RENAISSANCE®

WHITE PAPER

The Research Foundation for Accelerated Reader 360®

RENAISSANCE
Accelerated Reader 360®

Promising Practices Network

Accelerated Reader is rated as a "proven program" that boosts reading achievement by the Promising Practice Network.

NATIONAL DROPOUT PREVENTION CENTER/NETWORK

Accelerated Reader has "strong evidence of effectiveness," the top rating for Prevention and Intervention at all grade levels, according to the National Dropout Prevention Center/Network.

Student Progress Monitoring
studentprogress.org

Accelerated Reader meets criteria for scientifically based progress-monitoring tools set by the National Center on Student Progress Monitoring.

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09/15

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Introduction

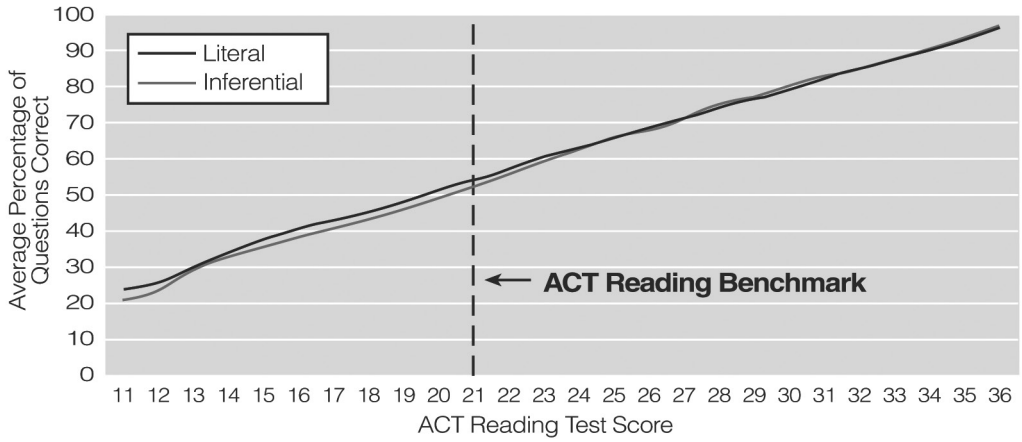
Practice is generally recognized as an essential component of any learning process (Willingham, 2009), and emphasizing the role of practice and hard work (rather than fixed intelligence) in academic accomplishments is beneficial for both motivation and performance (Mueller & Dweck, 1998). With regards to reading, practice builds vocabulary, fluency, comprehension, writing, and higher-order thinking skills (e.g., Anderson, Wilson, & Fielding, 1988; Baker, Simmons, & Kameenui, 1998; Greenfield, 2009; Guthrie, Wigfield, Metsala, & Cox, 1999) while also contributing to general abilities such as visual-information processing and speech perception (Dehaene et al., 2010; McBride-Chang et al., 2011).

> Research suggests time spent reading books is the best predictor of overall academic achievement, even more than socioeconomic status or ethnicity.
>
> (Kirsch et al., 2002)

Research suggests time spent reading books—in other words, reading practice—is the best predictor of overall academic achievement, even more than socioeconomic status or ethnicity (Kirsch et al., 2002). Similarly, results from the National Assessment of Educational Progress (National Center for Education Statistics, 1999) indicate that "at all three grades assessed [4, 8, and 12], students who reported reading more pages daily in school and for homework had higher average scale scores than students who reported reading fewer pages daily" (p. v).

Reading practice and critical thinking are fundamentally linked to one another, with progress in one invariably leading to progress in the other. ACT (2006) results indicate the two types of learning are very much connected, so that accurately assessing a student's literal reading comprehension may also provide an estimate of critical thinking ability. Literal reading comprehension helps students develop inferential thinking abilities (ACT, see figure 1; Willingham, 2009) and also aids critical thinking in building factual content-area knowledge.

Figure 1. Performance on the ACT reading test by comprehension level (Averaged across seven forms)



Note: Analysis was based on students who took any of seven test forms administered between fall 2003 and spring 2005. It was not possible to analyze performance below a score of 11 due to the small number of students scoring in this range.

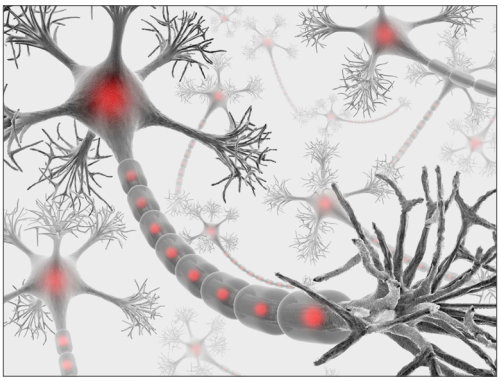
Reprinted with permission from ACT, Inc. (2006). Reading between the lines: What the ACT reveals about college readiness in reading. *Iowa City, IA.*

Pre-existing knowledge provides background information that can increase understanding, but also provides structure that can aid in organizing, understanding, and recalling new information. One example of prior factual knowledge affecting the structure of new information is *chunking*, which involves combining multiple pieces of information into one single piece (e.g., seven letters "HSUDNFJ" versus one word "ACHIEVE"). Knowledge gives structured meaning to information, making it less taxing for working memory and easier to recall. Entering a situation with knowledge about the topic at hand generally improves a person's ability to absorb new information, and problems are more likely to be solved when presented in a meaningful context (e.g., Social Constructivism, Vygotsky, 1978).

In addition to exposing students to factual knowledge, reading practice also affects brain structures in favorable ways. Practice promotes dendrite growth, which can create new neurological connections within the brain. It also strengthens existing connections by increasing myelination, which aids neuronal communication by providing support and insulation for cells (see figure 2). These changes in brain structure have positive effects on brain functioning and assist in deep learning. With practice, students are able to read more easily and quickly, freeing up cognitive capacity for more higher-order thinking. An experienced reader can focus on thinking critically about the content of a passage rather than devoting a large amount of energy trying to decipher what is being said. As early as first grade, better readers are more reflective than less skilled readers (Kagan, 1965), and by college, the amount of out-of-class reading is a significant predictor of critical-thinking skills (Terenzini, Springer, Pascarella, Nora, 1995).

> Reading practice and critical thinking are fundamentally linked to one another, with progress in one invariably leading to progress in the other.

Figure 2. Practice thickens myelin sheath



Research shows practice increases neurological connections, specifically the thickness of insulating myelin sheath, which vastly improves overall brain efficiency and higher-order thinking ability.

About Accelerated Reader 360™

In 1984, at her home in Wisconsin Rapids, WI, former educator Judi Paul began creating brief quizzes about books as a way to encourage her children to read more. Those quizzes were the prototype for what has evolved into Accelerated Reader 360 (AR 360). Although the basic premise remains the same, the program has become increasingly sophisticated over the years. Today, it is used in more than 37,000 schools worldwide, making it the most popular educational software for K12 students.

Reading Practice Quizzes, which assess book comprehension, are the cornerstone of AR 360. These quizzes comprise 5, 10, or 20 items about significant events, characters, and literal features of a book, and are presented matching the chronology of the book. In total, quizzes are available for more than 170,000 books—nearly half of which are nonfiction titles—and hundreds of informational articles.[1] Available titles are found using AR BookFinder (http://www.arbookfind.com/) or the Discovery Bookshelf, the latter guiding students to new materials based on their prior reading history, reading level, and book popularity.

1 Additional AR Quiz types include Recorded Voice Quizzes (for preliterate, struggling, and emergent readers); Spanish Quizzes (for Spanish bilingual, English learners, and Spanish language learning students); Early Reader Quizzes (for short titles read by beginning readers); Vocabulary Practice Quizzes (which complement Reading Practice Quizzes by testing knowledge of a book's key vocabulary); Other Reading Quizzes (which assess comprehension of selected textbook series and nonfiction instructional articles); and Literacy Skill Quizzes (which measure higher-order reading skills).

AR 360 provides a balance of independent reading practice with nonfiction reading and close-reading skills practice. Educators use this program to track students' comprehension of books read independently and grade-level instructional reading practice. AR 360 provides many benefits for students and teachers alike:

- Easy accessibility
- Instant results
- Comprehensive progress monitoring
- Tools to match students with appropriate texts
- Literacy skills, vocabulary, and instructional components
- Goal setting for personalized practice
- Research-based guidelines for encouraging growth in general reading achievement

AR 360 instantly scores each completed quiz and generates comprehensive data summaries, which helps teachers guide students to appropriate reading material, monitor reading practice, and target instruction. This immediate feedback helps students and teachers together evaluate whether reading is adequately matched to the student's skills, and makes students aware of their thought processes. Research suggests that instant feedback provided by the program facilitates greater improvement in reading comprehension than delayed feedback, which is associated with traditional book reports (Samuels & Wu, 2003). Similarly, the anticipation of quick feedback leads to better performance (Kettle & Häubl, 2010), and positive feedback, in particular, is thought to foster feelings of competence, enhance intrinsic motivation, and improve performance (Deci & Ryan, 1985; Harackiewicz, 1979).

Integrating with new technology

Use of digital devices (particularly tablets) and eBooks for reading is becoming increasingly common (Scholastic, 2015). Though general characteristics such as setting, characters, and theme play the largest role in book preference, format is also a factor, with a preference for digital text driven largely by interactive features (e.g., audio narration and online resources) that encourage students to engage with text in ways not possible with print materials (Jones & Brown, 2011; Milone, 2011).

AR 360™ provides a balance of independent reading practice with nonfiction reading and close-reading skills practice.

Some research suggests that reading comprehension is similar for print and digital text, with understanding more likely affected by literary features (e.g., content, theme, writing style) than format (Eden & Eshet-Alkalai, 2013; Jones & Brown, 2011; Milone, 2011, 2013; Salmerón & García, 2012). Other research shows digital text has the potential to enhance learning and engagement (Ciampa, 2012; Rockinson-Szapkiw, Dunn, & Holder, 2011), likely because it may help focus attention, with multisensory features especially effective for students at risk for learning disabilities and with low-socioeconomic status (Ciampa; Korat & Shamir, 2008; Rabiner, Murray, Skinner, & Malone, 2009; Shamir & Shlafer, 2011).

After reading a book, students may use a number of methods to take an AR Quiz, including Chromebooks, iPads, computers, and tablets 7-inches or larger. The AR 360 App is available for iPads and provides access to informational articles and accompanying instructional close-reading-skills practice activities. Likewise, the AR Student App is also available for download to native iOS devices such as the iPhone®, iPad®, or iPod touch®.

Instructional reading practice in AR 360 is based on digital nonfiction articles, and the program provides easy access to free Feedbooks or books purchased through Google Play. Renaissance Learning has also partnered with Brain Hive, Mackin VIA, myON Reader, and Capstone Interactive to provide a seamless route from affordable eBooks to their accompanying AR Quizzes.

Vocabulary
Vocabulary deficits tend to begin early in life and can have a pervasive negative effect on learning. Research with students in kindergarten and grade 2 shows that children with the largest vocabularies (highest 25%) know twice as many word meanings as children with the smallest vocabularies (lowest 25%) (Biemiller & Slonim, 2001). Children with low vocabularies at the end of the primary grades are likely to have poor academic outcomes as late as high school (Cunningham & Stanovich, 1997).

AR 360™ supports three key instructional shifts emphasized in current education reform:

1. More nonfiction reading
2. Increased text complexity
3. Ability to cite evidence

Many researchers and educators have identified reading practice as an effective means for increasing word knowledge (e.g., Adams, 1990; Anderson & Nagy, 1991; Baumann & Kameenui, 1991; Beck, McKeown, & Kucan, 2002; Stahl & Fairbanks, 1986). Incidental learning that occurs while students are reading is thought to account for a considerable 25–50% of vocabulary acquisition (Nagy, Anderson, & Herman, 1987). While reading, students are exposed to new words and also have opportunities to further develop their understanding of word meanings. Whether their literacy skill development is low, typical, or high, all students benefit from time spent reading, particularly when the material is at an appropriate level (Squire, 1995).

Vocabulary Quizzes are available in AR 360, and text-to-speech and dictionary tools are incorporated into the program's digital instructional articles. AR 360's vocabulary quizzing process is consistent with research indicating that effective instruction should couple definitional information with multiple exposures to new words in different contexts (Stahl & Fairbanks, 1986), and focuses on functional words needed to understand the text or likely to be encountered often (Stahl, 1986). Each Vocabulary Quiz includes words both from the most recently read book and words from books read previously.

Instructional reading practice

Reading text closely and thoughtfully promotes critical thinking. Research suggests students need increased instructional support as they interact with texts so they develop advanced literacy skills for learning effectively from complex college and career texts (ACT, 2006, 2009; Alvermann, 2001; Biancarosa & Snow, 2004; Heller & Greenleaf, 2007; National Governors Association, 2010; Zygouris-Coe, 2012). Particular emphasis has been placed on encouraging students to read more complex text and more nonfiction, and to cite evidence when composing responses to text.

These recommendations stem from investigations that suggest gaps exist between K12 experiences versus what is expected after high school graduation. It has been noted that the level of text complexity students typically encounter at the end of high school is substantially lower than the levels observed in college reading materials (Nelson, Perfetti, Liben, & Liben, 2012; see p. 15). Similarly, students primarily deal with fictional texts in the classroom, but as adults will be required to read mostly informational and nonfiction materials (Kletzien & Dreher, 2004). Students also often rely on personal views rather than cite sufficient evidence for claims (Bell & Linn, 2000; Hogan & Maglienti, 2001; Lee & Songer, 2003; Sadler, 2004; Sandoval & Millwood, 2005).

To better develop students' reading skills, educators are challenging students with complex texts and rebalancing the amount of fiction and nonfiction they read. This is expected to increase content-area knowledge and subject-specific vocabulary, as well as prepare students to be information-savvy adults capable of comprehending, evaluating, and correctly applying factual content. AR 360 supports three key instructional shifts emphasized in current education reform: (1) more nonfiction reading, (2) increased text complexity, and (3) the ability to cite evidence. The program helps teachers track the materials students are reading and whether they understand what was read. Instructional activities promote close-reading skills by having students cite text evidence and craft responses to informational articles, both of which encourage interaction with text and deep thinking about content.

Informational articles in AR 360 are designed to help teachers identify, level, and distribute relevant nonfiction material. Research suggests students may be highly motivated to read nonfiction texts that appeal to their curiosity (Dreher, 2003; Saul & Dieckman, 2005), and that programs that provide electronic scaffolding for students (e.g., encouraging them to make explanatory notes or comment on text) facilitate improved comprehension and better responses (Lee & Songer, 2003; Mendenhall & Johnson, 2010; Porter-O'Donnell, 2004; Yang, Zhang, Sue, & Tsai, 2011). In AR 360, educators can browse digital nonfiction articles by topic (e.g., history or science), skills related to specific standards (e.g., determining an author's purpose), ATOS level,[2] and grade.

While reading, close-reading skills practice activities prompt students to highlight and tag important information and respond to questions about the text. These built-in instructional activities encourage students to read closely, develop skills needed to transition to more complex texts, and learn to provide textual evidence while responding. After reading an article and completing accompanying activities, students take a brief AR Quiz to assess their comprehension of the material. Using quizzing data, teachers easily identify students who need support and those who are ready to move on to more challenging matter.

Independent reading practice

In addition to scaffolded classroom experiences with highly complex texts, students should also engage in independent reading within their individual achievement levels. The amount of reading practice students participate in is highly correlated to reading achievement gains (Anderson, 1996), and is most effective when it is coupled with feedback and guidance (Ericsson, Krampe, & Tesch-Römer, 1993; Renaissance Learning, 2012; Snow, 2002).

The books students read independently play a big role in their academic achievement. For students to get the most out of independent reading practice, educators should (1) help them identify appropriate books, (2) monitor reading rates and comprehension, and (3) intervene to provide instruction or make adjustments as needed. AR 360's data management capabilities enable just this type of differentiated reading practice, helping teachers monitor independent reading and guide students to books suited to their individual achievement levels and interests.

Getting the most out of reading practice: Factors of interest

For both independent and instructional reading practice, AR 360 can be used to monitor progress and guide students to appropriate texts. In doing so, educators are encouraged to focus on three main factors:

1. Quality of comprehension
2. Quantity of reading
3. Complexity of text

Of these factors, a multiple regression analysis[3] using AR 360 and STAR Reading[4] data from the 2010–2011 school year indicates that comprehension is the most influential factor affecting gains in general reading ability. Both quantity and complexity are also significant predictors of positive growth, but not to the same degree as quality of comprehension.[5] The following sections explain the research supporting best practices for reading practice as they relate to each of these factors.

Factor 1: Comprehension—Average percent correct (APC)

In AR 360, APC is the key factor for guiding reading practice. Best practice recommendations encourage students to have an APC of 85% correct or higher (Borman & Dowling, 2004; Renaissance Learning, 2012; Topping & Sanders, 2000).

2 ATOS is Renaissance Learning's readability formula. For more information, see pp. 9–11, 14–16.

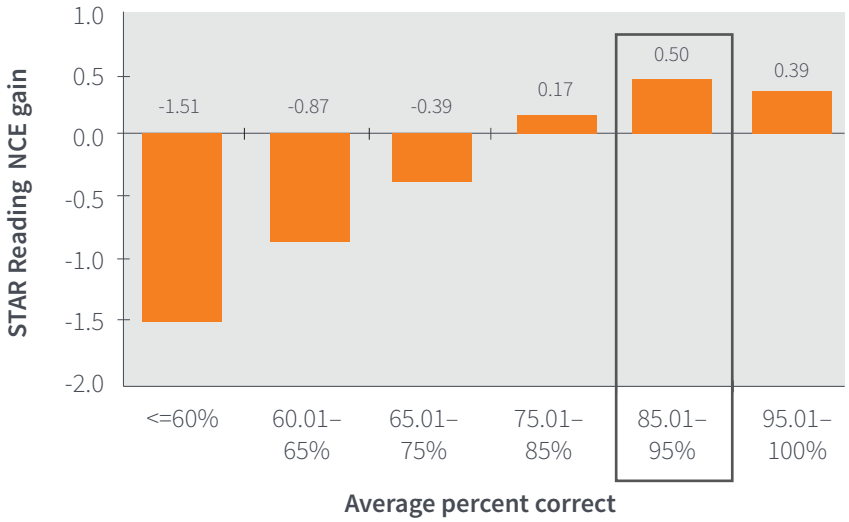
3 STAR Reading posttest normal curve equivalent (NCE) scores were regressed onto standardized variables for average percent correct, engaged reading time, and zone of proximal development while controlling for pretest scores.

4 STAR Reading is Renaissance Learning's interim assessment of reading achievement for K12 students. For more information, see the STAR Reading Technical Manual, available by request to research@renaissance.com.

5 Average percent correct (which measures quality of comprehension) accounted for the most variance in STAR Reading gains (ß = 3.07).

Figure 3 shows the relationship between AR Quiz performance and general reading achievement as measured by STAR Reading (using 2010–2011 data). The data show that students with an APC of less than 75% had negative gains, meaning that consistently scoring in the barely passing zone on quizzes was not productive for developing general reading ability. Students with APC levels above 75% experienced positive gains, and students with an APC between 85% and 95% had the most gains. Of note, gains began to slightly decline at extremely high APC ranges above 95%, suggesting that students who had an APC this high may have been reading books that were too easy.

Figure 3. Students with an APC between 85–95% on AR™ Quizzes experience the greatest reading gains
(*N* = 2,284,464; 2010–2011 school year)



Note: Normal curve equivalent (NCE) scores are a way of representing percentile scores so they can be accurately averaged and compared with each other. Because NCEs are derived from percentiles, they measure growth in comparison to national norms. Positive NCE gains mean student achievement grew at a faster rate than national averages. An NCE gain of zero represents the national average.

Factor 2: Quantity—Engaged reading time (ERT)

In addition to how well students understand what they are reading, it is also important to ensure students spend enough time reading. AR 360 provides ERT as one metric for quantity of student reading. Estimated ERT[6] is derived from AR Points, which are calculated based on the length of the book and number of items answered correctly on the quiz:

$$\text{points earned} = \frac{10 + \text{ATOS level}}{10} \; x \; \frac{\text{words in book}}{10{,}000}$$

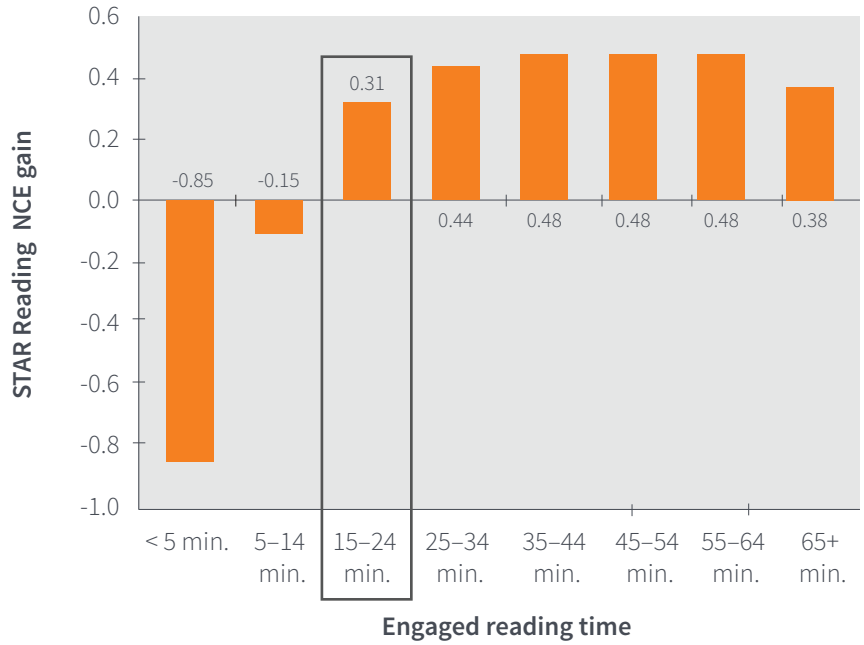
$$\text{ERT} = \frac{(\text{AR points earned}) \; x \; (\text{minutes per point value})}{\text{school days}}$$

6In computing ERT, the minutes per point value is based on the student's STAR Reading score.

As opposed to *allocated* (i.e., scheduled) reading time, this calculation provides an estimate of *engaged* reading time, which is more useful for predicting academic learning (Berliner, 1990). ERT is a subset of allocated time, and as such, almost always represents less time than is scheduled. Any number of factors can prevent readers from fully engaging with a text for 100% of the scheduled time. Students may need time to find their book, get distracted, or have trouble focusing.

Figure 4 illustrates the relationship between ERT and general reading achievement as measured by STAR Reading using data from the 2010–2011 school year. Trends indicate that an ERT of less than 5 minutes was associated with substantial negative gains, suggesting that students need to read at least 5 minutes per day to avoid falling behind in reading achievement. Students with ERT values greater than 15 minutes had positive gains, indicating that as little as 15 to 24 minutes spent reading daily has notable benefits. An ERT of 25 minutes or more was slightly more beneficial, but was approaching the point of minimal gain in benefits.

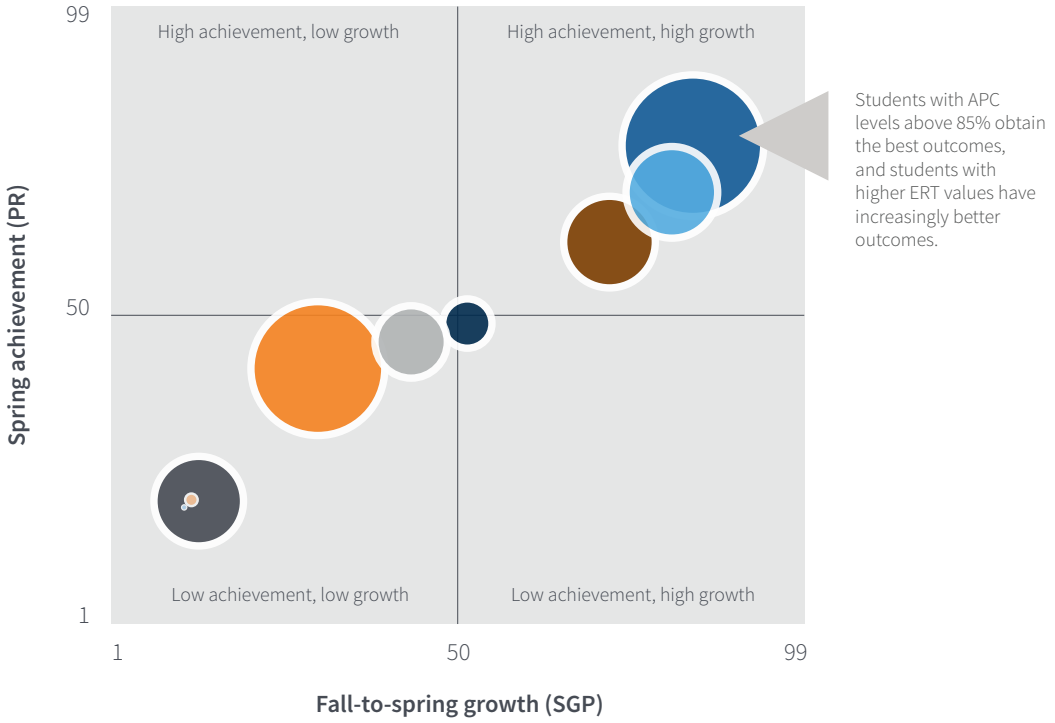
Figure 4. Students reading as little as 15–24 minutes per day have notable achievement gains



Note: Normal curve equivalent (NCE) scores are a way of representing percentile scores so they can be accurately averaged and compared with each other. Because NCEs are derived from percentiles, they measure growth in comparison to national norms. Positive NCE gains mean student achievement grew at a faster rate than national averages. An NCE gain of zero represents the national average.

Figure 5 combines APC and ERT levels in a quadrant graph to illustrate how both comprehension and volume affect end-of-year performance (i.e., STAR Reading spring percentile rank [PR]) and annual growth (i.e., STAR Reading fall-to-spring student growth percentile [SGP]).[7] In the graph, students are grouped according to APC and ERT levels, with bubble color indicating grouping and bubble size indicating the number of students in each group. Position on the graph indicates PR and SGP levels, with groups in the upper-right quadrant obtaining the best outcomes. Only students with APC levels above 85% tended to be in the upper-right quadrant, and within that quadrant, students with higher ERT values had increasingly better outcomes.

Figure 5. Characteristics of daily independent reading practice relate to growth and achievement outcomes



Note: Size of bubble indicates number of students in group.

Average percent correct (Daily reading comprehension)	Daily engaged reading time (Volume)	Median SGP: student growth percentile (Growth)	Median PR: percentile rank (Spring achievement)	Number of students
< 65%	< 15 min.	13	21	125,937
	15–29 min.	12	21	15,503
	30+ min.	11	20	5,176
65–85%	< 15 min.	30	42	190,084
	15–29 min.	43	46	102,251
	30+ min.	51	49	68,402
> 85%	< 15 min.	71	62	131,602
	15–29 min.	80	70	134,510
	30+ min.	83	77	202,370

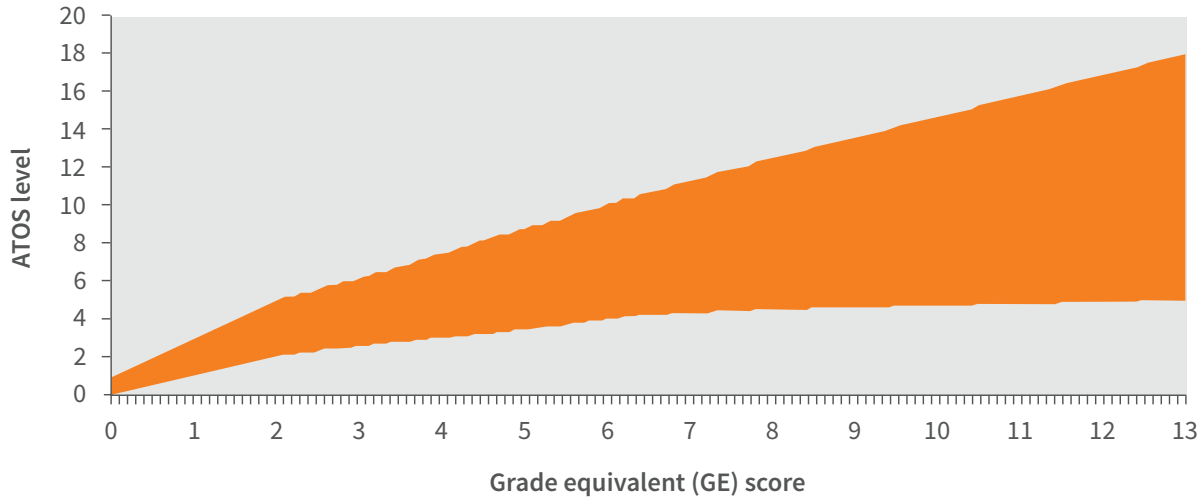
7 Student growth percentiles convey how much each student grew relative to their academic peers (i.e., students in the same grade with similar pretest scores). As with PR scores, SGPs operate on a 1 to 99 scale, with 50 reflecting typical growth. Scores above 50 indicate accelerated growth, a particularly important outcome for students working below grade level who need to grow faster in order to catch up.

Factor 3: Complexity—Zone of proximal development (ZPD)
It is important to note that not all reading is the same, and reading done at the appropriate level for an individual student will be most beneficial. The point between unchallenging versus frustratingly difficult text, where maximum growth occurs, may also be thought of as the *zone of proximal development* (Vygotsky, 1962). In this zone, students are challenged and presented with new vocabulary, but are also given enough context to construct meaning without being frustrated. In a sense, even though a book within this zone is read independently, it can be considered assisted reading because help discovering the meaning of new words and concepts is provided by the known portion of the text. In other words, this zone is a range of reading difficulty in which the text itself provides instruction, encouraging comprehension, vocabulary development, and critical thinking.

Renaissance Learning's recommended ZPD ranges are based on grade equivalent (GE) scores (see figure 6) provided by a norm-referenced reading assessment, such as STAR Reading. ZPD ranges were first developed using student-reading data from more than 20,000 students during the 2001–2002 school year and later were validated with data for more than 2 million students from the 2010–2011 school year (Renaissance Learning, 2012).

With AR 360, using individual GE scores, students receive a recommended ZPD range expressed in ATOS values. For example, a student with a suggested ZPD range of 1.0 to 2.5 ATOS would likely benefit from reading books written at a difficulty level between a beginning first-grade to middle second-grade level. Once teachers have a sense of each student's ZPD range, they can use it as a guide to look for books with ATOS levels within that range.

Figure 6. Suggested ZPD ranges by STAR Reading™ GE score



Note: GE scores range from 0.0–12.9+ and represent how a student's test performance compares to other students nationally. For example, if a fifth grader scores a GE of 7.6 on a reading assessment, the student's score is representative of how a typical seventh grader would perform on the same assessment after the sixth month of the school year. This does not mean the fifth grader is capable of reading seventh-grade material; rather, it indicates the student's reading skills are well above average for fifth grade.

Allowing for a wide range of text complexity lets teachers and students consider a variety of relevant factors when choosing books for independent reading practice. Likewise, it provides some guidance while still giving students a large degree of choice in selecting their reading materials, which is often beneficial for intrinsic motivation and performance (Deci & Ryan, 1985).

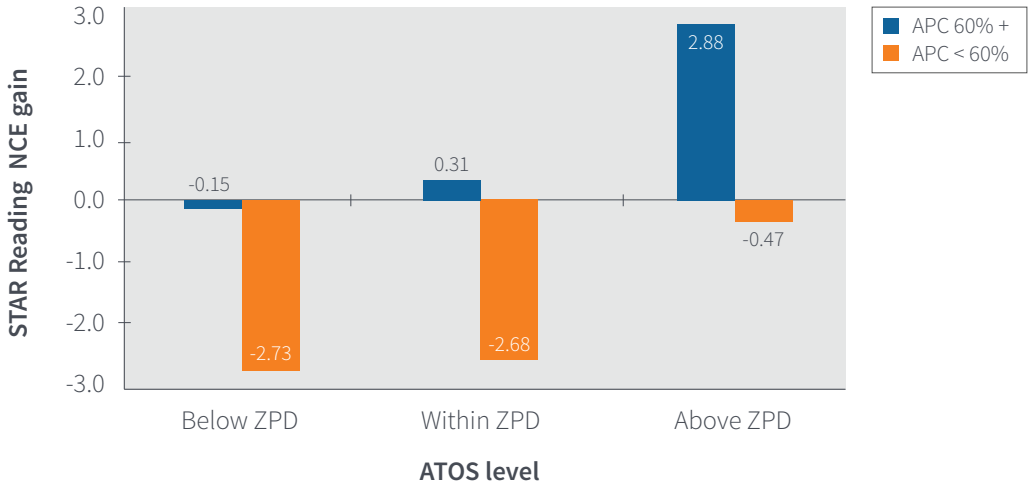
Research indicates that reading within recommended ZPD ranges is associated with growth in general reading achievement. For example, data on AR Quiz frequency from the 2010–2011 school year (see table 1, next page) showed that the majority (54%) of books read were within students' suggested ZPD range, 34% were below, and 12% were above. Unsurprisingly, students were most likely to pass quizzes for books with ATOS levels below the suggested ZPD range (94% passed), were slightly less likely to pass quizzes for books within their ZPD ranges (90% passed), and were least likely to pass quizzes for books above their ZPD range (74% passed).

Table 1. Majority of books read are within students' ZPD ranges; most quizzes are passed in or below

Book difficulty	Quizzes taken		Quizzes passed	
Below ZPD range	38,862,527	34%	36,518,495	94%
Within ZPD range	60,443,185	54%	54,266,663	90%
Above ZPD range	13,458,183	12%	9,990,788	74%
Total	112,763,895		100,775,946	89%

However, although students more frequently passed quizzes on books with ATOS levels below their ZPD, multiple regression analyses[8] considering complexity (ZPD) in conjunction with comprehension (APC) found that reading below ZPD was associated with negative gains in STAR Reading regardless of comprehension level (see figure 7, left column). Students with low comprehension of within-ZPD books also showed negative growth; however, students with high comprehension for within-ZPD reading had positive gains (center column). Similarly, students with low comprehension of above-ZPD books had negative growth, while students with high comprehension of above-ZPD reading showed the largest gains (right column).

Figure 7. Students reading with comprehension in and above their ZPD ranges make positive reading gains



Note: Normal curve equivalent (NCE) scores are a way of representing percentile scores so they can be accurately averaged and compared with each other. Because NCEs are derived from percentiles, they measure growth in comparison to national norms. Positive NCE gains mean student achievement grew at a faster rate than national averages. An NCE gain of zero represents the national average.

These results suggest that reading within suggested ZPD ranges is both attainable and beneficial. Trends also caution against doing a large amount of reading below the suggested ZPD range. Though below-ZPD reading may be necessary when other factors are considered (e.g., group projects, assignments, interests), this represents a low level of challenge often associated with declines in general reading achievement. In addition, the findings suggest that reading above the suggested ZPD is rare and difficult, but could lead to substantial gains if done successfully.

8 Posttest NCE scores were regressed onto the percent of quizzes passed below, within, or above ZPD while controlling for pretest scores, the total number of passed quizzes, APC, and ERT.

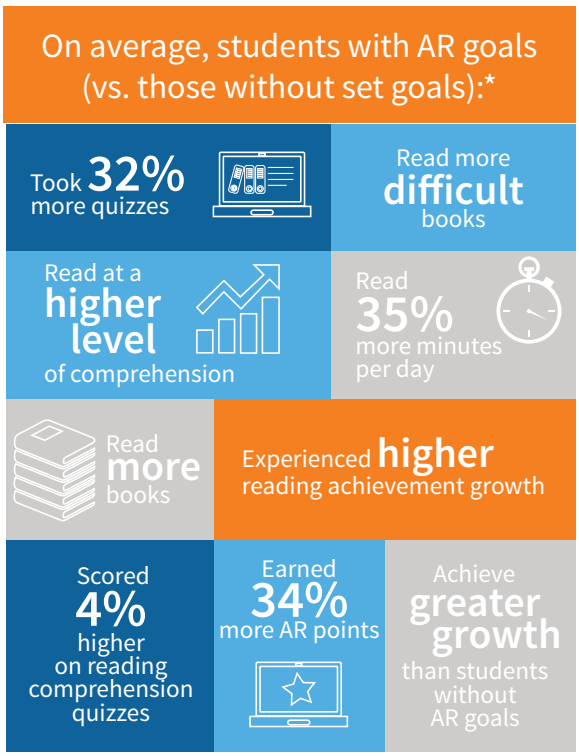
Students reading with comprehension within their ZPD range can be encouraged to read above ZPD, so long as they continue passing quizzes. However, being pushed to frequently read above the suggested ZPD range at the expense of comprehension (i.e., scoring below 60% on AR Quizzes) could actually be detrimental. If students are failing AR Quizzes for books with ATOS levels above their ZPD range, consider either offering instructional support to boost comprehension or encouraging students to practice reading books within their recommended ZPD. Passing quizzes for books within their ZPD range tends to be more beneficial for students than failing quizzes for titles above their ZPD. These results affirm that APC is the most important factor to consider when guiding students' independent reading practice. STAR Reading provides a recommended ZPD range as a starting point, but adjustments should be made so that students can maintain an APC of 85–95%.

Students reading with comprehension within their ZPD range can be encouraged to read above ZPD, so long as they continue passing quizzes.

Goal setting

Goal setting is incorporated into AR 360, giving teachers the opportunity to easily set personalized goals for each student by marking period. Consistent with prior research indicating that goal setting is often associated with improved performance (Harrison, 2013; MacNamara, Holmes, & Collins, 2006), analyses conducted using data from the 2013–2014 school year concluded that students with goals set read more than their peers without goals (see figure 8). Students with goals also had higher comprehension rates and demonstrated greater growth on reading achievement tests compared to students without goals.[9] These findings highlight the importance of setting goals for students, monitoring progress, and providing feedback.

Figure 8. Students with goals set for independent reading practice read more and achieve better outcomes



** Based on 2013–2014 data from 4,204,771 students who read 199,355,296 books.*

9 Reading achievement was assessed using STAR Reading. Analyses were conducted controlling for relevant factors such as grade and prior achievement.

AR™ Points

In addition to individually monitoring student reading comprehension (APC), quantity (ERT), and complexity (ZPD), AR Points are a powerful summary metric educators can use to measure reading-practice progress. Each book is assigned a number of points based on challenge (ATOS level) and length (number of words), and then students earn a portion of a book's points depending on how well they perform on the book's AR Quiz. The AR Goal-Setting Chart (see Appendix, p. 26) provides guidelines for the approximate number of points students should be able to earn depending on how much time they spend reading. These guidelines represent personalized goals based on reading achievement that can help educators determine how well students are using allocated reading practice time and whether they are reading at the correct level of challenge.

Renaissance Learning first published AR Point goals in 1993, based on a comparison of student reading logs and points earned (Advantage Learning Systems, 1992). The goals were then modified and validated based on (1) a comparison of point goals on the AR Goal-Setting Chart (converted to words read using the AR Points formula) to the number of words read by students as published in several studies (e.g., Allington, 2001; Carver, 1990; Harris & Sipay, 1990), and (2) an examination of data from more than 7,000 students in classrooms known to allocate 60 minutes for daily reading practice.

The point goals tended to be lower than the published reading rates, but reasonable given that the research settings involved reading for short periods of time under test conditions, whereas AR Points applied to everyday reading practice. Reading rates from students in schools known to allocate 60 minutes for daily reading practice showed a close relationship between expected points per week and the number earned by students (see table 2).

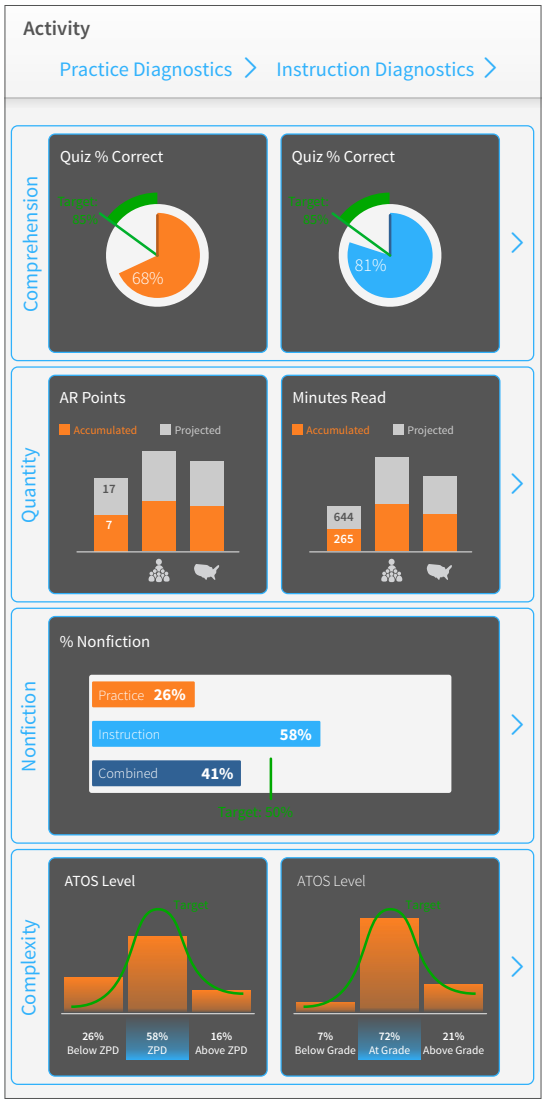
Table 2. AR™ Points on Goal-Setting Chart align with average points students earn per week

Grade equivalent (GE) score	Goal-Setting Chart points/week	60 min. schools: Avg points earned/week	60 min. schools: Number of students
1.0	1.7	1.9	862
1.5	1.9	2.2	645
2.0	2.1	2.4	770
2.5	2.3	2.7	945
3.0	2.5	2.9	675
3.5	2.7	3.2	596
4.0	2.8	3.3	397
4.5	3.2	3.5	487
5.0	3.5	4.1	486
5.5	3.9	4.1	439
6.0	4.2	4.8	377
6.5	4.6	5.3	299
7.0	4.9	5.6	155
7.5	5.3	5.8	102
8.0	5.6	6.4	134
9.0	6.3	7.3	84
10.0	6.9	7.3	30
11.0	7.6	7.8	21
12.0	8.3	8.7	61
Total			**7,565**

Monitoring reading practice using the Reading Dashboard

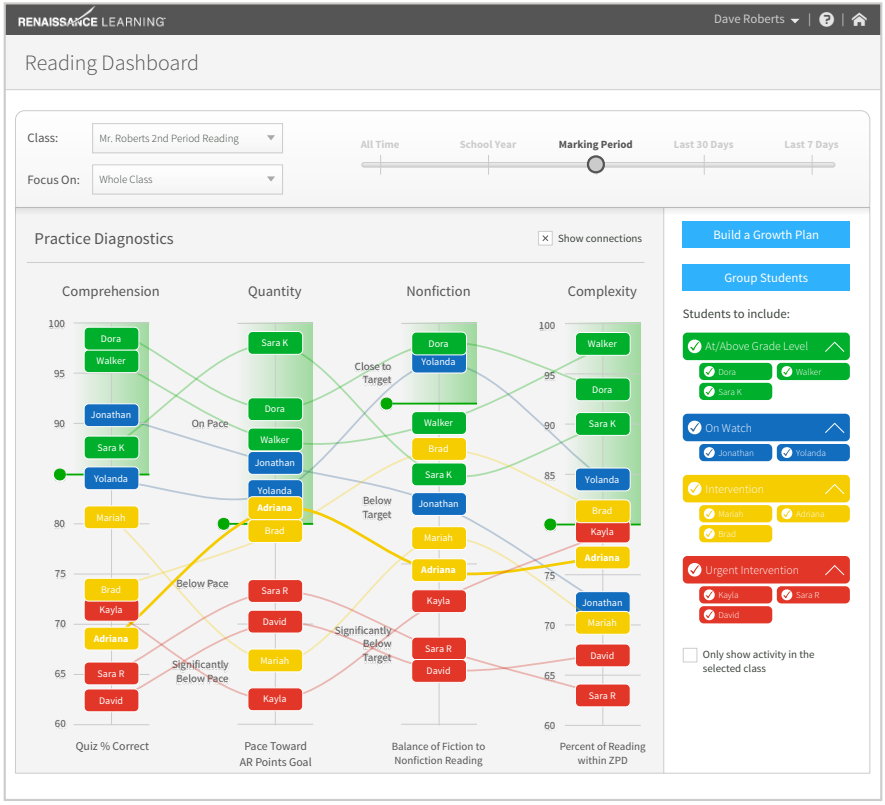
Key variables for setting goals and progress monitoring are summarized prominently for educators in the Reading Dashboard (see figure 9). Using the dashboard, educators can easily view summary data in one place to get a "360 degree view" of students' reading practice. The Activity section combines data from independent and instructional reading practice to summarize how students are performing relative to recommendations, and to highlight what may need adjustment or immediate attention. As students complete assignments and take quizzes, the Dashboard is instantly updated. Student, group, or class views are available and can be customized to any time period using a time-frame slider.

Figure 9. Dashboard example: Reading-practice activity at a glance



Within the Activity section, educators can click on any of the blue headings to display student-level diagnostic data in the areas of comprehension, quantity, nonfiction, and complexity (see figure 10, next page). This detailed view provides more specific information about how students are progressing toward goals, how they compare to others in their class, and which metrics need improvement. Students are placed into groups represented by color (green, blue, yellow, and red in the example), and the green hues in the upper section of each column represent the Learning Zone (i.e., goal levels) for each metric.

Figure 10. Dashboard example: Detailed diagnostics



ATOS™: Estimating text complexity and matching text to students

Renaissance Learning's ATOS Readability Formula is used to objectively analyze text and to predict which materials can be comprehended by individual readers. The product of an intensive research process and validated using data from thousands of students, ATOS takes into account the three most important predictors of text complexity: average sentence length, average word length, and average word difficulty level (Milone, 2014). As the text-analysis tool for Accelerated Reader 360, ATOS is arguably the most widely used system for matching books to students in the United States (Resnick, Sanislo, & Oda, 2010).

ATOS is reported on a grade-level scale so that student achievement and books share the same easy-to-interpret metric, helping teachers guide student reading practice within a range of difficulty that is neither too challenging nor too easy. For example, a book with an ATOS value of 1.0 has an appropriate difficulty level for students with a first-grade reading level. A book with an ATOS value of 2.5 has an appropriate difficulty level for students with a middle second-grade reading level.

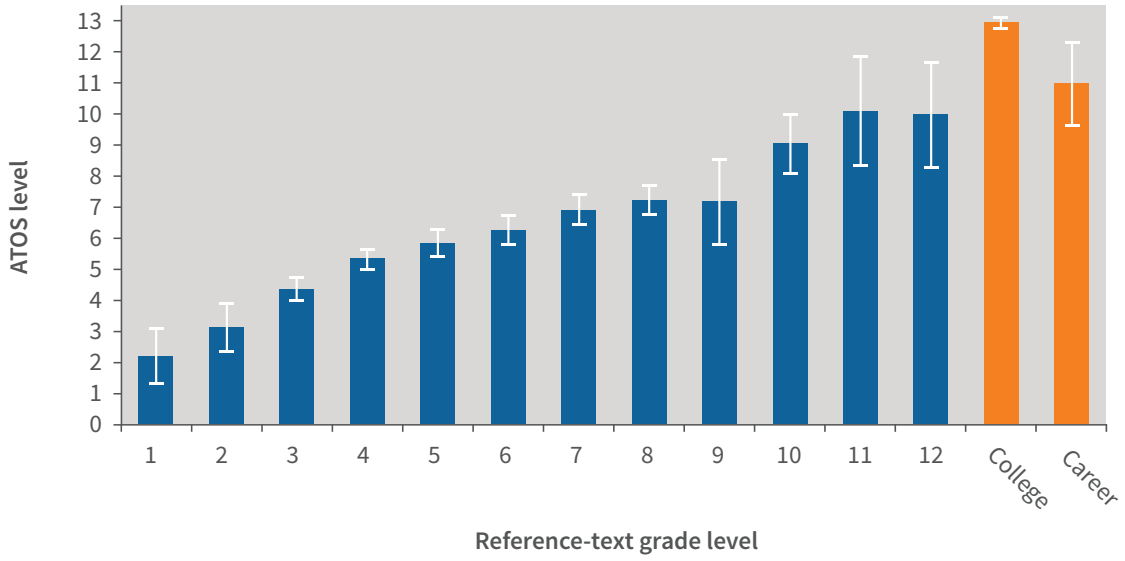
ATOS values for more than 170,000 books are available online using AR BookFinder (http://www.ARbookfind.com), and other text may be analyzed for free at http://www.renaissance.com/products/accelerated-reader/atos-analyzer/. In using ATOS, it is important to note that readability formulas typically produce an estimate of a book's text *difficulty*, but not the *suitability* of a book's content or literary merit for individual readers. Additional information to support book selection (such as author, interest level,[10] fiction/nonfiction, and student ratings) can be found in the results generated by AR Book Finder or within the program in Book Discovery. Ultimately, decisions about what content is appropriate should be guided by educators and parents who know students best.

10 Once individual ZPD ranges are estimated, students will have a good sense of the level where they should practice reading, but they may benefit from additional guidance in choosing books with appropriate content maturity. In addition to ATOS level, each book with an AR Quiz has an assigned interest level, which refers to the sophistication/maturity of a text's content, ideas, and themes: LG (lower grades, K–3), MG (middle grades, 4–8), MG+ (middle grades plus, 6 and up), and UG (upper grades, 9–12).

Independent evaluation of ATOS as a text complexity measure

In an objective evaluation of text complexity measures, Student Achievement Partners conducted a study assessing the validity of ATOS and five other text complexity metrics (Nelson et al., 2012). Mean ATOS levels were computed for a specified sample of exemplary grade-level, college, and career text passages. The trend for these values is consistent with prior research that indicates there is a gap between text complexity levels for secondary and postsecondary texts (see figure 11).

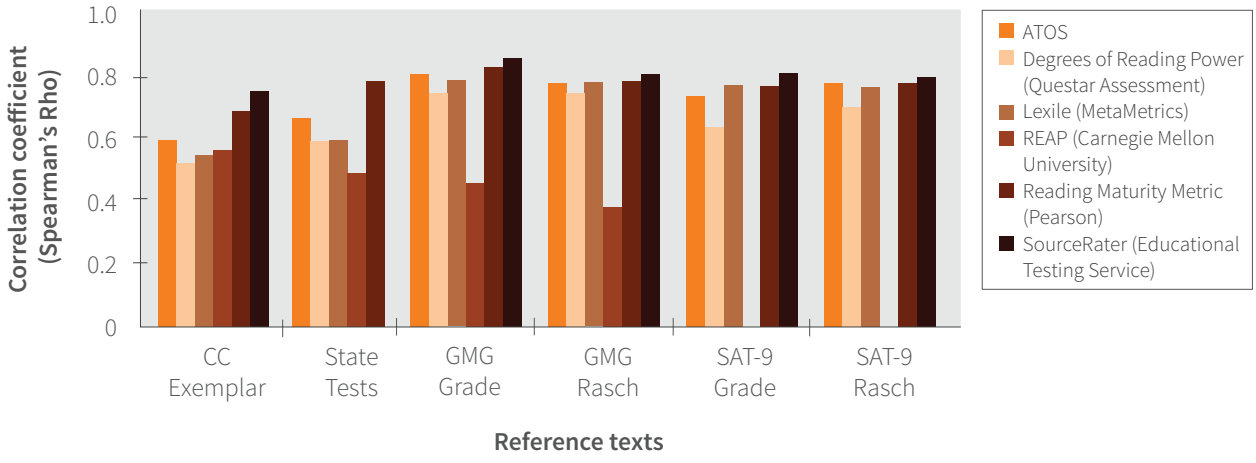
Figure 11. Mean ATOS™ level estimates reflect gap between secondary and postsecondary text complexity



Note: Error bars depict standard deviations to provide a sense of variance in complexity. The example grade-level reference-text measures were provided by Nelson et al. (2012) and included passages from Appendix B of the Common Core State Standards, standardized state tests, the Gates-MacGinitie Reading Test, and the MetaMetrics Oasis platform.

When Nelson et al. (2012) compared the text complexity estimates generated by ATOS and the other measures, the results indicated that "all of the metrics were reliably, and often highly, correlated with grade level and student performance-based measures of text complexity across a variety of text sets, and across a variety of reference measures" (p. 46; see figure 12).

Figure 12. Correlations between text complexity ratings and actual reference-text difficulty found all measures provided valid, reliable estimates



Note: Data from Appendix A of Nelson et al., 2012, p. 53. Explanation of scores not shown: REAP for SAT-9 texts—Access "required a legal agreement between institutions" (p. 25). SR for state tests texts—"Did not meet ETS criteria for valid grade level (see notes); classified by ETS as mixed genre" (p. 21).

As part of the Student Achievement Partners project, ATOS was included as a quantitative measure of text complexity in Appendix A of the Common Core State Standards (CCSS) (National Governors Association, 2010). General recommendations were created for the CCSS grade bands to help educators minimize the gap between the degree of text complexity students encounter in high school versus college (see table 3). In general, the instructional text complexity ranges suggest students should be able to read and comprehend texts approximately at or above grade level. It should be noted, however, that these ranges are an instructional end-of-year goal—not a guideline for daily independent reading practice.

Table 3. Recommended instructional ATOS™ ranges for Common Core State Standard grade bands

CCSS grade bands	Recommended ATOS level ranges
2nd to 3rd grade	2.75 to 5.14
4th to 5th grade	4.97 to 7.03
6th to 8th grade	7.00 to 9.98
9th to 10th grade	9.67 to 12.01
11th grade to CCR	11.20 to 14.10

Updates to the ATOS Readability Formula

In 2013, advances in technology and statistical techniques were applied to refine the ATOS readability formula in three ways:

1. The grade-level equation was optimized to increase validity at the lowest and highest ends of the spectrum.
2. The formula was refined to estimate readability levels for short passages with increased precision.
3. The Graded Vocabulary List was expanded from about 24,000 to more than 100,000 words.

The enhancements made to ATOS improved upon an already reliable and valid readability measure, making it even more precise when measuring text that runs a gamut of lengths, from one sentence to a full book. The rigor of the initial development process, subsequent validation, and recent updates all ensure that ATOS: (1) accurately measures characteristics that contribute to the understandability of text, and (2) can be used with confidence to match texts and books of any length to students for a variety of purposes.

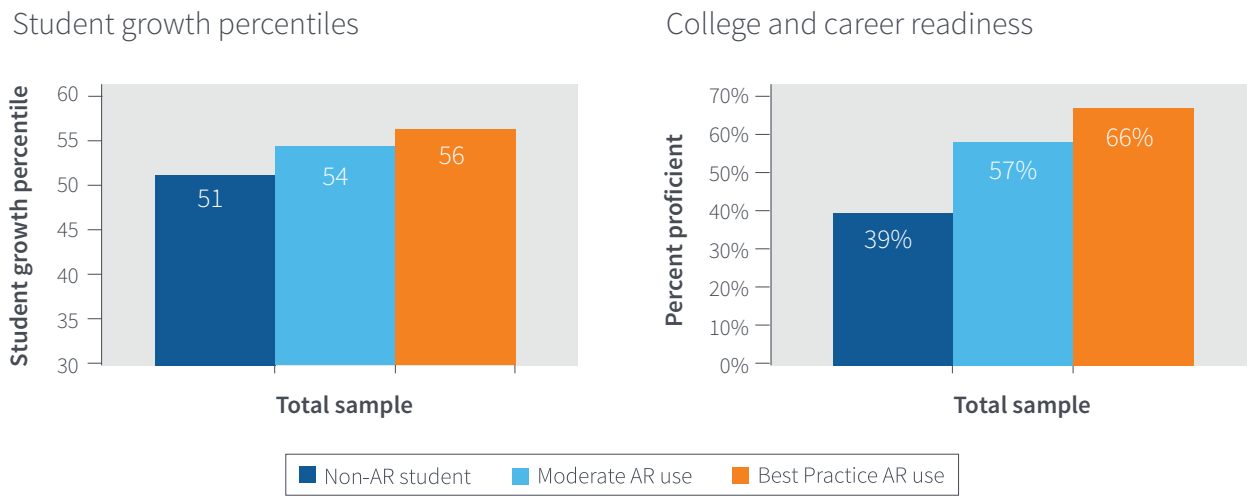
Efficacy: Key research support for Accelerated Reader™

When implemented with integrity, AR 360 has been shown to accelerate reading growth for all students. The large evidence base supporting AR 360 numbers more than 175 studies and reviews, including 31 experimental or quasi-experimental research studies—generally considered the strongest study designs—150 independent studies, and 27 articles that have been published in peer-reviewed journals, and thus upheld to the highest scrutiny. This sizable body of research is ever growing and has contributed to favorable reviews by external panels such as the Promising Practices Network, the National Dropout Prevention Center/Network, the National Center on Student Progress Monitoring, and the What Works Clearinghouse. A selection of this research is highlighted below in addition to a recent correlational study conducted by Renaissance Learning.

Trends in student outcome measures

In a 2015 analysis using data from the 2013–2014 school year, Renaissance Learning examined patterns of growth and expected college and career readiness according to the extent of individualized reading practice accomplished by students. The study analyzed data from over 2.8 million students and 12,000 schools nationwide in grades 1–12 to compare independent reading practice as tracked by AR 360 with the typical performance of students who do not use the program. Whether examined by grade or by populations of interest (struggling readers, English learners, and students in free or reduced lunch programs), AR 360 was associated with better student performance and higher levels of annual growth. And notably, the better the program was implemented, the better the outcomes were for students.

Figure 13. The better AR™ is implemented, the more students achieve growth and meet CCR benchmarks

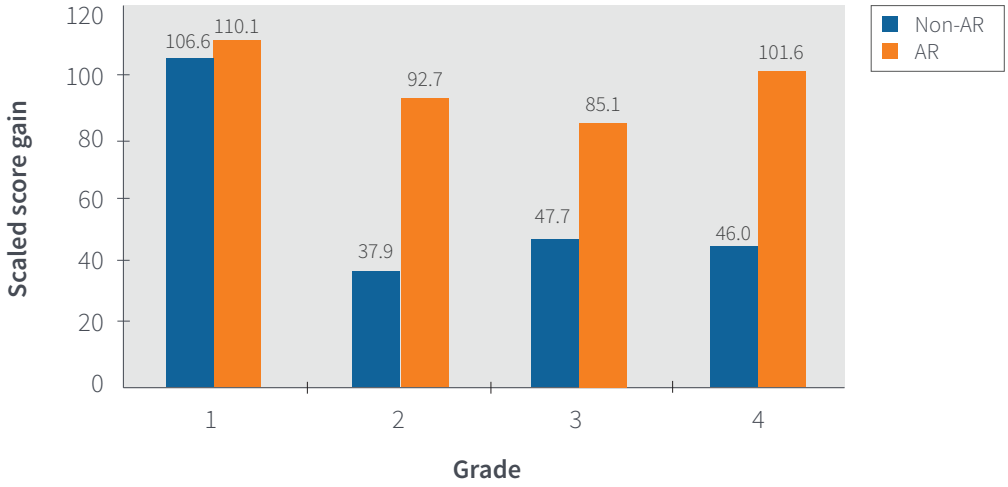


Note: Program use was voluntary (students were not recruited nor randomly assigned to a particular comparison group) and results should be considered correlational, not causal. While trends presented are helpful to understand patterns of growth at a high level, educators should rely most heavily on causal evidence, which generally r equires an experimental or quasi-experimental design. The balance of this section presents such evidence for Accelerated Reader.

Reading growth soars for Chicago area students using Accelerated Reader™

In an experimental study of 344 students and 19 teachers in the Chicago area, Shannon, Styers, Wilkerson, and Peery (2015) randomly assigned teachers in grades 1 through 4 at three urban elementary schools to use Accelerated Reader or serve in the control group. Over the course of one school year, students in classes using AR experienced significant gains in reading achievement from pre- to posttest, with a large effect size of d = 0.99. Overall, STAR Reading results showed that when compared to the control group, AR students outperformed non-AR students at each grade level and experienced significantly higher gains (d = 0.38), equivalent to moving from the 50th percentile rank (PR) to the 65th PR, while the comparison students remained at the 50th PR (see figure 14).

Figure 14. AR™ students far exceed control group gains



Accelerated Reader™ has positive impact on UK secondary students

In this experimental study, Siddiqui, Gorard, & See (in press) examined 349 Year 7 students at four secondary schools who had not achieved secure National Curriculum Level 4 in their Key Stage 2 (KS2) results for English. For 20 weeks, students were randomly assigned to either use Accelerated Reader (166 students) or serve in the control group (183 students). The students using AR achieved higher literacy scores on the GL Assessment New Group Reading Test than students not using the program (overall effect size of +0.24) (see table 4). Study results also indicated Accelerated Reader had a positive impact on students eligible for free student meals.

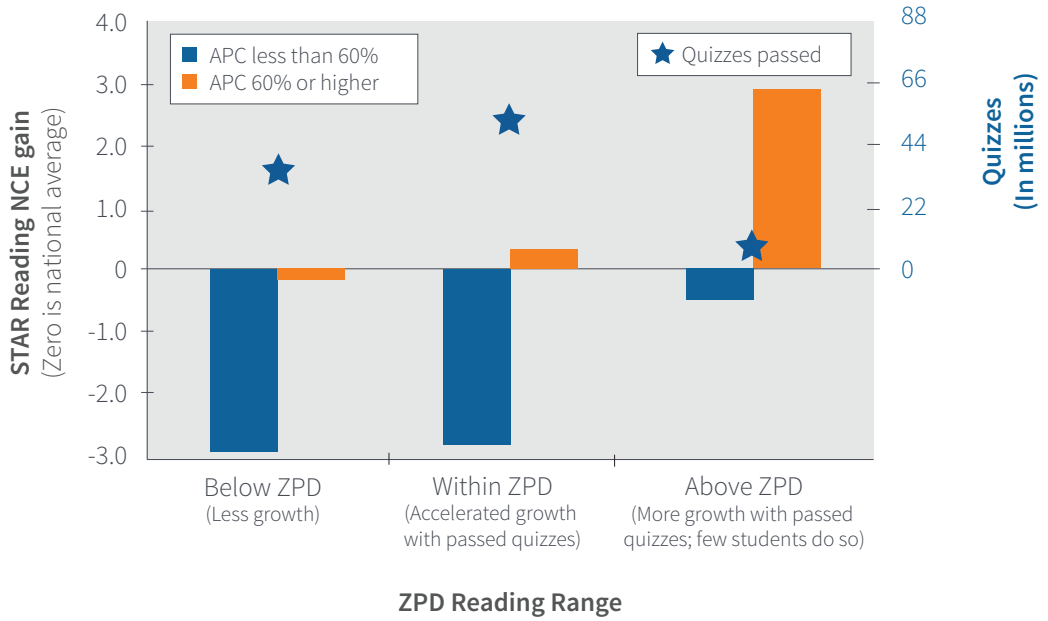
Table 4. UK secondary students use Accelerated Reader™ in intervention with great results

All students				
Group	**N**	**NGRTA**	**Standard deviation**	**'Effect' size**
AR	175	327.1	51.4	+0.24
Control	164	315.3	46.6	—
Students eligible for free school meals				
Group	**N**	**NGRTA**	**Standard deviation**	**'Effect' size**
AR	56	319.9	42.4	+0.38
Control	59	303.9	41.1	—

Guided independent reading with Accelerated Reader™ greatly improves reading skills

In 2012, Renaissance Learning conducted a study to update the original *Guided Independent Reading* publication with a larger, more current sample and analyses targeted to recent trends in educational standards and recommendations. Using the Accelerated Reader hosted database, researchers studied 2,284,464 students in grades 1–12 and found continued support for the original 2003 analyses. Quality (comprehension), quantity (engaged reading time), and difficulty (average percent correct) remained as the key factors to consider in creating successful student reading practice, with quality being most important (see figure 15). Trends indicated that students should strive for high levels of comprehension, be challenged to read increasingly complex text, and spend about 25 minutes per day reading (which requires roughly 35 minutes of daily scheduled reading time).

Figure 15. Optimal reading practice begins within ZPD; successful comprehension leads to higher growth



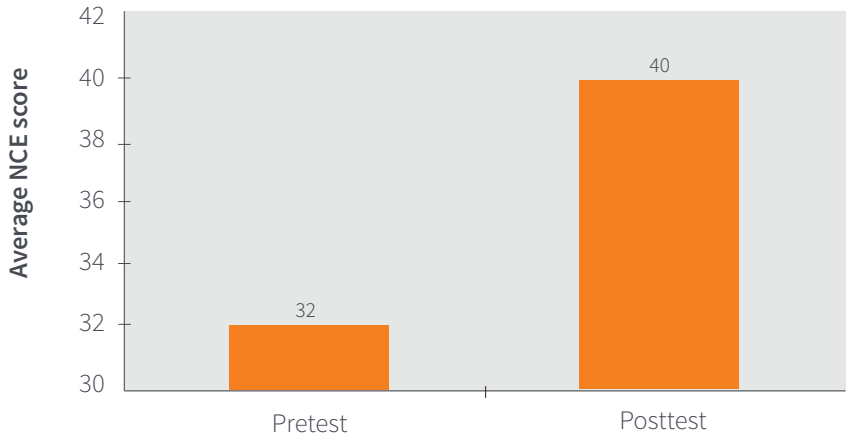
Note: The data show students' recommended ZPD ranges are a good starting point, which may need to be adjusted up or down based on students' APCs. There is potential for greater growth when reading above ZPD, but doing so is beneficial only if students are able to maintain a reasonable APC that indicates they comprehend what they are reading. If a student consistently scores highly on books read above ZPD, it is likely time to adjust the range. Not passing AR Quizzes above ZPD may mean the student is not benefitting from reading more challenging text.

Normal curve equivalent (NCE) scores are a way of representing percentile scores so they can be accurately averaged and compared with each other. Because NCEs are derived from percentiles, they measure growth in comparison to national norms. Positive NCE gains mean student achievement grew at a faster rate than national averages. An NCE gain of zero represents the national average.

Save the Children literacy initiative advances achievement with Accelerated Reader™

During the 2010–2011 school year, Save the Children supported several 140 local programs in 13 states (AL, AR, AZ, CA, CO, KY, LA, MS, NM, NV, SC, TN, WV) as part of its model literacy initiative. Services included the delivery of integrated in-school and after-school literacy activities for children including using Accelerated Reader. This 2011 report by White, Palmiter, Sinclair, and Reisner describes the program's implementation and participants, as well as the learning results achieved. STAR results showed the proportion of participants reading at a level appropriate for their grade or above increased. On the pretest, 12% of students were at grade level or higher—as shown by an NCE score of 50 or more. The posttest showed that 29% of students were reading at grade level. Average pre–post change was 8.2 NCEs, which was statistically significant (see figure 16, next page).

Figure 16. Struggling students' reading scores rise with AR™

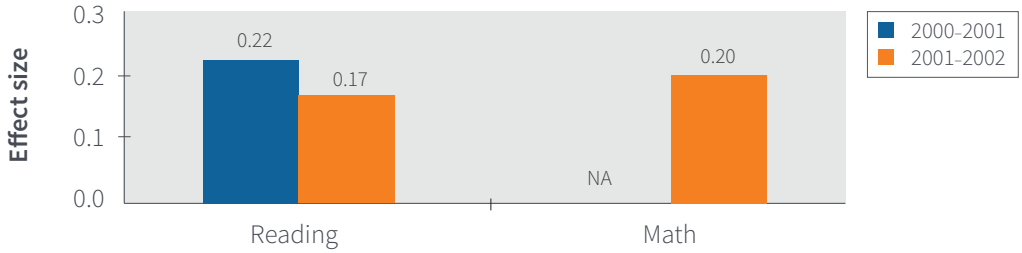


Note: Normal curve equivalent (NCE) scores are a way of representing percentile scores so they can be accurately averaged and compared with each other. Because NCEs are derived from percentiles, they measure growth in comparison to national norms. Positive NCE gains mean student achievement grew at a faster rate than national averages. An NCE gain of zero represents the national average.

Higher test scores in Texas attributed to Accelerated Reader™ and Accelerated Math™

This quasi-experimental, peer-reviewed, longitudinal study compared student achievement as measured by the Texas Learning Index (TLI) and Texas Assessment of Academic Skills (TAAS) between students using Accelerated Reader and Accelerated Math and matched controls for five years. At nine elementary and two middle schools in McKinney Texas, Nunnery and Ross (2007) found statistically significant, positive effects of the software and best practices on reading and mathematics achievement for elementary students, and on mathematics achievement for middle school students (see figure 17). Students in high-implementation schools scored even higher than comparison schools or low-implementation schools.

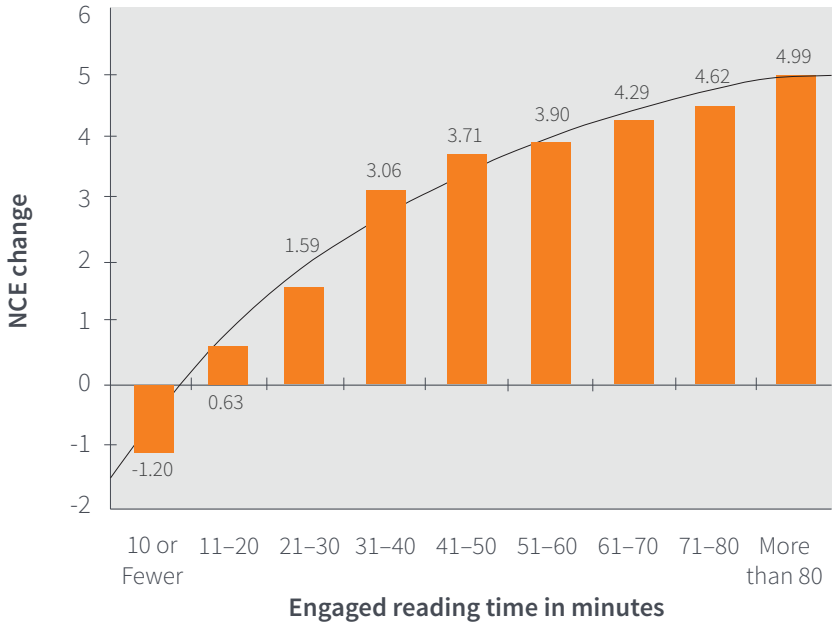
Figure 17. Renaissance™ tools have significant impact on fifth-grade TLI scores



Accelerated Reader™ accelerates quality, quantity of reading practice for kids at all levels

In this correlational, peer-reviewed study, Topping, Samuels, and Paul (2007) analyzed data for 45,670 students in grades 1–12 at 139 schools in 24 U.S. states who took Accelerated Reader Quizzes for more than 3 million books over the course of one school year. Measures of quantity (engaged reading time) and quality (average percent correct) showed that the more time students spent engaged in independent reading practice with AR, the greater were their gains in reading achievement (see figure 18). This held true for students at all levels of achievement; however, both high quantity and high quality together were necessary for high achievement gains, especially for older students.

Figure 18. Reading achievement gains

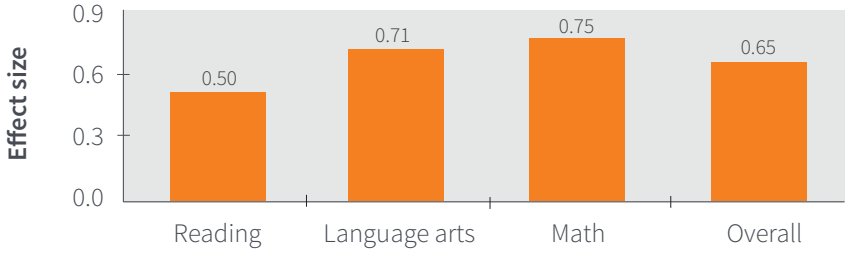


Note: Normal curve equivalent (NCE) scores are a way of representing percentile scores so they can be accurately averaged and compared with each other. Because NCEs are derived from percentiles, they measure growth in comparison to national norms. Positive NCE gains mean student achievement grew at a faster rate than national averages. An NCE gain of zero represents the national average.

Greater Accelerated Reader™ use leads to higher gains in Title I schools in Georgia

In this quasi-experimental, peer-reviewed study, Holmes, Brown, and Algozzine (2006) studied 2,287 students in four Title I elementary schools in central and northern Georgia over three years. Of the study schools, two were located in urban areas and two in rural areas. One school in each area was either a high or low implementer of Accelerated Reader and Accelerated Math. Results from the Georgia Criterion-Reference Competency Test (CRCT) indicate that students in the high-implementing schools outperformed students in the low-implementing comparison schools overall (effect size, ES = 0.65) and in reading (ES = 0.50), language arts (ES = 0.71), and math (ES = 0.75) (see figure 19). Researcher observations confirmed that the high implementers followed best practices more closely than the low-implementation schools. Teachers in all schools expressed positive attitudes towards AR and AM.

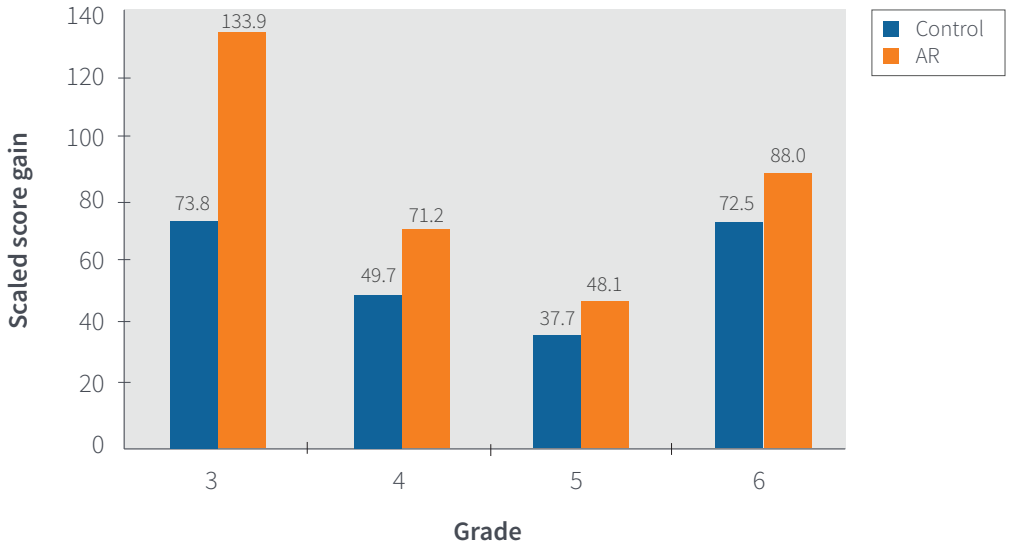
Figure 19. High AR™ implementers outperform low on CRCT



Significant reading gains in Tennessee tied to Accelerated Reader™

In this experimental, peer-reviewed study, Nunnery, Ross, and McDonald (2006) randomly assigned 76 teachers at 11 urban elementary schools in Memphis, Tennessee, to use or not use Accelerated Reader for one school year. In total, 83% of the students in grades 3–6 were eligible for free or reduced-price lunch. STAR Early Literacy and STAR Reading results for the 1,665 students studied showed significant gains and moderate to large effect sizes in grades K–2 and small to moderate effect sizes in grades 3–6 for students using AR (see figure 20). Students with learning disabilities benefited most in classrooms with high-implementation of AR compared to those in low- or no-implementation classrooms.

Figure 20. AR™ users outgain controls



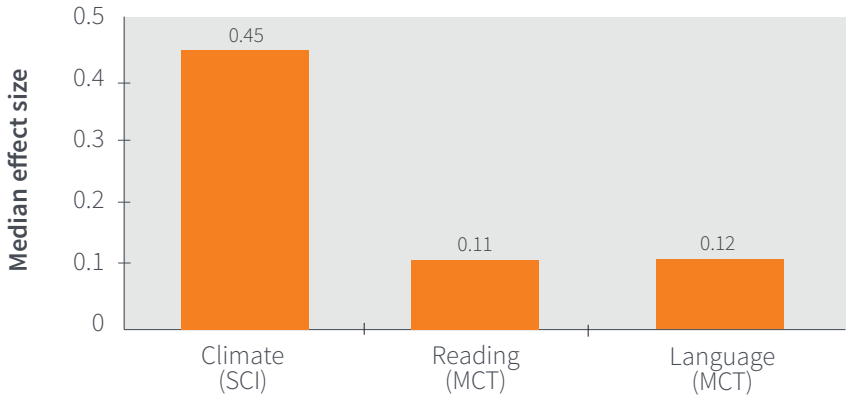
Arizona students using Accelerated Reader™ maintain goal orientation

This correlational, peer-reviewed study examined the effect of Accelerated Reader and best practices on the goal orientations of 239 students in grades 3–6 at an urban, Title I elementary school in Arizona. In total, 36% of students qualified for free or reduced-price lunch, and 24% came from minority backgrounds. Husman, Brem, and Duggan (2005) used an adapted version of Patterns of Adaptive Learning Scales (PALS) to measure both the goal orientation of students, as well as how they perceived their teachers' goal orientations. The results indicated that students using AR were less performance oriented (both performance-approach and performance-avoid) by the end of the year, while mastery goal orientation (learning for the sake of learning) remained consistently high. The researchers also found that students who perceived the goals of their teachers as being performance-approach or -avoid oriented tended to hold similar personal goals.

Test scores, climate improve in Mississippi with Accelerated Reader™, Accelerated Math™

Ross and Nunnery (2005) conducted a quasi-experimental study of Accelerated Reader and Accelerated Math with 10,000 students in grades 3–8 at 23 treatment and 18 control schools in Pascagoula and Biloxi, Mississippi, over a two-year period. More than 60% of the students in the study were eligible for free or reduced-price lunch. Mississippi Curriculum Test (MCT) results favoring AR/AM were found in reading (median effect size 0.11), language arts (median effect size 0.12), and math (median effect size 0.08) (see figure 21). Researchers also found that organizational climates reported by teachers at treatment schools were significantly more favorable than those reported by control schools on all seven dimensions of the School Climate Inventory (SCI), with effect sizes ranging from 0.20 to 0.54.

Figure 21. AR™ improves school climate, reading and language scores



Independent analysis confirms Accelerated Reader™ positively impacts achievement

In 2004, Borman and Dowling conducted an independent evaluation of the Accelerated Reader database, which contained reading and achievement records for 50,823 students in grades 1–12 from 139 schools in 24 U.S. states (related to the original Guided Independent Reading study first conducted in 2003 and updated in 2012; see summary on p. 19). In the elementary grades, students in AR classrooms implementing best practices showed statistically significant improvements in overall achievement level. In middle and high school, teachers who promoted greater reading success were able to improve achievement results. Higher average percent correct on AR Quizzes and reading above initial ZPDs were linked to greater outcomes. Additionally, even after using rigorous statistical controls for students' initial reading level, success rate, and challenge of material, quantity of reading emerged as a key predictor of later literacy development.

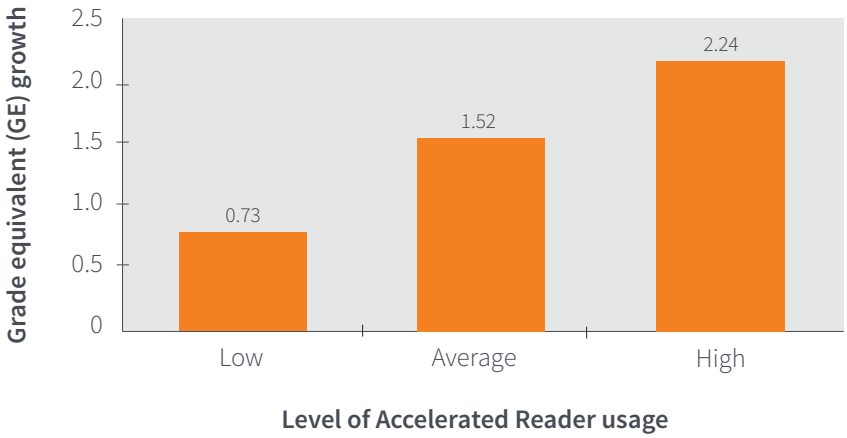
Borman and Dowling (2004) found three key predictors of student reading gains:

- **Quantity**: +10 NCEs for reading more than average
- **Quality**: + 4 NCEs for AR Quiz average of 85% and up
- **Challenge**: +3 NCEs for reading within ZPD, versus below

Virginia students score better in comprehension with high Accelerated Reader™ use

Johnson and Howard (2003) investigated the effect of Accelerated Reader on reading achievement and vocabulary development for 755 students in grades 3–5 at seven urban, Title I schools in Virginia. Students categorized as high-AR users in this quasi-experimental, peer-reviewed study gained significantly more on reading comprehension on the Gates-MacGinitie Reading Test (GMRT) than students categorized as average and/or low users (see figure 22).

Figure 22. High AR™ users achieve more growth on GMRT

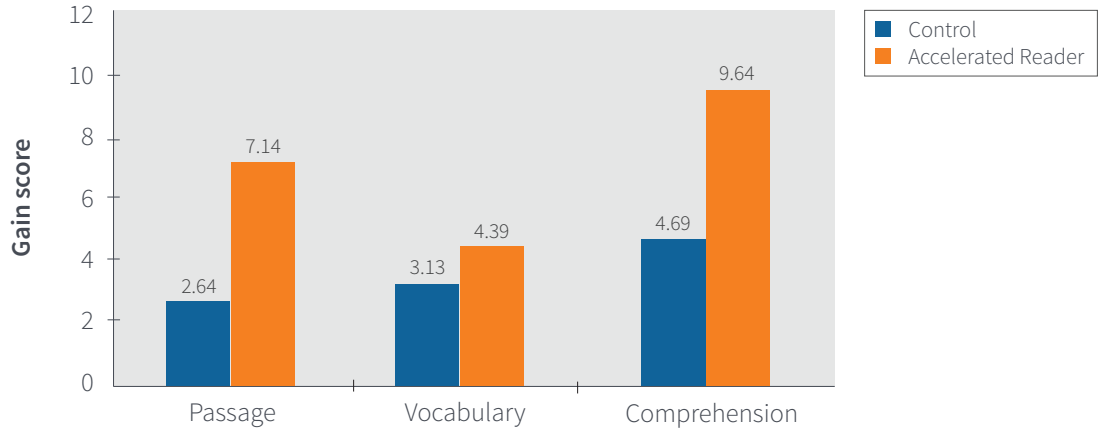


Note: GE scores range from 0.0–12.9+ and represent how a student's test performance compares to other students nationally. For example, if a fifth grader scores a GE of 7.6 on a reading assessment, the student's score is representative of how a typical seventh grader would perform on the same assessment after the sixth month of the school year. This does not mean the fifth grader is capable of reading seventh-grade material; rather, it indicates the student's reading skills are well above average for fifth grade.

Instant Accelerated Reader™ feedback helps comprehension gains double at MN school

In this quasi-experimental study, Samuels and Wu (2003) examined 67 students in grades 3 and 5 from a school in St. Paul, Minnesota; 64% of the students qualified for free and reduced-price lunch. A portion of the study students completed book reports while the balance completed Accelerated Reader Quizzes. After six months, the researchers found that students using AR and receiving immediate feedback showed significantly higher gains on STAR Reading, the Group Reading Assessment and Diagnostic Evaluation (GRADE), and a curriculum-based measurement (CBM) compared to students completing book reports and receiving only delayed feedback (see figure 23). In particular, students using AR demonstrated twice the reading comprehension gains as students not using AR.

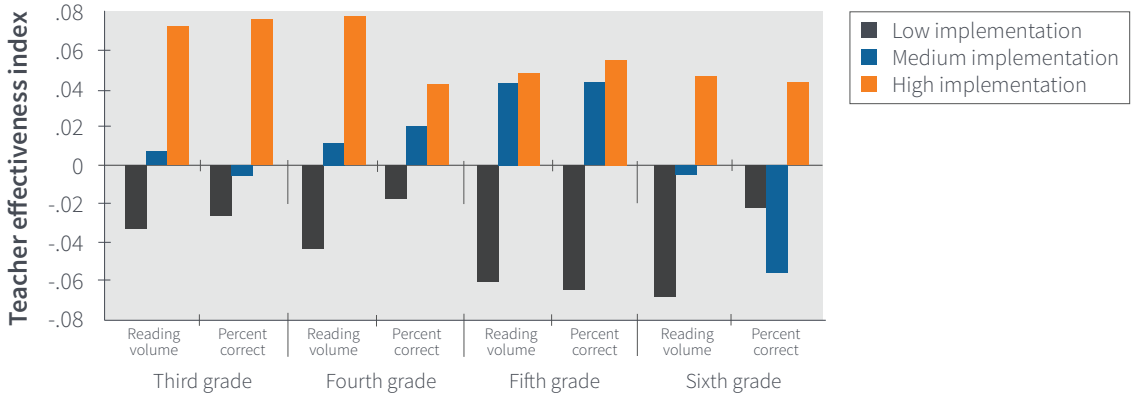
Figure 23. AR™ students achieve higher gain scores on the American Guidance Service GRADE Test



TN teachers' effectiveness rises with high quantity, quality Accelerated Reader™ use

Results from this quasi-experimental, peer-reviewed study of 62,739 students in grades 2–8 in Tennessee showed that both student reading volume and percent correct on Accelerated Reader Quizzes had a positive impact on teacher effectiveness as measured by the Tennessee Value-Added Assessment System (TVAAS) (Topping & Sanders, 2000). In particular, the best practice recommendations of 85% correct and reading within the zone of proximal development (ZPD) were confirmed. Furthermore, teachers completing best practices training were significantly more effective than control teachers who had not completed training (see figure 24). This study supports the National Reading Panel's recommendation that teachers need to be actively involved in the process of reading development, and it demonstrates that AR is useful in this process.

Figure 24. Teacher effectiveness increases on TVAAS as AR™ implementation improves



Conclusion

The key to ensuring success in reading is to personalize student practice, set goals, and provide a means to monitor progress toward those goals. Accelerated Reader 360 is a computerized, personalized practice system that makes all of this possible. AR 360 guidelines are clear, research-based principles designed to support teachers and shown to maximize student growth, which focus goal setting on quality (APC), quantity (ERT), and complexity (ZPD). AR 360 helps with both independent and instructional reading, giving educators the right combination of texts, skills, and insights for successful reading practice and continued student growth.

Appendix. AR™ Goal-Setting Chart

If you have Accelerated Reader and STAR Reading, the software will automatically recommend a ZPD and point goal for each student. Otherwise use the chart and guidelines below. Base goals on each student's reading level and the amount of daily reading practice that you provide.

Identify ZPDs

Identify each student's grade equivalent (GE) score with a standardized assessment or estimate a GE based on the student's past performance. The corresponding ZPD is a recommended book-level range for the student. If books in that range seem too hard or easy for a student, choose a new range or create a wider one that better matches the student's abilities.

Set Goals

APC goal—The most important goal for all students is to average 85 percent or higher on Reading Practice Quizzes. Meeting this goal has significant impact on reading growth. Averages of 90% and higher are associated with even greater gains. If a student struggles to maintain the minimum average, talk to the student and find out why. Then decide on a strategy that will lead to success.

Point goal—The chart shows the number of points students are expected to earn based on GE and time spent reading. These are estimates. Set goals that are realistic for individual students.

Table A1. AR™ Goal-Setting Chart

Grade-Equivalent Score	Suggested ZPD	60 Min. Daily Practice			45 Min. Daily Practice			35 Min. Daily Practice			30 Min. Daily Practice			25 Min. Daily Practice			20 Min. Daily Practice			15 Min. Daily Practice		
		Points per Week	Points per 6 Weeks	Points per 9 Weeks	Points per Week	Points per 6 Weeks	Points per 9 Weeks	Points per Week	Points per 6 Weeks	Points per 9 Weeks	Points per Week	Points per 6 Weeks	Points per 9 Weeks	Points per Week	Points per 6 Weeks	Points per 9 Weeks	Points per Week	Points per 6 Weeks	Points per 9 Weeks	Points per Week	Points per 6 Weeks	Points per 9 weeks
Emergent Reader		1.7	10	15	1.3	7.5	11.3	1.0	5.8	8.8	0.9	5.0	7.5	0.7	4.2	6.3	0.6	3.3	5.0	0.4	2.5	3.8
1.0	1.0-2.0	1.7	10	15	1.3	7.5	11.3	1.0	5.8	8.8	0.9	5.0	7.5	0.7	4.2	6.3	0.6	3.3	5.0	0.4	2.5	3.8
1.5	1.5-2.5	1.9	11	17	1.4	8.3	12.8	1.1	6.4	9.9	1.0	5.5	8.5	0.8	4.6	7.1	0.6	3.7	5.7	0.5	2.8	4.3
2.0	2.0-3.0	2.1	13	19	1.6	9.8	14.3	1.2	7.6	11.1	1.1	6.5	9.5	0.9	5.4	7.9	0.7	4.3	6.3	0.5	3.3	4.8
2.5	2.3-3.3	2.3	14	21	1.8	10.5	15.8	1.3	8.2	12.3	1.2	7.0	10.5	1.0	5.8	8.8	0.8	4.7	7.0	0.6	3.5	5.3
3.0	2.6-3.6	2.5	15	23	1.9	11.3	17.3	1.5	8.8	13.4	1.3	7.5	11.5	1.1	6.3	9.6	0.8	5.0	7.7	0.6	3.8	5.8
3.5	2.8-4.0	2.7	16	24	2.0	12.0	18.0	1.6	9.3	14.0	1.4	8.0	12.0	1.1	6.7	10.0	0.9	5.3	8.0	0.7	4.0	6.0
4.0	3.0-4.5	2.8	17	25	2.1	12.8	18.8	1.6	9.9	14.6	1.4	8.5	12.5	1.2	7.1	10.4	0.9	5.7	8.3	0.7	4.3	6.3
4.5	3.2-5.0	3.2	19	29	2.4	14.3	21.8	1.9	11.1	16.9	1.6	9.5	14.5	1.3	7.9	12.1	1.0	6.3	9.7	0.8	4.8	7.3
5.0	3.4-5.4	3.5	21	32	2.7	15.8	24.0	2.0	12.3	18.7	1.8	10.5	16.0	1.5	8.8	13.3	1.2	7.0	10.7	0.9	5.3	8.0
5.5	3.7-5.7	3.9	23	35	2.9	17.3	26.3	2.3	13.4	20.4	2.0	11.5	17.5	1.6	9.6	14.6	1.3	7.7	11.7	1.0	5.8	8.8
6.0	4.0-6.1	4.2	25	39	3.3	18.8	29.3	2.5	14.6	22.8	2.1	12.5	19.5	1.8	10.4	16.3	1.4	8.3	13.0	1.1	6.3	9.8
6.5	4.2-6.5	4.6	28	41	3.4	21.0	30.8	2.7	16.3	23.9	2.3	14.0	20.5	1.9	10.7	17.1	1.5	9.3	13.7	1.2	7.0	10.3
7.0	4.3-7.0	4.9	29	44	3.7	21.8	33.0	2.9	16.9	25.7	2.5	14.5	22.0	2.0	12.1	18.3	1.6	9.7	14.7	1.2	7.3	11.0
7.5	4.4-7.5	5.3	32	48	4.0	24.0	36.0	3.1	18.7	28.0	2.7	16.0	24.0	2.2	13.3	20.0	1.8	10.7	16.0	1.3	8.0	12.0
8.0	4.5-8.0	5.6	34	50	4.2	25.5	37.5	3.3	19.8	29.2	2.8	17.0	25.0	2.3	14.2	20.8	1.9	11.3	16.7	1.4	8.5	12.5
9.0	4.6-9.0	6.3	38	57	4.8	28.5	42.8	3.7	22.2	33.3	3.2	19.0	28.5	2.6	15.8	23.8	2.1	12.7	19.0	1.6	9.5	14.3
10.0	4.7-10.0	6.9	41	62	5.2	30.8	46.5	4.0	23.9	36.2	3.5	20.5	31.0	2.9	17.1	25.8	2.3	13.7	20.7	1.7	10.3	15.5
11.0	4.8-11.0	7.6	46	68	5.7	34.5	51.0	4.4	26.8	39.7	3.8	23.0	34.0	3.1	19.2	28.3	2.5	15.3	22.7	1.9	11.5	17.0
12.0	4.9-12.0	8.3	50	75	6.3	37.5	56.3	4.8	29.2	43.8	4.2	25.0	37.5	3.5	20.8	31.3	2.8	16.7	25.0	2.1	12.5	18.8

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