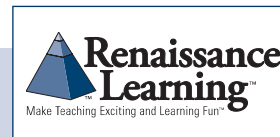


REPORT

from Renaissance
Learning™



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The Design of Accelerated Reader Assessments

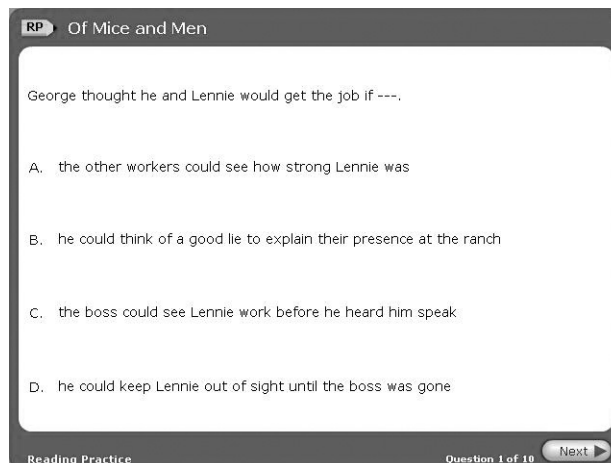
Accelerated Reader is progress-monitoring software that provides immediate, reliable, and valid feedback on student reading comprehension of books and other materials. For students, this feedback is motivational. For teachers, this data can be used to inform instruction and carefully monitor and guide each student's independent reading practice. Since its inception in 1986, Accelerated Reader has helped teachers realize remarkable reading achievement in their classrooms when it has been implemented according to recommended, research-based best classroom practices.

Each type of Accelerated Reader assessment is designed with careful consideration of guidelines from independent research, assessment reliability and validity, standardization and consistency, general issues with assessments, and the best practices of its use. Accelerated Reader assessments and best practices are supported by reliability and validity research as well as research that provides evidence of the impact of Accelerated Reader on student achievement.

Accelerated Reader Assessments

Reading Practice Quizzes

Reading Practice Quizzes are the most common type of assessment in Accelerated Reader. Each student takes these quizzes after books are read independently, with another person, or to the student. The purpose of these quizzes is to determine whether a student has read a book, to measure his or her literal comprehension of the book, and to provide immediate motivational feedback. Additionally, the quizzes provide feedback to help teachers monitor and manage student reading (e.g., achievement measurements, reading ability) and motivational feedback to encourage students to read (e.g., points, measured achievement, recognition).



Reading Practice Quizzes are selected-response (multiple-choice) quizzes available in 5-, 10-, and 20-item formats, depending on book level and length. (An *item* is a question and its multiple-choice answers.) The 5-item quizzes are primarily used to cover short books read by emergent readers, while 20-item quizzes cover longer books at higher reading levels. The most common Reading Practice Quiz is the 10-item quiz, which covers mid-range medium-length books.

Questions typically focus on significant events, characters, and other literal features. In addition, questions are presented in an order that matches the chronology of a book, a practice that reinforces story grammar as a student takes a quiz. After students complete a quiz, they receive a point value based on the percentage of questions answered correctly.

Stiggins (2005) noted that poor readers, non-readers, and emergent English readers are not able to effectively take selected-response assessments in English. In Accelerated Reader, however, this problem is remedied by the availability of Recorded Voice Quizzes and Spanish Quizzes. By using these quiz types, teachers are able to

administer the same quizzes to preliterate and emergent readers, Spanish bilingual, ESL, ELL, and Spanish language learning students without extra assistance.

Recorded Voice Quizzes, intended for preliterate and emergent English readers, are professionally recorded by a narrator who reads the quiz questions and answer choices as they appear on screen. The sound can be turned on or off depending on the child’s independent reading ability. As of November 2006, there are 2,398 Recorded Voice Quizzes in English.

Spanish Quizzes, intended for native Spanish bilingual, ESL, ELL, and Spanish language learning students, are written and edited by native Spanish speakers and available for best-selling Spanish titles. Two quizzes are available for popular bilingual books, one in English and one in Spanish, providing students and teachers added flexibility. As of November 2006, there are 6,147 Reading Practice Quizzes in Spanish and 582 Other Reading Quizzes in Spanish, totaling 6,729 Spanish Quizzes (see Table 1).

Vocabulary Practice Quizzes

Vocabulary development is an important component of learning how to read (e.g., Nagy, 1998; National Institute of Child Health and Human Development, 2000). Vocabulary Practice Quizzes, powered by Accelerated Vocabulary and available through Renaissance Place, measure a student’s command of vocabulary words encountered while reading.

These quizzes are designed to reinforce vocabulary acquisition, assist with individualizing vocabulary instruction, and generate student interest in words through authentic, in-context literature experiences. Vocabulary words are identified by finding words that are at or above the average reading level of the text, appear in the book at least twice, are significant to the book’s meaning, and are interesting or useful in everyday conversation. Quizzes include 5, 10, or 15 words from a particular book as well as review words from previously read books.

When a student has chosen a book to read, the teacher, librarian, or student prints a vocabulary list for the book on paper or as a label to affix to a bookmark or the inside cover of the book. Students review the words before reading and then encounter them in context while

reading. To motivate students and provide a “word culture” in the classroom, teachers can provide ongoing strategies for word learning and help students apply them to their word lists. Once a book has been read, students review their vocabulary list, take and pass a Reading Practice Quiz, and then take the corresponding Vocabulary Practice Quiz. Accelerated Reader generates reports on each student’s continuing vocabulary development.



Literacy Skills Quizzes

Literacy Skills Quizzes were developed to help identify students’ reading strengths and weaknesses. As a supplement to Reading Practice Quizzes, teachers can administer Literacy Skills Quizzes for various reasons, such as test-preparation or to assess a deeper understanding of a book. Currently, there are 784 Literacy Skills Quizzes available for many of the most popular titles in the Accelerated Reader database. Many of these books are considered classics, such as *Charlotte’s Web*, *A Farewell to Arms*, and *Macbeth*.

Questions on Literacy Skills Quizzes are randomly generated from a 36- or 60-item bank. The item bank approach is appropriate for assessing literacy skills because there is ample content in the books for which these assessments have been developed. Most Literacy Skills Quizzes are available in 12-item formats (using a 36-item bank), but a few are available in a 24-item format (using a 60-item bank). Due to item-bank technology, and Literacy Skills Quiz can be taken up to 3 times. Teachers are advised that the best time for students to take Literacy Skills Quizzes is after they have passed the Reading Practice Quiz for the same book.

Quiz items are based on 24 specific, higher order, reading comprehension skills from state standards, basal reading series, and standardized tests. The skills are grouped into four categories—initial understanding, literary analysis, inferential comprehension, and constructing meaning—so that diagnostic reports can be generated to give teachers an accurate picture of students’ reading abilities. Examples of the kinds of skills assessed are: understanding the main idea, understanding characterization, recognizing cause and effect, and recognizing plot. Each Literacy Skills Quiz includes an electronic teacher’s guide with a brief summary, main character list, vocabulary words, and questions that prompt discussion.

Other Reading Quizzes

Other Reading Quizzes are written on reading textbook series and other classroom reading material and enable teachers to monitor independent and classroom reading of assigned material. These quizzes, like Reading Practice Quizzes, follow the order of the text and assess literal comprehension using a multiple-choice format.

Other Reading Quizzes are aligned to a variety of textbooks including series published by Macmillan/McGraw-Hill, Houghton Mifflin, Harcourt School Publishing, Scott Foresman, and SRA/McGraw-Hill. These quizzes are specifically linked to how textbooks and other materials are used in the classroom, and the material is organized into units of various subjects.

For supplemental materials in a textbook series, such as suggested or additional reading, students can take a Reading Practice Quiz. These materials can be self-selected or assigned, and reading is self-paced. Teachers can use these materials to gradually transition students from teacher-led reading practice to self-selected, independent reading practice.

Summary of Available Quiz Titles

With the variety of quizzes available for different reading media, teachers are able to monitor just about every kind of reading available to students, as well as different aspects of achievement related to reading (e.g., literal comprehension, higher order thinking, vocabulary development). As of November 2006, more than 110,000 quizzes have been developed.

Table 1 is a summary of available Accelerated Reader quiz titles, broken down by type of quiz, literature type, quiz language, and number of items per quiz. In many cases, multiple types of quizzes have been developed for one book, so the total number of available quizzes shown in the table exceeds the total number of books. The average reading level (ARL) is also presented to demonstrate that as the reading level increases, the number of items per quiz also increases (see Table 1).

Accelerated Reader Enterprise provides access to all Reading Practice, Vocabulary Practice, and Literacy Skills Quizzes. Powered by Renaissance Place, a web-based data management system, Accelerated Reader Enterprise includes access to new quizzes as soon as they are released. Accelerated Reader Enterprise also includes professional development, access to an information dashboard, expanded technical support, and automatic software upgrades.

Assessment Considerations

Quiz Development

Before the content of the quizzes is developed, a point value is assigned to each book based on the number of words in the book and the book’s reading level, which is determined using the ATOS Readability Formula for Books (see Renaissance Learning, 2006b). Students earn points after reading a book and taking a quiz, and the amount of points earned is based on the percentage of correct responses. Points are an accurate summary of reading quantity, level, and comprehension (Paul, 1996; Paul, 2003).

To ensure that Accelerated Reader quizzes present “a meaningful, interesting, and reasonably demanding challenge” (Black & Wiliam, 1998), the development of each quiz entails a multi-step editorial process with quality checks at several points. Dedicated content developers and editors from Renaissance Learning create and edit Accelerated Reader quizzes following several guidelines recommended by a number of researchers (e.g., Frary, 1995; Haladyna, Downing, and Rodriguez, 2002; Stiggins, 2005) for designing multiple-choice assessments.

The two main goals of developers and editors are to make sure that the quiz questions are (1) key to the text

or advance the plot in an important way and (2) not guessable without having read the book. For the reasons stated above, we do not accept quizzes other than those written by trained Renaissance Learning quiz developers, who work closely with editorial staff to ensure quality throughout the quiz development process.

The multi-step process, the length of which depends on the acquisition, length, and genre of the book, begins when Renaissance Learning quiz developers read a book and draft items that reflect key points in the text or plot. The quiz is written at or below the reading level of the book to ensure that students understand it. Next, two editors review the quiz, checking for content and plausibility, spelling, usage, grammar, punctuation, and conformation to quiz style. Special attention is paid to ensure that the distracters (the incorrect responses for each question) are neither too implausible nor too similar to the correct answer.

Following these reviews and modifications (if necessary), an editor evaluates the quiz to ensure that the software recognizes the correct responses. The final quality check involves spell checking and proofing. Beyond this, quiz reliability and validity are continually assessed and updated (e.g., Renaissance Learning, 2006a).

Reliability, Validity, and Usability

Accelerated Reader quizzes conform closely to the most widely accepted principles of assessment. For an in-depth discussion of reliability, validity, and usability see *Accelerated Reader: Understanding Reliability and Validity* (Renaissance Learning, 2006a).

Reliability is the extent to which the scores from an assessment are consistent across repeated administrations of the same or similar assessments to the same group or population. The more reliable assessment scores are, the more they are free from errors of measurement. In educational assessment, some degree of measurement error is inevitable.

The internal reliability of Accelerated Reader quiz scores has been documented to be in the moderate to high range, with reliability increasing as quiz length increases and as students accumulate a longer record of quizzes. This is a common phenomenon in assessment; all other things being equal (such as item difficulty), longer tests tend to be more reliable than shorter ones (Renaissance Learning, 2006a).

Validity is the degree to which an assessment measures what it claims to measure. Evidence of assessment validity is often indirect and incremental, consisting of a variety of data that, taken together, are consistent with the theory that the assessment measures the intended construct. Accelerated Reader quizzes are valid because they are tied directly to the content of a specific book or passage and focus on facts rather than conjecture.

In one study, students were instructed to take quizzes on books that they had not read (Renaissance Learning, 2006a). Nearly all of the students failed the quizzes, yet their prior quiz history showed that they tended to do well on the quizzes when they had read the books. The results confirm that quiz content is highly related to book content, and without this knowledge, students cannot pass Accelerated Reader quizzes. In other words, Accelerated Reader quizzes are valid assessments of literal reading comprehension.

In addition to being reliable and valid, the computerized selected-response assessments of Accelerated Reader are usable, i.e., the quizzes are easy to use and efficient (in terms of time and money). The assessments provide a high degree of useful information while consuming relatively few teacher resources, such as time.

All Accelerated Reader quizzes have a median time of less than 10 minutes per quiz, and the median time to complete the most commonly-used type of quiz (the 10-item Reading Practice Quiz) is just over three minutes (Renaissance Learning, 2006a). Additionally, the quizzes save time for the teacher, since the teacher does not need to score each quiz or administer the quizzes one-on-one.

As noted by Stiggins (2005):

[Selected-response] tests are efficient in that we can administer large numbers of multiple-choice or true/false test items per unit of testing time. Thus, they permit us to sample widely and draw relatively confident generalizations from the content sampled. For this reason, when the target is knowledge mastery, selected response formats fit nicely into the resource realities of most classrooms. (p. 70)

Standardization and Consistency

Accelerated Reader quizzes are developed with standardized assessment procedures and fixed parameters to ensure fairness and consistency. Accelerated Reader

quizzes are standardized in two respects. First, quizzes fit the definition of standardized given by Popham (1999) in that they are “administered and scored in a predetermined, standard manner.” This characteristic is important because it ensures that the quizzes are fair. Even though Accelerated Reader is considered a low-stakes formative assessment, both students and teachers invest much of themselves in the assessment, and the perception of fairness contributes importantly to the widespread acceptance of Accelerated Reader. Second, the consistent manner in which Accelerated Reader quizzes are developed and administered means that the information the quizzes provide is comparable over time and from student to student.

In order to maintain fairness and consistency, Accelerated Reader does not have the option to allow teachers to assign alternate point values or to change the number of questions required to pass a quiz. Allowing such flexibility would render the information collected meaningless because data would not be comparable from student to student. The open-ended approach is arbitrary and might be perceived by students as being unfair, which may decrease student motivation to succeed. Additionally, Accelerated Reader allows students to earn a portion of the points assigned to a book, depending upon the percentage of items that they answer correctly. This practice is consistent with the typical grading method used by teachers. Furthermore, the length of every Accelerated Reader quiz is dependent on the length of the book, reflecting the attention span and cognitive level of the student taking the quiz.

Assessment Issues

Cheating

Feedback received from teachers using Accelerated Reader has indicated that cheating is not a significant problem on Accelerated Reader quizzes. Students normally feel there is little reason to cheat on an Accelerated Reader quiz for two reasons. First, there are typically no negative consequences associated with failing a quiz. Second, if a student has read a book at the appropriate level, chances are that he or she will answer most of the questions correctly. Experience suggests that students believe the purpose of the quiz is to help improve reading, not to give a grade. Thus, there is no reason to cheat.

Accelerated Reader quizzes discourage casual cheating (e.g., students sharing correct answer choices) because the answer choices are presented in a random and different order for each student. Furthermore, in the typical Accelerated Reader classroom, students are reading different books, and take a quiz only once. It is unlikely that they will be sufficiently familiar with another student’s book or quiz to provide useful information to another student.

Some educators have suggested that using an item bank for all quizzes will stop whatever cheating may occur. Item banks, however, do not halt the most typical way in which students cheat—one student takes the test for another student. Additionally, quizzes for short books will result in small item banks. These quizzes will not be equivalent upon multiple administrations, decreasing fairness and accuracy. Thus, the best way to reduce cheating is to monitor the assessment process.

Students can attempt to pass a quiz on an unabridged version of a book simply by reading the abridged version of that book. Accelerated Reader quizzes focus on the primary plotline or facts in a book. Because of this, it is possible that the quiz on an unabridged text could be passed by reading the abridged text. If we attempt to prevent this type of cheating by offering quiz questions on obscure facts from the unabridged text, we would penalize students who do not cheat. Students may also attempt to pass quizzes by watching a movie based on the book. If such a movie is 1) a nationwide theater release, 2) a very popular title or has wide appeal for the age group, and/or 3) is readily available on DVD or VHS, we review the related quiz(es) to ensure that students will not be able to pass the quiz(es) by watching the movie.

The best practices of Accelerated Reader encourage teachers to monitor reading practice daily using **Status of the Class** and **Reading Logs**, two techniques that provide information teachers can use to reduce the incidence of cheating. Status of the Class is a technique that guides teachers to conduct daily reviews of each student’s reading. It takes about 30 to 60 seconds for each student each day. The teacher checks each student’s Reading Log, carefully examining the information the student has written, including the book’s title and reading also asks each student questions about the book to ensure that the students are reading daily without struggling to

STAR Reading

STAR Reading is a reliable, valid, and efficient periodic progress-monitoring assessment of general reading achievement and comprehension for grades 1–12. Administered in 10 minutes or less, STAR Reading provides accurate, norm-referenced scores, including grade equivalents, percentile ranks, and normal curve equivalents, and a criterion-referenced instructional reading level, in easy-to-understand reports. These reports, available for students, teachers, administrators, and parents, provide valuable progress-monitoring information throughout the year.

STAR Reading uses an item bank of almost 1,300 items and computer-adaptive technology to tailor each student's test to his or her abilities. This method reduces testing time and increases reliability. Students begin with a question below their ability level, and the next question is more difficult if students answer correctly or less difficult if students answer incorrectly. This process repeats for every question, resulting in personalized growth information.

This use of an item bank is appropriate because each item has been calibrated and tested on a national standardization sample (Renaissance Learning, 2006c). The assessment can create a number of unique “forms” for multiple administrations. Each assessment is fair because each is tailored to students with comparable abilities. Additionally, STAR Reading scores are highly correlated with traditional standardized tests. For more information, see *STAR Reading: Understanding Reliability and Validity* (Renaissance Learning, 2006c).

level and the number of pages read per day. The teacher read or comprehend. When a student has finished reading a book, the teacher can determine whether the student is ready to take a quiz.

These techniques reduce the possibility of cheating by personalizing the process through direct monitoring. In sum, teachers can circumvent cheating by allowing students to self-select books and by monitoring reading practice using Status of the Class and Reading Logs.

Open Book Quizzing

Since Accelerated Reader quizzes help teachers motivate students and monitor reading practice, teachers can use Accelerated Reader to guide students to books levels they are able to read with success. Using grade-equivalent scores from STAR Reading or another standardized test, teachers can place each student within the appropriate Zone of Proximal Development. After determining a student's ZPD range, teachers can continuously monitor and adjust the range depending on each student's success.

When a student relies on recall while quizzing, quiz scores indicate the student's level of comprehension of the book. Low quiz scores (below 80% on a single quiz or below 85% on average) indicate that a student is struggling at the assigned book level. When a student struggles, the teacher can adjust the ZPD range and guide the student to more appropriate books.

When a student relies on finding information in the book while quizzing, quiz scores no longer accurately indicate the student's level of comprehension, and the teacher can no longer accurately assess whether the books a student has read are at the appropriate level. A student may continue to select books that are too difficult, or the teacher may never realize that the student needs extra instruction to improve reading comprehension. A student who uses the book while quizzing may have high quiz scores but may receive a low reading comprehension score on STAR Reading or a state test. Therefore, Accelerated Reader is best used when students do not have access to books during quizzing.

There are a few exceptions when open-book testing may be appropriate:

- During instruction on how to take Accelerated Reader quizzes, but for no more than two weeks
- During instruction on how to read nonfiction and take corresponding Accelerated Reader quizzes, but for no more than two weeks
- For emergent readers who read picture books
- As an intervention method for a special education student

At times, schools have used open-book quizzing to promote point competitions rather than individualized goals or because students are doing poorly on quizzes. A number of alternative strategies, however, can be used to motivate students and increase average percent correct. For example, students can be instructed to read a few pages, close the book, and summarize what they've read. Another strategy is to skim through the previous chapter before continuing to read, or to review book before quizzing on it.

Retaking Quizzes

As a rule, teachers are discouraged from allowing students to take Reading Practice, Vocabulary Practice, or Other Reading Quizzes more than once. Retaking the identical quiz typically increases students' scores but is likely to be perceived by parents as unfair (Snow, 1993). The tendency to score better increases when students receive feedback about whether their answers are right or wrong. Given this tendency, one might question the purpose of allowing students to retake a quiz, or more specifically, to retake a Reading Practice Quiz that is meant to determine if a student has read a book. In essence, the regular retaking of quizzes may indicate cheating. Allowing students to take a quiz more than once may cause some students to take quizzes on books they have not read because they have a good chance of passing the quiz after taking it several times.

If students have read a book within their zone of proximal development (ZPD), they are likely to pass the quiz because of the way it has been designed. If a student does not pass a quiz, it is probably because the student has not read the book or the book was too difficult in the first place. In neither case does it make sense for the

Zone of Proximal Development

Reading achievement can be enhanced even further when students are matched with books at an appropriate level of difficulty. The zone of proximal development (ZPD) is a theoretical concept inspired by Russian psychologist Lev Vygotsky (1978). Vygotsky said that those acquiring language concepts will learn most effectively if the concepts are not too easy, yet not beyond the limit of their language-learning potential. In literature-based reading, ZPD is the range of book readability levels that will result in optimal growth in reading ability for each student.

Students who read books within this zone achieve optimal reading growth because they are reading books that are challenging but not frustrating. Books that are too easy prevent students from building the vocabulary and comprehension abilities required to become proficient readers, while books that are too hard frustrate students and cause their reading volume to decrease.

Teachers can use Renaissance Learning's STAR Reading or any other norm-referenced test of general reading ability to place each student in the appropriate ZPD range (Renaissance Learning, 2006b, 2006e). Student performance on Accelerated Reader quizzes also indicates whether students have been placed within the appropriate ZPD range. Teachers monitor each student's ZPD range, using Status of the Class and Accelerated Reader, and adjust it as necessary if any scores indicate that the books are too hard or too easy. Both assessments contribute to reading achievement by recommending appropriately challenging reading material.

student to retake the quiz. Occasionally, there may be extenuating circumstances that contribute to failure, like disruptions, illness, personal situations, and such. When this is the case, the teacher has the option of negating the student's score in the software and allowing the student to retake the quiz.

Literacy Skills Quizzes, on the other hand, are an exception to this recommendation. The items on these quizzes are drawn from item banks correlated to specific comprehension skills. The purpose of Literacy Skills Quizzes is to measure various aspects of comprehension. Teachers may choose to have students retake Literacy Skills Quizzes up to three times in order to provide additional practice or to assess specific elements of comprehension. In addition, Literacy Skills Quizzes can be useful for diagnostic purposes, to measure the change in students' skills after an intervention, or to determine if students have mastered one or more skills. Item-bank technology allows equivalent forms of the assessment to be generated within a skill category.

Literal Understanding

Occasionally, the Accelerated Reader quizzes are criticized as assessing "lower order" thinking, but literal comprehension is an important aspect of learning. According to Stiggins (2005), "by deemphasizing content mastery [i.e., literal comprehension], we in effect deny our students access to the very content they need to solve the problems that we want them to solve" (p. 46). There are a number of problems with measuring "higher order" thinking.

For instance, questions focusing on higher order thinking skills are prone to bias, more so than questions focusing on literal comprehension. Higher-order thinking skills may reflect students' backgrounds rather than their achievement. As noted by Popham (1999), questions intending to measure higher order thinking might measure what students already know instead of what they learn in class. Additionally, ACT (2006) discovered that literal and inferential understanding did not differentially affect average percent correct on the ACT. In fact, the relationship between these two comprehension categories and average percent correct was nearly identical.

Thus, the assessment of literal understanding is closely tied to inferential comprehension, or higher order thinking, and would provide just as much information as

assessments on higher order skills. On Reading Practice Quizzes, students with well-developed higher order thinking skills do not achieve more than students who are not as developed with these skills. All students who read the book and understand it at a basic level receive the same score, consistently fulfilling one purpose of the assessment—to determine whether a student has read and comprehended the book.

Assessment Practices

Motivation and Challenge

Teachers can motivate students by providing opportunities for successful reading, and Accelerated Reader is a tool that can assist with this goal. Teachers can use information from Accelerated Reader to assist students with book selection, monitor reading practice, provide frequent and objective feedback, and set reading goals. Students have fun as they read interesting books at appropriate levels and experience success on Accelerated Reader quizzes—both positive, reinforcing experiences. As students learn that reading is fun, the amount of reading and motivation to read increases.

Each book is assigned a point value. Points are an accurate summary of reading quantity, level, and comprehension (Paul, 1996; Paul, 2003). Points can be used to set reading goals and to motivate students to meet those goals. These points are not necessarily extrinsic rewards. It is only when teachers choose to give students rewards based on points that extrinsic rewards are involved in Accelerated Reader. Otherwise, points are nothing more than a quantitative measure of reading practice. Thus, Accelerated Reader can be used to motivate students with or without extrinsic rewards.

In practice, establishing percent correct, point, book level, reading certification, and other goals as well as selecting books at appropriate levels leads to greater reading motivation. This tendency is consistent with the observations of Black and Wiliam (1998) that students respond more favorably when they can establish their own goals and are presented with "a meaningful, interesting, and reasonably demanding challenge." High implementation of Accelerated Reader promotes both personalized goal setting and appropriate book levels (Renaissance Learning, 2006e). Furthermore, a study by Husman, Brem, and Duggan (2005) found that the

students' orientation on mastery, rather than performance (such as a grade), remained consistently high after the implementation of Accelerated Reader.

Informative Assessment and Teacher Involvement

The purpose of daily progress-monitoring assessments like Accelerated Reader is to inform instruction, provide immediate performance feedback, monitor progress, and increase motivation. These assessments, as noted by Stiggins (2005), are *FOR* learning rather than *OF* learning. This means that the goal of the assessment is to *enhance* learning, not just to demonstrate what has been learned or to assign a grade. However, this cannot be done without interaction between teacher, student, and the information provided by the assessment.

The teacher is heavily involved in the reading and assessment process. Teachers enable assessments like Accelerated Reader to work effectively by guiding students to books at appropriate reading levels, monitoring progress, providing social feedback to students (e.g., praise), and adjusting instruction and curriculum. Teachers enable excellence in student performance by teaching with methods based on information (Paul, 2003). The progress-monitoring data from Accelerated Reader, along with many other sources (e.g., short conferences with students), are a key source of information for the classroom.

High Implementation and Best Practices

In order to maximize the benefits of Accelerated Reader assessments, Renaissance Learning researched classroom practices that work with Accelerated Reader to improve student learning. High implementation of Accelerated Reader has been confirmed to improve reading comprehension (see Research). Listed below are the standards of high implementation, or best classroom practices, of Accelerated Reader (adapted from Paul, 2003). As emphasized, teachers play a critical role in the effective use of Accelerated Reader.

- 1. Reading Time.** Teachers ensure that students have an appropriate amount of time for teacher-guided, independent reading of self-selected books.
- 2. Reading Success.** Teachers ensure that students are highly successful readers, with an average percent correct of 85% or above on Accelerated Reader quizzes. Research also suggests that obtaining an even higher average percent correct (for example, 90% or

100%) can provide even greater reading achievement gains (see Paul, 2003; Borman & Dowling, 2004; and Renaissance Learning, 2006d).

- 3. Appropriate Reading Level.** Teachers ensure that students are reading books at levels appropriate to their age and abilities, i.e., within the recommended ZPD range (see box on p. 7).
- 4. Progress Monitoring.** Teachers obtain information for progress monitoring from three sources: daily feedback from direct teacher monitoring and conferencing with each student (Status of the Class, see p. 5), daily and weekly feedback from Accelerated Reader, and periodic (3 to 10 times per year) feedback from STAR Reading or another reliable and valid reading assessment.
- 5. Personalized Goals.** Teachers ensure that students establish personalized goals in three areas: average percent correct on Accelerated Reader quizzes, reading practice time (measured by points), and average book level (see Goal Setting Chart, p. 13).
- 6. Personalized Instruction.** Teachers combine information from daily progress monitoring, Accelerated Reader, STAR Reading, and student goals to inform, improve, and assess instruction at a personal level.

Research

As of November 2006, over 30 independent, experimental and quasi-experimental studies have analyzed the impact of Accelerated Reader and its research-based best practices. In one study (Nunnery, Ross, & McDonald, 2006), 44 third- through sixth-grade classrooms, with 978 at-risk students, were randomly assigned to either implement Accelerated Reader with the current curriculum or continue with the current curriculum alone. Student reading scores improved in classrooms that used Accelerated Reader, and students with learning disabilities improved the most in classrooms with high implementation.

In another study by Nunnery and Ross (in press), 11 schools used Accelerated Reader and were matched for comparison to similar schools that were not using Accelerated Reader. Elementary students in Accelerated

Reader schools performed better on reading achievement than the other students. Students in schools with high-intensity implementation also scored significantly higher than students in comparison schools or schools with low-intensity implementation.

Samuels and Wu (2003) randomly assigned 67 students in third and fifth grades to use Accelerated Reader, which provides immediate feedback on comprehension on books read, or to do book reports, which result in delayed feedback after being graded by instructors. Classrooms that used Accelerated Reader achieved significantly higher reading comprehension scores than classrooms that used book reports. Thus, immediate feedback provided by Accelerated Reader improved reading comprehension.

In another study, Ross, Nunnery, and Goldfeder (2004) studied 1,665 students in 76 classrooms from 11 schools in Memphis, TN. Teachers were randomly assigned to use Accelerated Reader with the current curriculum or to continue with the current curriculum alone. They found moderate to large positive effect sizes for the students using Accelerated Reader in grades K–3. In all three studies cited above, students who used Accelerated Reader outperformed students in control classrooms.

In addition, the results from an examination of the reading records of 50,823 students indicated that reading achievement was enhanced by carefully guided independent reading, increased reading practice time, and high implementation of Accelerated Reader (Paul, 2003). Students in classrooms exhibiting these qualities demonstrated greater reading achievement. In general, this study found that students can attain greater reading achievement by reading 20 minutes or more each day and by scoring 85% or higher on quizzes.

Independent research has also discovered this relationship. Bolt (2004) analyzed 3,000 classrooms that used Accelerated Reader and discovered that when Accelerated Reader was implemented according to Renaissance Learning's standards, student achievement significantly increased. Specifically, when students spent more time on guided, independent reading, reading gains increased. Regardless of reading curriculum, students in classrooms with higher levels of implementation achieved greater gains than students in lower levels.

Borman and Dowling (2004) assessed the relationship between student reading behavior and achievement, as well as between classroom implementation variables and achievement. They found that student reading success rates and reading challenge levels were key predictors of student literacy development. Additionally, high success rates and reading in higher ZPD ranges than initially assigned were even better predictors of student outcomes.

These results occur for a number of reasons. Students who use Accelerated Reader spend more time reading books than students who do not use the assessment, and the longer students use Accelerated Reader, the more they read (Paul, 2003). Accelerated Reader is also a motivational tool, increasing student motivation to read (Brem, Husman, & Duggan, 2005). Additionally, teachers who use Accelerated Reader are encouraged to follow best practices for classroom implementation, one of which is to seek high levels of comprehension on quizzes (Paul, 2003; Borman & Dowling, 2004). All of these factors combine to increase reading achievement.

The experiences of teachers and the results from large-scale and experimental research studies have indicated that the quantity of reading practice is one of the principal correlates of reading achievement. This conclusion was supported by the results of the National Assessment of Educational Progress (National Center for Education Statistics, 1999):

In 1998, 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.

Summary and Conclusions

Accelerated Reader is progress-monitoring software. It provides teachers with quality information needed to monitor and guide reading practice and to inform instruction. The feedback it provides allows teachers to determine how much students are reading, whether students are reading books at appropriate difficulty levels, and if students understand what they are reading. In addition, the immediate feedback provided by Accelerated Reader has been shown to have a positive motivational effect on students. Overall, the quality and

quantity of the data provided by Accelerated Reader help to overcome one of the most significant problems in education—a lack of meaningful information.

The assessments that are part of Accelerated Reader are reliable and valid, scientifically research-based, and provide teachers with relevant information to guide instruction. Reading Practice Quizzes contain a fixed number of questions, determine if a student has read a book, and motivate additional reading. Vocabulary Practice Quizzes provide necessary practice for improving and enlarging vocabulary. Literacy Skills Quizzes contain questions that have been drawn from

an item bank and are meant to assess a broad range of comprehension skills. Other Reading Quizzes help teachers monitor students' reading assignments in textbooks and supplemental texts.

The compilation of a large database of high quality quizzes, now numbering more than 110,000, has made Accelerated Reader one of the most popular educational software tools in America's schools. An extensive body of research supports its effectiveness, and ongoing research ensures that the assessment continues to enhance teachers' efforts.

Table 1. AR Quiz Titles Available in the US (as of November 2006)

			Quiz Length (in number of questions)									
			5		10		12 ^b or 15		20 or 24 ^b		All	
Quizzes	Type	Lang	Count	ARL	Count	ARL	Count	ARL	Count	ARL	Count	ARL
Reading Practice ^a	Fiction	Eng	14,402	2.58	28,733	4.56	0	NA	1,287	6.75	44,422	3.98
		Sp	1,793	2.89	2,214	4.60	0	NA	173	7.39	4,180	3.98
	Non-F	Eng	16,229	3.65	27,019	6.70	0	NA	302	8.56	43,550	5.58
		Sp	1,350	3.15	647	5.66	0	NA	17	9.11	2,014	4.01
	Both	Both	33,774	3.13	58,613	5.56	0	NA	1,779	7.14	94,166	4.72
Literacy Skills	Fiction	Eng	0	NA	0	NA	752	5.49	14	8.36	766	5.54
	Non-F	Eng	0	NA	0	NA	18	5.86	0	NA	18	5.86
	Both	Eng	0	NA	0	NA	770	5.50	14	8.36	784	5.55
Other Reading	Fiction	Eng	2,301	2.79	629	4.27	0	NA	0	NA	2,930	3.11
		Sp	409	3.19	93	4.53	0	NA	0	NA	502	3.44
	Non-F	Eng	2,773	4.22	381	5.70	0	NA	150	6.21	3,304	4.48
		Sp	56	4.38	24	4.91	0	NA	0	NA	80	4.54
	Both	Both	5,539	3.55	1,127	4.79	0	NA	150	6.21	6,816	3.82
Vocab. Practice	Fiction	Eng	2,498	3.42	3,421	4.10	1,837	4.96	0	NA	7,756	4.09
	Non-F	Eng	1,021	4.46	393	5.15	52	6.34	0	NA	1,466	4.71
	Both	Eng	3,519	3.72	3,814	4.21	1,889	5.00	0	NA	9,222	4.19
All	Both	Both	42,832	3.23	63,554	5.47	2,659	5.14	1,943	7.08	110,988	4.63

Note. Abbreviations: Vocab. = Vocabulary, Non-F. = Non-fiction, Lang. = Language, Eng. = English, Spa. = Spanish, ARL = Average Reading Level. Books for 1,764 quizzes may be out of print.

^a 2,382 of these quizzes are also available as Recorded Voice Quizzes in English.

^b 12- and 24-question quizzes have respective item banks of 36 and 60 questions.

Goal-Setting Chart

Use the chart and guidelines below to help plan goals for your students based on their reading level and the amount of daily reading practice that you provide.

Identify ZPD

Identify each student's grade-equivalent (GE) score with a standardized assessment, such as STAR Reading, 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

Average percent correct—The most important goal for all students is to average 85% 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 goals—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.

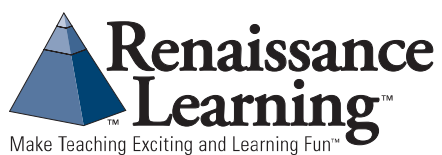
Grade-Equivalent Score	Suggested ZPD	60 Min. Daily Practice			30 Min. Daily Practice			20 Min. Daily Practice		
		Points per Week	Points per 6 Weeks	Points per 9 Weeks	Points per Week	Points per 6 Weeks	Points per 9 Weeks	Points per Week	Points per 6 Weeks	Points per 9 Weeks
1.0	1.0 – 2.0	1.7	10	15	0.9	5.0	7.5	0.6	3.3	5.0
1.5	1.5 – 2.5	1.9	11	17	1.0	5.5	8.5	0.6	3.7	5.7
2.0	2.0 – 3.0	2.1	13	19	1.1	6.5	9.5	0.7	4.3	6.3
2.5	2.3 – 3.3	2.3	14	21	1.2	7.0	10.5	0.8	4.7	7.0
3.0	2.6 – 3.6	2.5	15	23	1.3	7.5	11.5	0.8	5.0	7.7
3.5	2.8 – 4.0	2.7	16	24	1.4	8.0	12.0	0.9	5.3	8.0
4.0	3.0 – 4.5	2.8	17	25	1.4	8.5	12.5	0.9	5.7	8.3
4.5	3.2 – 5.0	3.2	19	29	1.6	9.5	14.5	1.0	6.3	9.7
5.0	3.4 – 5.4	3.5	21	32	1.8	10.5	16.0	1.2	7.0	10.7
5.5	3.7 – 5.7	3.9	23	35	2.0	11.5	17.5	1.3	7.7	11.7
6.0	4.0 – 6.1	4.2	25	39	2.1	12.5	19.5	1.4	8.3	13.0
6.5	4.2 – 6.5	4.6	28	41	2.3	14.0	20.5	1.5	9.3	13.7
7.0	4.3 – 7.0	4.9	29	44	2.5	14.5	22.0	1.6	9.7	14.7
7.5	4.4 – 7.5	5.3	32	48	2.7	16.0	24.0	1.8	10.7	16.0
8.0	4.5 – 8.0	5.6	34	50	2.8	17.0	25.0	1.9	11.3	16.7
9.0	4.6 – 9.0	6.3	38	57	3.2	19.0	28.5	2.1	12.7	19.0
10.0	4.7 – 10.0	6.9	41	62	3.5	20.5	31.0	2.3	13.7	20.7
11.0	4.8 – 11.0	7.6	46	68	3.8	23.0	34.0	2.5	15.3	22.7
12.0	4.9 – 12.0	8.3	50	75	4.2	25.0	37.5	2.8	16.7	25.0

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