated learning gains in reading over the study period that were significantly greater than those demonstrated by students in the control group. This analysis included a covariate to control for pretest differences in *STAR Reading* achievement. Table 19 displays the results of this analysis, which indicated that, as a group, students participating in *Accelerated Reader* for the 2009–2010 school year demonstrated greater learning gains, as measured by the *STAR Reading* assessment, than did control-group students. Furthermore, the difference in gains was significant and corresponded to a moderate effect size ($d = 0.38$) and an improvement index (as defined by the WWC, 2008) of 15 percentile points.

Table 19

Effect of Study Condition on Mean Pretest to Posttest STAR Reading Gains

Outcome variable	Coefficient	Standard error	t value	Approx. df	p value	Effect size
STAR Reading scale score	38.25	12.59	3.04	17	.01*	0.38

* Significant at the .05 level.

Multilevel Modeling Analyses Examining the Effect of *Accelerated Reader* on Student Learning Gains From Pretest to Midyear

Evaluators also used multilevel modeling to determine whether students participating in the *Accelerated Reader* program demonstrated learning gains in reading that were significantly greater than those demonstrated by students in the control group by midyear. Like the previous analysis, this analysis included a covariate to control for pretest differences in *STAR Reading* achievement. Table 20 displays the results of this analysis and reveals that, at midyear, the learning gains of *Accelerated Reader* participants were comparable to those of students in the control group. The effect size, $d = 0.14$, corresponded to an improvement index (as defined by the WWC, 2008) of 6 percentile points.

Table 20

Effect of Study Condition on Mean Pretest to Midyear STAR Reading Gains

Outcome variable	Coefficient	Standard error	t value	Approx. df	p value	Effect size
STAR Reading scale score	14.15	16.01	0.88	17	.39	0.14

Effect of Study Condition on Learning Gains of Subgroups of Students

Evaluators used multilevel modeling to examine whether the effects of *Accelerated Reader* (versus not using the program) differed across males and females and across Caucasian and non-Caucasian students. Table E3, in Appendix E displays the results of these analyses, which revealed no significant gender by condition interaction or gender by ethnicity interaction. These findings suggest that the effect of study condition on learning gains was similar for males and for females and for Caucasian and non-Caucasian students.

Evaluators also conducted analyses to examine the effect of study condition on learning gains based on student grade level. Because of the small number of teachers per grade in the treatment and control group, multilevel modeling was not appropriate for this analysis. Therefore, evaluators ran an analysis of covariance.⁹ The findings revealed that the study by condition interaction was not significant [$F(3, 330) = 1.38, p = .25$], suggesting that the effect of study condition on learning gains was comparable across first, second, third, and fourth grades.

⁹ This analysis included pretest *STAR Reading* as a covariate, condition and grade as independent variables, as well as the condition by grade interaction. Because the analysis divided the sample and did not account for the nested data structure, readers should use caution when interpreting the results.

Finally, evaluators conducted an analysis of covariance examining whether there was a significant study condition by school interaction.¹⁰ Because of the small number of teachers per school in each study condition, using multilevel modeling was not appropriate for this analysis. Results indicated that the study condition by school interaction was not significant [$F(2, 330) = 0.10, p = .91$], suggesting that the effect of participating in *Accelerated Reader* versus comparison programs was comparable across participating schools.

Taken together, these findings suggest that the program effect (that is, the effect of study condition on learning gains) was similar for males and females, for Caucasian and non-Caucasian students, across grades, and across schools.

¹⁰ This analysis included pretest *STAR Reading* as a covariate, condition and school as independent variables, as well as the condition by school interaction. Because the analysis divided the sample and did not account for the nested data structure, readers should use caution when interpreting the results.

SUMMARY AND DISCUSSION

This evaluation study examined the efficacy of Renaissance Learning's *Accelerated Reader* program in increasing students' reading skills. *Accelerated Reader* is a computer-based program that facilitates progress-monitoring assessment and guided independent reading practice in the classroom. The program involves three primary steps in which students first read a book corresponding to their skills and interest, then take an *Accelerated Reader* quiz to assess their understanding, and finally, the program generates immediate feedback for students and teachers. The program is not a core reading program, but rather a supportive program for teachers to use in addition to their regular reading materials.

This study took place over the 2009–2010 school year with 19 teacher participants and 344 student participants in first through fourth grade across three private Catholic schools. For this study, treatment teachers and students used *Accelerated Reader* in addition to their regular classroom materials, and control teachers and students used only their regular materials, and not *Accelerated Reader*. This study used various teacher and student measures to assess student learning in treatment and control groups and to assess teachers' implementation fidelity and perceptions of *Accelerated Reader*.

Findings revealed that, overall, teachers implemented *Accelerated Reader* with a high degree of fidelity. On average, treatment teachers used the program almost five days per week, and in most treatment classrooms, teachers reported that their students practiced independent reading for 30–45 minutes per day. The *Accelerated Reader* student-engagement time data also revealed that, on average, students were engaged in the program for more than 30 minutes per day. Teachers' responses to the implementation logs, as well as data gathered during onsite observations and interviews, suggest that teachers implemented most key routines endorsed by *Accelerated Reader* appropriately, reading to students regularly, checking their logs before they took quizzes, providing appropriate support and feedback, intervening when appropriate, reviewing reports, monitoring student reading practice, and recognizing students' successes. Likewise, logs and site visits revealed that students were appropriately engaged in the *Accelerated Reader* activities. Therefore, it seems that students received appropriate dosage of the program over the study period, and teachers and students engaged in the key *Accelerated Reader* routines while using the program.

Teachers praised many aspects of *Accelerated Reader*, including the training they received, the degree to which it meets the needs of students who read at various levels, and its effectiveness at improving students' reading comprehension. Teachers also appreciated the feedback mechanism, noting that it served to motivate students. Additionally, teachers valued the way the program supports students in choosing their own materials, and they liked that students felt excited when they did well on quizzes. In comparison to control teachers, treatment teachers spent more time assessing students, focusing on the joy of reading, engaging in activities to motivate students, and setting up specific routines and responsibilities related to reading.

Teachers also shared feedback about challenges and potential for improving the program. About half the teachers found the program difficult to implement. There are likely several reasons for these difficulties. First, implementing *Accelerated Reader* in the classroom requires several preparatory steps, and for this study, teachers did not know whether they would be using the program until after the

school year already started. Therefore, they did not have as much time as they would have liked to set up and prepare for the program. They found the training helpful, but they would have preferred additional training. During interviews, some teachers indicated that they thought it would be much easier to implement the program in the future because they had already taken care of the preparation. Some teachers also reported concerns regarding time and technology, which are two common concerns teachers often express when implementing a technology-based program for the first time. Often, as teachers use a program over time, implementation becomes easier. Some teachers also expressed concerns about the availability of books at all levels and noted that the program could be difficult to use with students who are not motivated or with students who read at lower levels and need to rely on notes to aid comprehension.

The student learning results revealed that students who participated in *Accelerated Reader* over the study period demonstrated significant learning gains on the *STAR Reading* assessment. These gains corresponded to large effect sizes and were evident by the middle of the school year. By the end of the study period, on average, treatment students demonstrated *STAR Reading* performance that corresponded to grade-equivalent scores above their grade level. They also demonstrated steady increases in their Instructional Reading Levels over the study period. The degree to which students demonstrated success on *Accelerated Reader* quizzes was not significantly associated with learning gains, but it is possible that this is because most students performed quite well on the quizzes, so there was not a lot of variability for quiz performance.

Comparisons of student learning gains among treatment and control students revealed that, as a group, students who participated in the *Accelerated Reader* program during the study period demonstrated significantly greater gains on the *STAR Reading* assessment than did students who did not participate in the program. This differential gain corresponded to a moderate effect size. In addition, examination of the Instructional Reading Levels corresponding to treatment and control students' average *STAR Reading* scale scores suggest that, on average, the Instructional Reading Levels of treatment students increased more throughout the study period than did the Instructional Reading Levels of control students. Overall, this study's findings suggest that participating in the *Accelerated Reader* program (versus not participating in the program) had a positive impact on student learning gains.

To conclude, teachers generally implemented the *Accelerated Reader* program with high fidelity, and they liked many aspects of the program. All teachers who implemented *Accelerated Reader* agreed that they would like to continue using the program next year. Regarding student learning, on average, students who participated in *Accelerated Reader* over the study period demonstrated large learning gains. Furthermore, their learning gains were larger than those demonstrated by the control group, suggesting that *Accelerated Reader* had a positive impact on student learning as measured by the *STAR Reading* assessment.

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APPENDIX A

WWC Evidence Standards

WWC evidence standards ^a	Evidence for meeting criteria
1. Study design: Did the study use random assignment to place study participants into treatment and control groups?	Magnolia Consulting uses SPSS to assign teachers randomly to treatment and control groups.
2. Attrition: Are the levels of overall attrition and differential attrition of concern?	There was extremely low attrition in this study. Specifically, the attrition rate was less than 1%. Therefore, evaluators could not conduct meaningful analyses to examine differential attrition.
3. Establishing equivalence in RCTs with attrition and quasi-experimental designs (QED): Is there baseline equivalence of the analytical sample? If the difference of characteristics is high, did evaluators statistically adjust for those differences?	Examination of baseline pretest <i>STAR Reading</i> scores revealed significant group mean differences in these scores [$t(335) = 1.96, p = .05$], with students in the control group scoring higher ($M = 417.91, SD = 199.11$) than students in the treatment condition ($M = 372.27, SD = 221.84$). The effect size associated with this significant difference (Cohen's $d = 0.22$) is relatively small but sufficient to warrant concern that the groups might not have had similar prior reading achievement levels. Therefore, evaluators statistically controlled for this pretest difference in analyses examining group differences in student learning.
4. Confounding factor: Is there a confounding factor that makes it impossible to separate how much of the variability in the outcome is attributed to the treatment and how much is attributable to the confounding factor?	The study included no confounding factors. There were multiple schools, teachers, and students in each study condition.
<p>5. Reasons for not meeting standards:</p> <p>(a) Is there a valid or reliable outcome measure?</p> <p>(b) Are the outcomes overaligned with the treatment?</p> <p>(c) Are the treatment and comparison groups equivalent at baseline?</p> <p>(d) Does the overall attrition rate exceed the WWC standards?</p> <p>(e) Does the differential attrition rate exceed the WWC standards?</p> <p>(f) Do the estimates of the effects account for differences in pretreatment characteristics while using a QED?</p> <p>(g) Was there more than one unit of analysis in either condition, making it possible to attribute the effect solely to the treatment?</p> <p>(h) Was the treatment the only treatment in the study, making it possible to attribute the effect solely to the treatment?</p> <p>(i) Was the treatment implemented as designed, making it possible to attribute the effect solely to the treatment?</p>	<p>(a) There are published reports providing evidence for the reliability and validity of the <i>STAR Reading</i> assessment.</p> <p>(b) The primary outcome, learning in reading as measured by the <i>STAR Reading</i> assessment, is not overly aligned with the program. However, it is important to note that Renaissance Learning publishes the <i>STAR Reading</i> assessment.</p> <p>(c) Evaluators statistically controlled for any preexisting differences.</p> <p>(d) The overall attrition rate for students was very low (less than 1%). There was no school or teacher attrition.</p> <p>(e) There was not a large degree of differential attrition.</p> <p>(f) Evaluators controlled for pretest group differences using appropriate covariates.</p> <p>(g) Within each study condition, there was more than one classroom (and teacher), and within each classroom, there was more than one student.</p> <p>(h) There was only one treatment condition in this study.</p> <p>(i) Implementation monitoring revealed that teachers implemented the treatment (<i>Accelerated Reader</i>), as designed.</p>

^a These standards reflect the December 2008 *What Works Clearinghouse Procedures and Standards Handbook (Version 2.0)*.

WWC evidence standards ^a	Evidence for meeting criteria
<p>6. Corrections and adjustments: Are appropriate effect sizes and corrections made for the study design?</p>	<p>Where appropriate, evaluators conducted effect sizes to determine the strength of the findings. Calculations of effect sizes accounted for the nested data structure.</p>

APPENDIX B

School Characteristics

	School A			School B			School C			Study totals		
	Treatment	Control	Total	Treatment	Control	Total	Treatment	Control	Total	Treatment	Control	Total
<i>First grade</i>												
Classrooms	1	1	2	1	0	1	1	1	2	3	2	5
Number of students	16	14	30	26	0	26	16	14	30	58	28	86
<i>Second grade</i>												
Classrooms	0	1	1	1	0	1	1	1	2	2	2	4
Number of students	0	21	21	21	0	21	15	15	30	36	36	72
<i>Third grade</i>												
Classrooms	1	0	1	1	1	2	1	1	2	3	2	5
Number of students	21	0	21	18	16	34	17	15	32	56	31	87
<i>Fourth grade</i>												
Classrooms	1	1	2	0	1	1	1	1	2	2	3	5
Number of students	17	15	32	0	27	27	22	18	40	39	60	99
<i>School totals</i>												
Classrooms	3	3	6	3	2	5	4	4	8	10	9	19
Number of students	54	50	104	65	43	108	70	62	132	189	155	344
<i>Gender among participants</i>												
Female	59.3%	56.0%	57.7%	53.8%	46.5%	50.9%	48.6%	46.8%	47.7%	53.4%	49.7%	51.7%
Male	40.7%	44.0%	42.3%	46.2%	53.5%	49.1%	51.4%	53.2%	52.3%	46.6%	50.3%	48.3%

Ethnicity among participants

African American	7.4%	8.0%	7.7%	0.0%	0.0%	0.0%	1.5%	3.2%	2.3%	2.7%	3.9%	3.2%
Hispanic	9.3%	14.0%	11.5%	6.2%	4.7%	5.6%	14.7%	14.5%	14.6%	10.2%	11.6%	10.8%
Caucasian	61.1%	50.0%	55.8%	90.8%	93.0%	91.7%	55.9%	51.6%	53.8%	69.5%	62.6%	66.4%
Asian/ Pacific Islander	11.1%	10.0%	10.6%	0.0%	0.0%	0.0%	26.5%	24.2%	25.4%	12.8%	12.9%	12.9%
Other	11.1%	18.0%	14.4%	3.1%	2.3%	2.8%	1.5%	6.5%	3.8%	4.8%	9.0%	6.7%

Limited English proficiency among participants

LEP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Non-LEP	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Special education among participants

Special education	0.0%	0.0%	0.0%	0.0%	7.0%	2.8%	2.9%	0.0%	1.5%	1.1%	1.9%	1.5%
Non-Special education	100.0%	100.0%	100.0%	100.0%	93.0%	97.2%	97.1%	100.0%	98.5%	98.9%	98.1%	98.5%

Free/Reduced-Price lunch among participants

Free/Reduced lunch	3.7%	4.0%	3.8%	1.5%	2.3%	1.9%	NA	NA	NA	2.5%	3.2%	2.8%
Non-Free/Reduced lunch	96.3%	96.0%	96.2%	98.5%	97.7%	98.1%	NA	NA	NA	97.5%	96.8%	97.2%

Section 504 among participants

Section 504	3.7%	6.0%	4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	1.9%	1.5%
Non-Section 504	96.3%	94.0%	95.2%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	98.9%	98.1%	98.5%

APPENDIX C

Data Analysis Plan Summary

Data Analysis Plan Summary

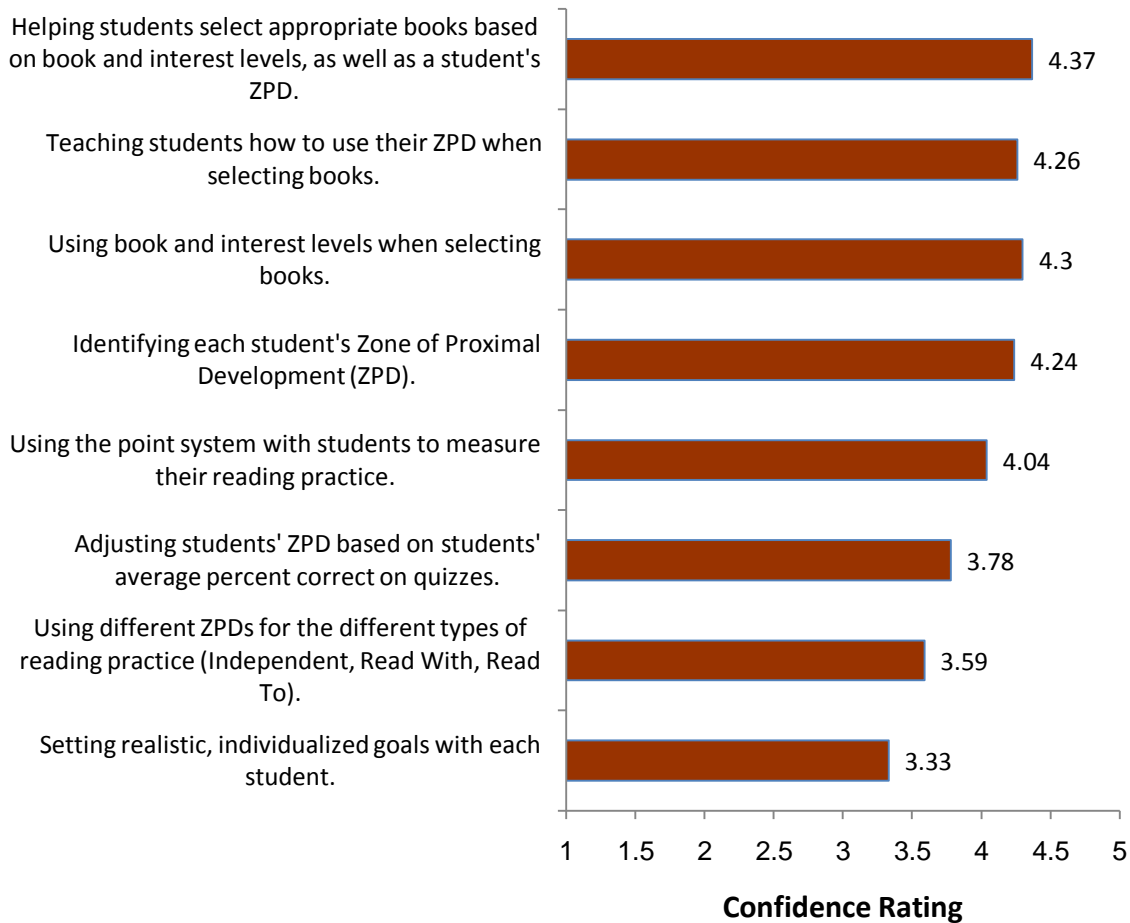
Evaluation question	Analysis
Participant characteristics	
<i>What are the characteristics of students who participated in the study?</i>	Descriptive statistics for grade, gender, ethnicity, free/reduced lunch, migrant status, disabled status, special education status, and limited English proficiency (LEP)
<i>What are the characteristics of teachers who participated in the study?</i>	Descriptive statistics for number of years teaching, number of years teaching at current grade, highest degree, and level of implementation
<i>Are there demographic differences between treatment- and comparison-group students?</i>	Chi-square analyses with treatment/comparison group as the independent variable and gender, ethnicity, free and reduced lunch, migrant, disabled, special education, and LEP as the dependent variables
Teacher implementation fidelity and perceptions	
<i>How do teachers implement the Accelerated Reader program?</i>	- Descriptive statistics for implementation log data, calculated percentage of implementation compared to benchmark
<i>What are teachers' perceptions of the program?</i>	- Content analysis and analytic induction of participant interviews and classroom observations
Treatment student performance	
<i>Do students who participate in the Accelerated Reader program demonstrate significant learning gains in reading over the study period?</i>	Evaluators will use HLM 6 software to examine <i>STAR Reading</i> gains among treatment students from pretest to posttest. The outcome variables will be pretest to posttest gains in <i>STAR Reading</i> scale scores. The equations for this analysis are as follows: Level 1 equation: $Y_{ij} = \beta_{0j} + r_{ij}$ Level 2 equation: $\beta_{0j} = \gamma_{00} + u_{0j}$
<i>To what extent do students use Accelerated Reader during the study? Are variations in participation levels associated with differential learning gains among students who use the program?</i>	Evaluators will calculate students' mean engagement time and use that variable as a predictor variable in an HLM analysis, examining the degree to which engagement time is associated with <i>STAR Reading</i> gains. The equations for this analysis are as follows: Level 1 equation: $Y_{ij} = \beta_{0j} + \beta_{1j}X_{1i} + r_{ij}$ Level 2 equation: $\beta_{0j} = \gamma_{00} + u_{0j}$ $\beta_{1j} = \gamma_{10}$

Evaluation question	Analysis	
<i>Are variations in how teachers implement Accelerated Reader associated with differential learning gains among students who use the program?</i>	Evaluators will calculate teachers' implementation fidelity and use that variable as a predictor variable in an HLM analysis, examining the degree to which fidelity is associated with <i>STAR Reading</i> gains. The equations for this analysis are as follows: Level 1 equation: $Y_{ij} = \beta_{0j} + \beta_{1j}X_{1i} + r_{ij}$ Level 2 equation: $\beta_{0j} = \gamma_{00} + u_{0j}$ $\beta_{1j} = \gamma_{10}$	
<i>What is the magnitude of the gains experienced by treatment students?</i>	Calculate effect sizes for student performance results on the <i>GMRT</i> using the formula for Cohen's and the formula from Raudenbush et al. (2005), as appropriate.	
	Cohen's $d = \frac{\overline{X^t} - \overline{X^c}}{\frac{s^t + s^c}{2}}$	Raudenbush et al. (2005) $\delta = \frac{\gamma_{001}}{\sqrt{\tau_\beta + \tau_\tau + \sigma^2}}$
Treatment- and comparison-group comparisons		
<i>How does the reading performance of students who use Accelerated Reader compare to that of students who do not use the program?</i>	Evaluators will use HLM 6 software to examine the effect of condition on <i>STAR Reading</i> gains from pretest to posttest. The outcome variables will be pretest to posttest gains on the <i>STAR Reading</i> . The equations for this analysis are as follows: Level 1 equation: $Y_{ij} = \beta_{0j} + r_{ij}$ Level 2 equation: $\beta_{0j} = \gamma_{00} + \gamma_{01}W_j + u_{0j}$	
	<u>Level 1 predictor variables</u> Pretest <i>STAR Reading</i> score	<u>Level 2 predictor variables</u> Condition
<i>What is the magnitude of performance differences between treatment and comparison groups?</i>	Calculate effect sizes for student performance results using the formula for Cohen's and the formula from Raudenbush et al. (2005), as appropriate	
	Cohen's $d = \frac{\overline{X^t} - \overline{X^c}}{\frac{s^t + s^c}{2}}$	Raudenbush et al. (2005) $\delta = \frac{\gamma_{001}}{\sqrt{\tau_\beta + \tau_\tau + \sigma^2}}$

APPENDIX D

Supporting Figures and Tables for Program Implementation

Within this appendix, evaluators provide additional information about program implementation. The following section addresses treatment teachers' perceptions of getting started with the program and use of program components.



FigureD1. Teacher's confidence in setting up various *Accelerated Reader* materials ($n = 27$).

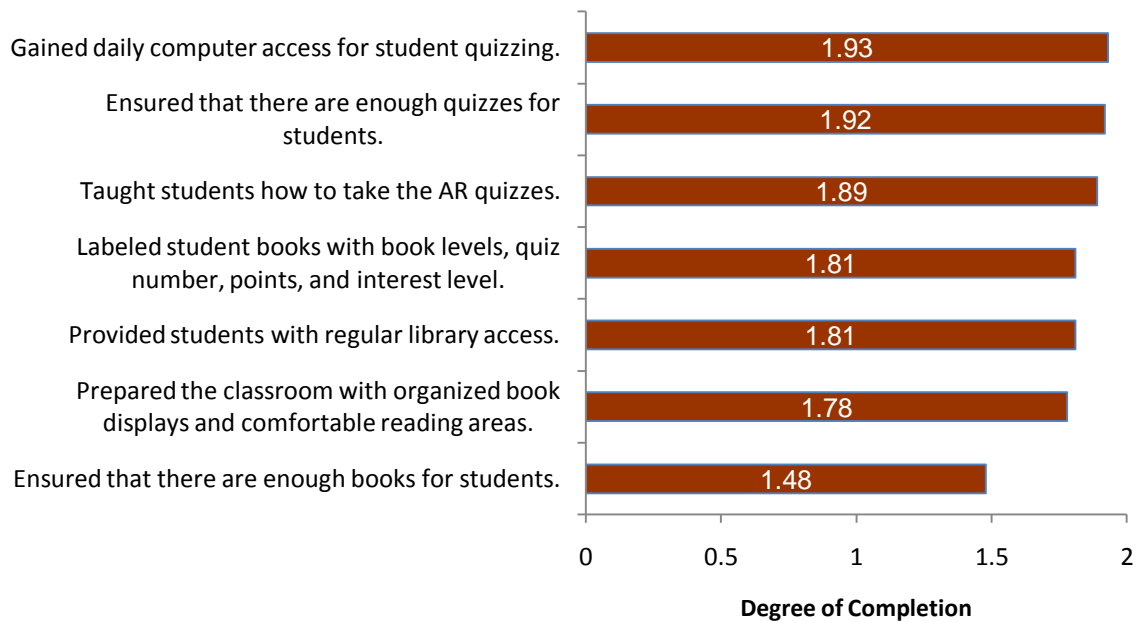


Figure D2. Use of *Accelerated Reader* preparatory components ($n = 27$).

Table D1
Frequency of Use of Accelerated Reader Program Components

	Daily		Biweekly		Weekly		Monthly		Not at all	
	%	#	%	#	%	#	%	#	%	#
Student Reading Log	93%	25	-	-	7%	2	-	-	-	-
Student Record Reports	48%	13	22%	6	26%	7	-	-	4%	1
Diagnostic Reports	39%	10	19%	5	37%	10	-	-	4%	1
TOPS Reports	74%	20	7%	2	15%	4	4%	1	-	-
Goal Setting Chart	15%	4	19%	5	19%	5	35%	9	12%	3
TWI Reports	11%	3	11%	3	11%	3	11%	3	56%	15
Literacy Skills	4%	1	-	-	-	-	-	-	96%	26
Other Reading Quizzes	-	-	-	-	-	-	7%	2	93%	25
Vocabulary Practice	-	-	-	-	-	-	-	-	100%	26

APPENDIX E

Supporting Tables for Student Performance Results

The following table presents descriptive *STAR Reading* data for the treatment and control groups in this study.

Table E1
Pretest and Posttest STAR Reading Scale Score Means, Standard Deviations, and Gains for Treatment and Control Groups

All Grades Combined						
	Treatment <i>n</i> = 181			Control <i>n</i> = 145		
	Pretest	Posttest	Gain	Pretest	Posttest	Gain
Mean	369.18	466.17	96.99	413.48	468.44	54.96
Standard deviation	219.70	222.26		190.48	112.21	
First Grade						
	Treatment <i>n</i> = 57			Control <i>n</i> = 25		
	Pretest	Posttest	Gain	Pretest	Posttest	Gain
Mean	163.60	273.65	110.05	188.64	295.28	106.64
Standard deviation	105.06	123.75		130.65	132.24	
Second Grade						
	Treatment <i>n</i> = 36			Control <i>n</i> = 33		
	Pretest	Posttest	Gain	Pretest	Posttest	Gain
Mean	317.14	409.83	92.69	360.45	398.30	22.85
Standard deviation	99.96	86.06		137.89	128.68	
Third Grade						
	Treatment <i>n</i> = 51			Control <i>n</i> = 31		
	Pretest	Posttest	Gain	Pretest	Posttest	Gain
Mean	444.71	526.82	82.11	427.97	475.65	47.68
Standard deviation	137.37	127.08		135.71	185.04	
Fourth Grade						
	Treatment			Control		

	<i>n</i> = 37			<i>n</i> = 56		
	Pretest	Posttest	Gain	Pretest	Posttest	Gain
Mean	632.41	733.92	101.51	537.09	583.09	46.00
Standard deviation	198.28	229.70		161.56	199.67	

The following table shows the results of multilevel model analyses examining *Accelerated Reader program* participants' pretest to posttest *STAR Reading* gains. Because the analyses divide the sample, readers should use caution when interpreting results.

Table E2
Multilevel Modeling Results Examining STAR Reading Gains for Subgroups of Treatment Students

Student subgroup	Coefficient	Standard error	<i>t</i> value	Approx. <i>df</i>	<i>p</i> value	Effect size
Male (vs. female)	-24.87	14.47	-1.72	182	.09	-0.25
Caucasian (vs. non-Caucasian)	9.03	15.87	0.57	182	.57	0.09

The following table displays the results of multilevel model analyses examining the effect of study condition on learning gains for subgroups of students. Because the analyses divide the sample, readers should use caution when interpreting results.

Table E3
Multilevel Modeling Results Examining Effect of Study Condition on STAR Reading Gains for Subgroups of Students

Student subgroup	Coefficient	Standard error	<i>t</i> value	Approx. <i>df</i>	<i>p</i> value
Condition X male (vs. female)	-8.27	22.18	-0.37	326	0.71
Condition X Caucasian (vs. non-Caucasian)	-1.60	24.08	-0.07	326	0.95

APPENDIX F

Student Performance Results Broken out by Grades 1-3 and Grade 4

This appendix breaks out main student findings by first through third grade and by fourth grade. It is important to note that breaking out the findings by these groups divided the sample. Therefore, results should be interpreted with caution.

Learning Gains among *Accelerated Reader* Participants

Multilevel Modeling Analyses Examining Student Learning Gains from Pretest to Posttest for Treatment-Group Students in Grades 1-3

Table F1 displays the results of this analysis, which indicated that, as a group, first-, second-, and third-grade students participating in *Accelerated Reader* for the 2009–2010 school year demonstrated significant learning gains as measured by the *STAR Reading* assessment.

Table F1

Mean STAR Reading Pretest to Posttest Gains for Treatment Students in Grades 1 - 3

Outcome variable	Coefficient	Standard error	t value	Approx. df	p value	Effect size
<i>STAR Reading</i> scale score	95.88	6.77	14.16	7	<.001*	1.18

* Significant at the .05 level.

Multilevel Modeling Analyses Examining Student Learning Gains from Pretest to Posttest for Treatment-Group Students in Grade 4

Table F2 displays the results of this analysis. The sample size for this analysis was very small. Therefore, HLM was unable to compute a *p* – value.

Table F2

Mean STAR Reading Pretest to Posttest Gains for Treatment Students in Grade 4

Outcome variable	Coefficient	Standard error	t value	Approx. df	p value	Effect size
<i>STAR Reading</i> scale score	104.42	6.93	15.07	n/a*	n/a*	.71

* HLM was unable to compute these values because of the small number of level 2 units and sample size.

Comparisons of Student Learning Gains by Treatment and Control Group

Multilevel Modeling Analyses Examining the Effect of Condition on Student Learning Gains from Pretest to Posttest for Students in Grades 1-3

Table F3 displays the results of this analysis, which indicated that for first-, second-, and third-grade students, end-of-year learning gains of *Accelerated Reader* participants were greater than those of students in the control group. The effect size of $d = 0.34$ corresponded to an improvement index (as defined by the WWC, 2008) of 13 percentile points.

Table F3
Effect of Study Condition on Mean Pretest to Posttest STAR Reading Gains for Students in Grades 1-3

Outcome variable	Coefficient	Standard error	t value	Approx. df	p value	Effect size
STAR Reading scale score	29.83	12.78	2.33	12	.04*	0.34

* Significant at the .05 level.

Multilevel Modeling Analyses Examining the Effect of Condition on Student Learning Gains from Pretest to Posttest for Students in Grade 4

Table F4 displays the results of this analysis, which indicated that for fourth-grade students, end-of-year learning gains of *Accelerated Reader* participants were statistically comparable to those of students in the control group. The effect size of $d = 0.47$ corresponded to an improvement index (as defined by the WWC, 2008) of 18 percentile points.

Table F4
Effect of Study Condition on Mean Pretest to Posttest STAR Reading Gains for Students in Grade 4

Outcome variable	Coefficient	Standard error	t value	Approx. df	p value	Effect size
STAR Reading scale score	59.47	30.00	1.98	3	.14	0.47