Reading Management Programs: A Review of the Research

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Abstract

This manuscript reviews research to date on the instructional use of reading management software programs. The manuscript provides an overview of these programs, including their history and diffusion; describes their theoretical basis; and examines research findings on reading management software in three key areas (program implementation, reading achievement, and student attitudes). High quality implementation at both the classroom and school level is critical to reading management programs’ success. Additionally, careful attention should be given to the balance between extrinsic and intrinsic motivation. Parental involvement in reading may also play a pivotal role in the successful implementation of reading management programs. The authors conclude that more research is needed and especially longitudinal studies, to fully understand the impact of reading management programs.
Literacy has important life consequences for people living in industrialized countries such as the United States. More specifically, low literacy levels put children at risk for problems later on as adults, including low socioeconomic status, poor quality of life associated with poverty, unemployment, welfare dependency, and teenage pregnancy (Berlin & Sum, 1988; Kirsch, Jungeblut, Jenkins, & Kolstad, 1993; Kutner, Greenberg, & Baer, 2005). Focused national efforts to improve the teaching of reading in the U.S. have had disappointing results.

The overarching goal of the No Child Left Behind Act (2001) is to close the achievement gap, particularly among low-achieving children (e.g., poor, English language learners, migrant, and those who need reading assistance) and between minority/non-minority and advantaged/disadvantaged students. While the National Assessment of Educational Progress (NAEP) 2007 reading assessment of 4th grade children showed that the gaps between white and black or Hispanic children narrowed slightly since 2002, no significant change in 8th grade reading score gaps occurred between white and black or Hispanic students during the last 15 years (Lee, Grigg, & Donahue, 2007).

A variety of approaches to improve reading achievement have been introduced in schools, including several that deploy new technologies (see, e.g., Kulik, 2003). Among technology-based approached, reading tutorial packages have received a great deal of attention and scrutiny, with a recent national study suggesting they fail to have any positive effect (Dynarski et al., 2007). However, less national attention has been paid to reading management programs, which use software to encourage, direct, and assess students' independent reading from books, and are among the most widely used educational software programs in the country.
In this paper, we review research to date on the instructional use of reading management software programs. We begin with an overview of these programs; describe their theoretical basis; examine research findings on reading management software in three key areas (program implementation, reading achievement, and student attitudes); and then discuss the implications of this review for educational practice and further research.

The History and Diffusion of Reading Management Programs

The first reading management program, The Electronic Bookshelf, was invented in 1981 by a school librarian who wished to promote reading in children and hold them accountable for that reading (Everhart, 1998). Electronic Bookshelf software included a recommended book list, multiple-choice comprehension quizzes, and a points- and record-keeping system. Electronic Bookshelf was very successful and several competing reading management programs were soon developed, including Accelerated Reader, Reading Counts!, BookSharp, and That’s a Fact, Jack! (Everhart, 1998). Accelerated Reader (AR) is now the most popular reading management program in the United States and in the world (Renaissance Learning, 2008). Reading Counts! is the second-most popular reading management program (Chenowith, 2001).

Reading Counts! and Accelerated Reader work on similar principles. Children are first given a test to assess their reading level. Then, they select and read books from a range of options at their level that the school has purchased for its library. After reading the book, they return to the school-based computer and take a brief comprehension quiz. If they pass the quiz, students are directed to choose other books at the same level and, eventually, books at increasing levels of difficulty (Grenawall, 2004). Software tracks student progress by recording points
earned for each quiz taken. Schools or teachers set the minimum percentage required to pass quizzes (which can range from 60% to 85% correct answers).

Implementation of reading management programs is expensive, requiring investment in hardware, software, and books. Accelerated Reader, for example, charges a one-time school fee of $2,799 with an additional $1,000 per year for every 250 children enrolled (Renaissance Learning, 2008). What Works Clearinghouse (2007) estimates school’s annual fees to range between $3,000 to $10,000. In contrast, start-up costs for Reading Counts! range from $700 to $3,000 (Scholastic, 2007b). These licensing fees do not include the costs of computers and other equipment, books, or personnel. While this paper does provide information to consider in implementation of a reading management program, it does not attempt to provide a cost-benefit analysis as compared to other possible interventions.

**Theoretical Basis of Reading Management Programs**

In recent years, much attention has been focused on what Paris (2005) calls "constrained" reading skills of alphabetic and phonological knowledge, which involve small sets of knowledge that are mastered in relatively brief periods of development. Although these skills are critical for mastering decoding skills and have led to improved reading test scores in early grades, they are not sufficient to promote comprehension. Indeed, despite growth in reading test scores in the primary grades, there has been little improvement in students’ reading proficiency at the middle or high school levels, when "unconstrained" or higher-order skills, such as vocabulary, general knowledge, reading motivation, and reading strategies, explain most of the variance in reading achievement (Paris, 2005).
To promote these unconstrained skills, scholars and educators have advocated for wide reading, which involves students individually and silently reading as much as possible, both inside and outside the classroom, for their own pleasure, information, and general understanding (Day & Bamford, 1998; NICHD, 2000). In-school independent reading has a variety of forms, including sustained silent reading (SSR), Drop Everything and Read (DEAR), and free voluntary reading (FVR), all of which provide for scheduled time for students to read self-selected books in class for five to 45 minutes daily (Anderson, 2000; Fisher, 2004; Gardiner, 2007; Lee-Daniels & Murray, 2000; NICHD, 2000).

Implementation appears to be critical to the success of in-school independent reading programs, the most popularly cited in the literature of which is sustained silent reading. In the absence of accountability, there may be concerns that children may not read during sustained silent reading time or read books that are either too easy or too difficult to promote reading skill (Stahl, 2004). Furthermore, the success of sustained silent reading in promoting children’s reading skills has had mixed support in the literature (e.g., Holt & O’Tuel, 1989; NICHD, 2000; Summers & McClelland, 1982). Providing additional time to read in class in and of itself does not lead to reading improvement (Manning & Manning, 1984; Topping, Samuels, & Paul, 2007). It appears that additional reading time coupled with instructional scaffolding, including teacher-student conferences, peer discussions, assisting children in choosing the appropriate book level, and accountability (i.e., keeping track of the number of pages read) improves children’s reading achievement (Kemp & Collins, in press; Manning & Manning, 1984).
Despite these issues with implementation, an extensive body of research exists on the benefits of independent reading. In eight of ten studies reviewed, free reading programs had a positive effect on reading comprehension as compared to traditional instruction; the other two showed no difference (Krashen, 2004). Free reading programs have also been shown effective in promoting vocabulary development, grammar test performance, writing, and oral/aural language ability (Krashen, 1989; 2004). The positive results of free reading appear to apply robustly to both younger (e.g., Elley & Mangubhai, 1983) and older students (e.g., Mason & Krashen, 1997), to students in a variety of countries around the world (e.g., Elley, 1991; 1998), to students at a low-proficiency level in reading (e.g., Shin, 2001), and to English language learners (e.g., Elley & Mangubhai, 1983; Elley, 1991).

Another way to think about children’s independent reading is in terms of out-of-school reading. Differences among children’s reading behaviors are truly staggering, in some cases the top 10% of children read five times as many minutes per day as the bottom 10% (Anderson, Wilson, & Fielding, 1988). Furthermore, teachers have a strong influence on children’s out-of-school reading which results in whole classrooms reading significantly more outside of school than others (Anderson, Wilson, & Fielding). Teacher guidance in choosing appropriate level books, motivational incentives, time to read in class, and reading aloud to children are all ways teachers can support independent reading. Notably, of all the possible out-of-school activities, reading had the strongest association with children’s reading proficiency (Anderson, Wilson, & Fielding).
Reading management programs seek to capture and amplify the benefits of independent reading programs within the classroom. Through combining free voluntary reading with measures of accountability, they attempt to keep better track of what students read, provide more accurate recommendations as to possible books at the desired reading level, and thus create an overall positive climate for reading at schools. This combination is expected to encourage students to read more often, promote improved reading comprehension, and greater pride in reading among students (Renaissance Learning, 2008; Scholastic, 2007a). Furthermore, reading management programs encourage children to read outside the classroom (e.g., through summer reading and parental involvement) and may lend themselves to additional teacher scaffolding (e.g., teacher-student conferences as to book level and accountability in reading books).

**Research on Reading Management Software**

Despite the prominence of reading management software in U.S. schools, there has been relatively little published empirical research on it (see discussion in Trelease, 2006). We focus our research review on published empirical studies on Accelerated Reader, the most widespread program, as we have not identified published empirical studies on competing products. However, as the second most widespread reading management software program, Reading Counts!, is very similar to Accelerated Reader in content and function, we believe that the results found from research on the use of Accelerated Reader would be applicable to it as well.

We organize our review by three main categories of studies: the implementation of reading management programs, their effects of reading achievement, and their effects on student attitudes.
Implementation

No educational reform effort can be expected to have much impact if it is not fully implemented. Unsatisfactory implementation has proven to be the downfall of many educational technology efforts (see discussion in Cuban, 2001); particularly those involving reading instruction (see, for example, Slayton & Llosa, 2002). We thus first consider research related to how reading management software is implemented in schools.

Implementation of reading management programs is influenced by a range of actors, including administrators, librarians, computer resource teachers, classroom teachers, parents, and students. A strong school-wide commitment (i.e., a general buy-in from the administrators, staff, and teachers as a whole) in which funds are allocated for the purchase of the software, quizzes, books, and training and time and attention is directed to the program appears to be important. For example, in a study on laptop implementation, Author (2006) found that Accelerated Reader’s successful implementation in one school was due in large part to the enthusiasm for technology on the principal’s part, his willingness to fund the school library with more than 16,000 books with Accelerated Reader quizzes, and a strong school focus on both reading and the instructional use of technology of which Accelerated Reader was the centerpiece. This commitment seemed to have had a positive effect on students in the school; children there read an average of one book per day, as evidenced by their Accelerated Reader records.

Moreover, school-wide implementation of reading management programs can result in additional funds, time, and attention spent toward supporting student reading which in turn can have a positive effect on student reading achievement. Specifically, Accelerated Reader use
corresponds to increased numbers of books in school libraries, additional silent reading time in class, increased number of books read by students, and improved reading achievement (see discussions in Topping & Paul, 1999; Trelease, 2001). Additionally, Volland, Topping and Evans (1999) found that treatment groups receiving Accelerated Reader benefited in substantive ways over the control groups in the form of added teacher training and more in-class reading time (i.e., double the amount of daily reading time).

In addition to administrative support, individual teachers, parents, and students must commit to the use of the reading management program in order for it to be successful. High quality implementation of such programs tends to result in greater gains in independent reading. For example, Author (2006) described a teacher who took an active role in promoting voluntary student reading by holding conferences with students to support them in their book choices and reading comprehension and creating a positive classroom environment that celebrated students’ reading accomplishments achieved with the aid of the reading management program. Consequently, the children in that classroom read more books. Similarly, Nunnery, Ross, and McDonald (2006) found a relationship between classroom implementation, the amount of time students read independently, and growth in reading achievement. In classrooms where a reading management program was poorly implemented, 80% of the children spent less than 30 minutes per day reading. In high implementation classrooms Accelerated Reader “significantly reduced the negative impact of learning disability status on growth in reading when compared to control classrooms or low-implementation classrooms” (Nunnery, Ross, & McDonald, 2006, p. 15).
The dual aspects of reading management program implementation (school and classroom factors) highlight the importance of both quantity and quality to independent reading and reading achievement. Quantity refers to the amount of book reading that takes place at home and at school. Quality refers to reading comprehension and teacher support (e.g., importance placed on independent reading within the classroom, teacher guidance with respect to book choice, opportunities for classroom discussion) (Topping & Paul, 1999). The combination of quantity and quality seems to be particularly important for older children (i.e., those in grades 6-12) because these students are less likely to read carefully and more likely to read below their reading level (Topping, Samuels, & Paul, 2007).

**Reading Achievement**

There is general support in the literature for reading management programs’ positive effects on reading achievement. In statewide analyses of reading management program implementation, schools that owned Accelerated Reader had higher reading scores (Kulik, 2003). Furthermore, the median effect of three controlled studies indicated that Accelerated Reader use increased reading test scores by 0.43 standard deviations. The six studies that Kulik reviewed are independent evaluations (i.e., not sponsored by the parent company) which is important, considering that the Renaissance Learning web site contains numerous developer-sponsored reviews all of which describe above-average gains in reading for users of Accelerated Reader.

A few studies have examined the use of reading management programs with sub-populations of students who are typically considered at-risk for low academic achievement. Johnson and Howard (2003) found the use of Accelerated Reader correlated with improved
reading skills of urban inner-city students. The number of Accelerated Reader points accrued predicted reading comprehension and reading vocabulary scores for students in third-, fourth- and fifth-grade. Additionally, McGlinn and Parrish (2002) found English language learners using Accelerated Reader either maintained or increased their reading level over a three month period. Furthermore, these students dramatically increased the number of books read each month, from an average of two to 21 books. However, it is difficult to discern whether the growth shown by the English learners in McGlinn and Parrish’s study resulted from the use of Accelerated Reader or the increased time allotted in class for independent reading, the weekly reading conferences, and the use of extrinsic rewards to motivate reading. Finally, there is a positive relationship between reading management program implementation and reading achievement growth rates for students with learning disabilities (Nunnery, Ross, & McDonald, 2006).

Despite gains in reading achievement across schools, it appears that the use of reading management programs benefit children in the lower grades more than in higher grade levels. Nunnery, Ross, and McDonald (2006) found consistently positive effects on reading achievement of third through sixth grade students in classrooms that used Accelerated Reader as compared to classrooms that received the district-required reading instruction alone. However, third grade students made the highest gains from pre- to posttest than any other grade level and fifth and sixth grade students benefitted the least from program implementation. Similarly, the use of Accelerated Reader does not necessarily lead to long-term increases in reading in older children, despite short-term gains in book reading experienced in the lower grades (Pavonetti, Brimmer, & Cipielewski, 2002). In particular, seventh grade students who had been exposed to
Accelerated Reader in fifth grade did not have a greater breadth of knowledge of book titles (as a proxy for print exposure) than children who had not used a reading management program in fifth grade.

There is further evidence that gains in achievement related to reading management program implementation are unevenly distributed, as some researchers have found that particular ethnic subgroups of students benefit from Accelerated Reader than others. For example, Sadusky and Brem (2002) found that the use of Accelerated Reader produced better reading outcomes for white students than for minority students. They examined the effects of the implementation of Accelerated Reader and found an 18% overall gain in students’ standardized reading test scores over the course of five years. However, when scores were disaggregated by ethnicity, gains in reading scores by Hispanic students were not significant and indeed were much smaller than the gains made by white students.

**Student Attitudes**

Effective reading programs do not just improve students’ short-term reading achievement, but help develop life-long enthusiasts for reading. Thus an important line of research related to reading management programs is their effect on reading attitudes, both in the aggregate and in relationship to particular groups of students.

Teachers, parents, students tend to have positive attitudes toward reading management program implementation (Sadusky & Brem, 2002). Perceptions of specific benefits of Accelerated Reader include positive motivation to read, excitement about reading, achievement growth in reading, and increased amount of reading. However, improved attitude in reading
does not necessarily cut across all groups evenly. For example, Volland, Topping, and Evans (1999) found girls’ attitudes toward reading improved when they used the Accelerated Reader program. However, boys did not show improved attitudes toward reading after use of Accelerated Reader. Everhart (2005) also found gender differences in reading attitudes. Although most students liked Accelerated Reader, girls had a more positive view toward the program than boys.

Despite these positive findings, the use of Accelerated Reader may in some cases adversely affect students’ reading attitudes and their perceptions of their reading skills, particularly among low readers. Putman (2005) examined the relationships among students’ accrual of Accelerated Reader points, their reading self-efficacy beliefs, and the value they place on reading. Students who accumulated the most Accelerated Reader points showed increases in their reading self-efficacy. In contrast, students who fell in the mid-range of Accelerated Reader point accumulation showed decreases in both their reading self-efficacy and their value of reading. Finally, students who earned the fewest Accelerated Reader points showed the lowest levels of reading self-efficacy and value in reading of all three groups. Although use of reading management programs may encourage children who are successful readers, educators should be aware that program use may discourage less capable readers. These findings suggest that the Matthew effects described by Stanovich (1986) occur not only with reading achievement, but also with reading attitudes. More specifically, children with positive attitudes toward reading may read more and in turn develop even better attitudes toward reading.
The use of extrinsic rewards is controversial in education, due to its potentially negative impact on intrinsic motivation. However, the use of external incentives, such as pizza and ice cream parties, is fairly common among schools that use Accelerated Reader (Sadusky & Brem, 2002). In a study comparing Accelerated Reader use with and without incentive rewards, Stanfield (2006) found that students’ attitudes towards reading declined with the use of these rewards, although the number of books read and AR quiz scores remained the same. Concerns about the use of extrinsic rewards, including the simple reward of passing quizzes, is shared by Krashen (2007), who believes young people are intrinsically motivated to read given access to interesting reading materials and time to read them. In his meta-analysis of more than 20 incentive-based reading management programs, Krashen (2003) concluded that access to books and increased time spent reading are the two factors that lead to better reading, not the use of the Accelerated Reader program.

Other concerns exist with respect to how reading management programs use may affect student attitudes to reading and reading behaviors (see, Pavonetti et al., 2002; Sadusky & Brem, 2002). Principally, these concerns center on student choice of books. For example, students may choose limit their selections to books on the Accelerated Reader book list. In some schools or classrooms, children’s grades are tied to Accelerated Reader book reading. For this reason, parents and teachers may discourage children from reading books that are not on the school’s leveled list. Furthermore, the kinds of books that are available are limited to those that have quizzes purchased by the school and to books that have been leveled as part of the reading management program. Thus, new books are often unavailable as options to students. Students’ reading choices may also be limited with respect to genre, thereby discouraging children from
reading a wider variety of books. This is unfortunate, because certain genres, such as comic books, may serve as a bridge to more formal types of reading, especially for English language learners (Ujiie & Krashen, 1996). Another problem is that students are not allowed to read books or take AR quizzes out of their range, which may preclude them from reading books that are interesting to them but are out of their assigned level. In addition, some books on the Accelerated Reader lists may not be suitable for younger readers. Pavonetti et al. (2002) provided a distressing example of a third grade child who read a book at his Accelerated Reader level that was clearly inappropriate for his chronological age and contained graphic violence and adult thematic elements.

**Discussion: One Piece of the Reading Puzzle**

The use of reading management programs has been shown to have a number of potential benefits. Schools that use reading management programs tend to have more books in their libraries, allow more time for sustained silent reading in class, and have students who read more books, than schools that do not use these programs. Furthermore, many studies provided suggestive evidence that these programs may lead to improved student reading achievement.

However, the research record to date is limited, and much more systematic research is needed to determine the use of managed reading programs may play a causal role in improving students’ reading achievement. Furthermore, longitudinal studies are required to see whether gains in reading achievement are long-lasting, and much more research is needed to understand the impact of reading management programs on student attitudes. Qualitative research in schools, classrooms and homes can also paint a richer picture of the diverse ways that
administrators, teachers, students, and parents carry out and respond to the implementation of reading management programs.

Critics charge that reading management programs supplant good reading instruction (see Oppenheimer, 2004). In our view, such criticisms are off the mark. The choice for schools should not be "good reading instruction" vs. "a reading management program." Rather, it should be "good reading instruction with a reading management program," or "good reading instruction without a reading management program." Krashen and others suggest that the benefits of a reading management program can be had without the expense or extrinsic rewards of a reading management program. We would tend to agree with his assessment that it is the sustained time doing extensive reading of interesting and appropriately-leveled material that brings the benefits, not reading management programs per se. However, we are also cognizant of the difficulties of bringing these kinds of reading reforms into schools (more reading time, more library books, etc.) without reading management programs. It is likely that the purchase and deployment of reading management programs encourages administrators to buy more library books and to identify them by the appropriate level, teachers to assign more sustained silent reading, and parents to support such reading more while keeping better track of their children's progress. Thus the most important incentives involved in reading management programs may be those provided for the adults, rather than for the students.

For schools that choose to use reading management programs, several points are worth noting. First, as with other software-oriented educational efforts, implementation is of critical importance. A strong school-wide commitment to teacher training and motivation to invest class
time in reading management programs is necessary. Those teachers who have a strong commitment to a voluntary reading program will have students who read more. Thus reading management programs must be coupled with a professional development focus on the benefits of voluntary reading.

Second, careful attention should be given to the balance between extrinsic and intrinsic motivation. The research record suggests that an overreliance on external incentives may be counter-productive. We would not counsel teachers or schools to abandon these external incentives, but we do recommend that they be complemented by efforts to foster intrinsic motivation in reading, through, for example, class discussion of the books students read, opportunities for students to write about their books, and other activities that highlight the intellectually stimulating nature of reading.

Finally, parental involvement in reading may play a pivotal role in the implementation of reading management programs. Parents should be informed as to how these programs work, how to provide their children access to leveled books via public or school libraries, and how to help their children choose appropriate books, read every day, and comprehend the texts.

Conclusion

The literature on reading management programs for literacy instruction is thus far limited and too little of it has been conducted independently or published in peer-reviewed outlets. Positive outcomes reported on reading achievement have not yet been demonstrated to persist over time or to be matched by improvement in reading attitudes. More research is needed and especially longitudinal studies, to fully understand the impact of reading management programs.
Schools that make use of reading management programs can likely amplify their success with effective professional development, an emphasis on intrinsic as well as extrinsic rewards, and increased involvement of parents. Schools that eschew use of reading management programs will want to find other mechanisms to grow their library collections and increase students’ time spent on voluntary extensive reading.
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