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## **THE EFFECTS OF THE ACCELERATED READER PROGRAM ON THE READING COMPREHENSION OF PUPILS IN GRADES THREE, FOUR, AND FIVE**

Roger A. Johnson

Email: [rjohnson@odu.edu](mailto:rjohnson@odu.edu)

Carol A. Howard

### **Abstract**

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Many students continue to struggle with acquiring the necessary skills to become successful readers. The most commonly used software for teaching reading is the Accelerated Reader (AR). This study investigated the effect of the AR program on the reading achievement and vocabulary development of 755 third, fourth, and fifth graders from a low socio-economic, urban environment. Students categorized as “high AR users” gained significantly more on reading comprehension than those students categorized as “average and/or low users.” The results indicate that the AR program can be quite effective if the participating students are willing to do supplemental reading.

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### **Introduction**

The National Reading Panel (2000) states that reading “comprehension is critically important to the development of children’s reading skills and therefore to the ability to obtain an education.” Slavin, Karweit, Wasik, Madden, and Dolan (1994) note that students who complete the third grade and lack reading skills are not likely to graduate from high school. Furthermore, American school children without high levels of reading comprehension face a difficult and uncertain economic future. As Bronfenbrenner, McClelland, Wethington, Moen, and Ceci (1996) note, “In a technological society, the demands for higher literacy are constantly increasing, creating ever more grievous consequences for those who fall short and contributing to the widening economic disparities in our society.”

Recreational reading programs are designed to encourage the development of the “reading habit.” Reading is a skill that requires much practice to perfect. Activities to practice reading should bring both success and enjoyment to all children in order to foster an ongoing interest in reading.

Van Riel (2001, pp. 30- 31) coined the term “reader development” in the 1980s. She

believes that students should have “active intervention to open up reading choices, increase reader’s enjoyment, and offer opportunities for people to share their reading experiences.” These supplemental reading programs are generally inexpensive, non-competitive, and allow students to develop skills at their own pace. Minimal assistance of a teacher is required.

The Accelerated Reader (AR) program (Paul, VanderZee, Rue & Swanson, 1996) is the most commonly used recreational/motivational reading program. According to the Education Commission of the States (1999), approximately 43,000 schools (one of three) throughout the United States are currently using the Accelerated Reader (AR) program. The AR program (Paul et al. 1996) combines a literature-based reading program with the use of a computer to provide detailed reports to parents, teachers, and administrators on each child’s reading progress. The purpose of this is to offer students appropriate recreational reading as a means of encouraging reading achievement gains. Students that read sufficient numbers of books often receive awards such as certificates of achievement, ribbons, picture-taking, or pizza parties. The AR was developed by Paul and his associates at the Institute for Academic Excellence. (Paul, et al. 1996).

Paul and his associates have conducted several studies using large numbers of subjects that all purport to show the effectiveness of the AR program. Paul et al. (1996) compared students in 2500 elementary, middle, and high schools in Texas that had adopted the AR software with their counterparts in 3500 schools that did not own the AR software. The Texas schools with and without the AR programs were of similar geographic and demographic characteristics. Students in the AR schools outperformed their counterparts on the *Texas Assessment of Academic Skills Test* that was administered in grades 3-8 and in the 10<sup>th</sup> grade. However, the differences between the school performance was not examined in enough detail to determine statistical significance. In addition, although a preliminary version of these findings have been presented at educational conferences, the findings have not been subjected to peer review associated with a refereed journal.

In 1997 Paul, Swanson, Zhang, and Hehenberger noted that “several hundred Tennessee grade schools” that had purchased the AR program outperformed their counterparts. In 1999 Paul, owner of the AR, and Topping evaluated the effectiveness of the AR in 2193 schools across the United States. Topping and Paul (1999) found that AR students spent more time on reading than their counterparts who were not enrolled in AR programs. Next, Topping (Vollands, Topping, and Evans, 1999) investigated the use of the AR with sixth-grade students in an economically distressed area of Scotland. The two sixth grade classes that used the AR had greater gains in reading than their counterparts that did not use the AR program. However, since there had only been a “marginal implementation” of the AR program, the differences between the AR classrooms and the controls may have been attributed to other variables.

Evaluations of the AR program by researchers other than by Paul and his associates are less supportive. Outside evaluations have employed less subjects, and resulted in mixed findings. Peak and Dewalt (1994) compared 50 ninth graders who had received five years of AR instruction with 50 ninth graders who had not received AR instruction. The authors used a multiple regression statistical test, and concluded that “some of the differences between reading scores can be attributed to the program.” However, Peak and Dewlat (1994) did not provide the reader with multiple regression outcomes nor did they explain why they used this particular multivariate statistics.

Five recent studies of the AR program report positive findings. It appears that library use and/or reading levels increase after the introduction of the AR program. (Anderson, 2001; Ganter, 2000; and Lawson, 2000). Facemire (2000) and Scott (1999) both report that student reading levels increased after the introduction of the AR program.

However, these positive findings are challenged by less recent studies which report negative and/or nonsignificant findings for classrooms using the AR. Using 30 students, Mathis (1996) failed to find any statistical significant increase in reading comprehension from the fifth to the sixth grade. Rosenheck, Caldwell, Calkins, and Perez (1996) found that neither the frequency of library use nor attitudes toward reading improved after the AR had been in place. Prince and Barron (1998) postulate that the “use of the widely known Accelerated Reader Program alone cannot create lifelong learners.” Although the AR and the Electronic Bookshelf may increase library use and standardized test scores, according to Carter (1996), both programs tended to diminish student motivation, restrict title choice of books, and overemphasize testing.

In summary, there have been several large scale studies carried out by Paul (the owner of the AR software) and his associates which reported positive findings. In addition, several recent small scale AR evaluations (Anderson, 2001; Ganter, 2000; Lawson, 2000; Facemire, 2000; and Scott, 1999) have reported that reading scores and/or library use has increased following the introduction of the AR. On the other hand, three recent evaluations of the AR (Mathis, 1996; Rosenheck, et al. 1996; Price and Barron, 1998; and Carter, 1996) question its effectiveness.

Due to the conflicting findings of past studies and the widespread use of the AR program in US schools, further insight into its effectiveness is necessary. If the AR program is only marginally effective, then students should be spending valuable classroom time on other pedagogical reading techniques, and/or monies should be used to hire additional educational personnel and/or purchase additional library books.

The purpose of this study was to determine whether the AR program was effective, and whether its effectiveness was dependent upon the amount of student usage. More specifically, did students classified as “Low” users and “Average” users gain as much on reading comprehension measures as students classified as “High” users?

## **Method**

Students that participate in the AR program choose their own books from the Accelerated Reader book list, which contains more than 12,000 titles. Each of the 12,000 books is assigned a point value based on its length and the Flesch-Kincaid reading index to determine readability (Flesch, 1974, p. 23). Students read selected books at their own pace and then take a test on the computer. The computer test consists of multiple choice questions about important facts in the book. Most of the questions evaluate literal comprehension. In order to earn any points on a book, the student must answer at least 60 percent of the questions correctly on the test. Careful test writing and security features in the software greatly reduce the possibility of student cheating. AR points are therefore a fairly accurate measure of the quantity of words being read and comprehended. Students may only test once for a given book. If students read too quickly, they score poorly because they are not reading with comprehension. When implemented according to design, teachers are expected to oversee students' reading patterns. If a child's test scores are too low, teachers intervene with advice on reading level and rates. The computer scores the test, calculates the number of points earned by each student, and records the data. Reports are generated listing the AR points earned, number of tests taken, number passed, average grade level of books read, and average percentage achieved on the tests taken. Thus, an accurate measure of reading practice is obtained from review of the AR data (Website: <http://www.readingonline.org/critical/topping/rolarD.html> ).

### **Design and Statistics**

This study used a one-group pre-test post-test design with intact groups of classes. Randomization of subjects was not possible and a control group was not available. The treatment consist of three types of AR usage: Low participation (0- 20 AR points); Average participation (21- 74 points); and High participation (75 points and above). Generally, students with students with Low participation read less than three books during an academic year. Average participants read three to five books, while High participants read more than eight to ten books.

Student reading comprehension and vocabulary was examined using a Multivariate Analysis of Variance (MANOVA). The Wilks'-Lamda test was used as a test of significance for the MANOVA. This test is appropriate for the multivariate cases where several means and variances for each group exist (Kachigan, 1986, p. 329).

### *Subjects*

All of the subjects (755) in the current study attended seven inner-city, Title 1, elementary schools. One hundred and sixty-six third graders, 297 fourth graders, and 292 fifth

graders participated in the year long AR program. The majority of the students in the selected schools were considered at-risk as they qualified for the free lunch program. Eighty-five percent of the students were African-American and approximately fifty percent were males. Any student that participated in English As A Second Language training or was enrolled in Special Education was not eligible for the study due to multiple treatment interference concerns. Students were tested at the beginning and end of the school year with the *Gates-MacGinitie Reading Test* (MacGinitie, MacGinitie, Maria, & Dryer, 1996). The *Gates-MacGinitie Reading Test* is used extensively in the public school systems across the United States to measure reading comprehension. The reading test scores are a composite measure of reading comprehension and reading vocabulary. Test items have been reviewed and approved by consultants from minority groups.

### **Results**

The AR program was effective in improving the reading skills of urban, inner-city students. Participants in all three usage groups improved their reading skills as measured by the *Gates-MacGinitie Reading Test*. In statistical language significant main effects occurred in concurrence with the degree of AR usage (Wilks' Lambda = .9428,  $F = 11.13$ ,  $p < .0001$ ). Students who read the most (High Participants) gained 2.24 years on the *Gates-MacGinitie Reading Test*. The Average Participants gained 1.52 years; and the Low Participants gained .73 of a year. The High AR Participants exceeded normal expectations for gains by an additional one year and two months. The Average Participants gained an extra one half year, while the Low Participants only achieved three quarters of an academic year's progress. Thus, as reading practice increased with AR usage, reading comprehension and reading vocabulary scores improved.

Overall, there were low levels of AR participation among the 755 students in the current study. Fifty-two percent of the students earned less than 21 points, the equivalent of reading two or three books. They were classified as "Low AR Users." Thirty-six percent of the sample, labeled as "Average Usage", earned between 21 and 74 points. Less than 12 percent of the sample, the "High Usage" participants, earned more than 75 points. This indicates that most of the students in this investigation were reading much less than the recommended one hour per day.

### **Discussion**

The results of this investigation suggest that the AR program can be effective if the participating students are willing to do supplemental reading. Students who read below grade level and would benefit most from the AR program had the least participation. In spite of large amounts of encouragement, 52 percent of the students in the sample participated minimally in

the program. No supplemental reading program will be effective if students do not participate. The presence of an AR program, without actual daily usage by students, is not helpful in improving reading comprehension and vocabulary.

Practical issues designed to increase student participation in recreational reading using the AR program should concern school administrators and teachers. Time in school for recreational reading must be considered when scheduling curriculum. Perhaps, a before-school and after-school AR program would provide uninterrupted quiet time for students to have recreational reading. In addition, administrators can ensure that proper support personnel are hired and trained to manage the AR computer labs and keep them in good working order. Moreover, teacher training and student–parent orientations are essential to promoting optimal AR program use. Teachers must monitor the appropriate choice of books to ensure that selections are neither too easy or too challenging. Incentives on an individual, classroom, and school-wide basis should be instituted and monitored by the building administrator as well as by the central administration.

The home environments of these students also needs to be investigated. School personnel need to investigate whether home environments are conducive to reading and whether parents are reading to their children. Programs to promote family literacy may be an important component in a school's literacy design. Research in the area of family literacy for this population should be considered. If the students' home environments are not promoting reading, the implementation of before-and-after school literacy programs may be indicated.

A drawback of the AR program is the nature of the comprehension questions. Most AR questions are concerned with literal rather than inferential reading comprehension. Teachers tell us that in order to quickly gain the maximum points, (and earn prizes) some proficient readers will choose to read at a low level. That is, they will choose short and easy books rather being challenged by longer and more difficult books that are more likely to emphasize inferential reading comprehension.

Reading comprehension is a multifaceted process whereby the reader is influenced by his or her background, the text, and the purpose for reading the text. It is important to examine reasons why the High Usage AR group made significantly more reading progress than the Average and/or Low Usage AR groups. Reading begets reading. More exposure to literature develops vocabulary, a key element in reading proficiency. Vocabulary and prior knowledge further develop comprehension. High usage and/or Skilled readers bring background knowledge to the reading process that may give them advantages in better comprehending the text. In Snow, Burns, and Griffin's text, *Preventing Reading Difficulties in Young Children*, (1998, p. 62) it is postulated that the readers background knowledge is the key that enables the reader to understand text. Skilled readers "differ from unskilled readers in their use of general

world knowledge to comprehend text literally as well as to draw valid inferences from texts, in their comprehension of words, and in their use of comprehension-monitoring and repair strategies.”

According to the 2001 publication, *Put Reading First: The Research Building Blocks for Teaching Children to Read*, a Skilled reader will decide on his or her purpose for reading a particular text. Depending on their purpose they might adjust their reading speed in order to conform to the difficulty of the text. Any comprehensive difficulties that may occur are monitored and corrected. Reading more slowly, noting major sections of the text, or rereading particular sections of the text are examples of monitoring one’s reading. After completing their reading assignment, a Skilled reader will check his or her understanding of the material that he or she has just read. A Skilled reader will read differently to understand a technical article, a magazine for pleasure, a letter from a friend, and/or a text for a letter grade.

Moreover, according to *Put Reading First* (2001), Skilled readers are constantly thinking as they read and are actively engaged in a complicated process of attempting to make sense of what they are reading. The past experience and knowledge that the Skilled reader brings to the reading process determines the strategies that they will use while reading. The Skilled reader brings a high level of vocabulary and language structure. Skilled readers also know when they are experiencing problems with comprehension and are able to resolve these difficulties.

Skilled readers also acquire a complex set of skills and various memory techniques that enable them to better master concepts. As Vander Zanden (2003, p. 243) notes, “As children mature cognitively, they become increasingly active agents in their remembering process.” This mental awareness and understanding of one’s own cognitive style is defined as metacognition. Metacognitive strategies enable the Skilled reader to monitor their reading techniques.

In addition, there are a number of instructional and assessment techniques that have been shown to be highly effective in enhancing reading comprehension. Tompkins (2001) instructional strategies for teaching reading comprehension are as follows: Microprocesses whereby readers place various ideas into phrases within a sentence; Integrative processes whereby readers connect sentences through using words such as “also” and “however”; Macroprocesses whereby readers visualize the structural pattern of the entire text; Elaborative processes whereby make connections to prior inferences; and Metacognitive processes whereby readers monitor their own reading techniques.

The *National Reading Panel* (2000) states that “comprehension can be improved by teaching students to use specific cognitive strategies when they encounter barriers to understanding what they are reading.” Comprehension monitoring, cooperative learning, using graphic and semantic organizers such as story maps, answering questions, generating questions, structuring a story, and integrating ideas and generalizing from the text are specific pedagogical

techniques that have been found to be highly effective in enhancing student reading comprehension. Teaching a combination of these techniques is most effective.

According to Thompkins (2001) “teachers often view comprehension as a mysterious process of making meaning or understanding what students read. It often seems mysterious because it is invisible; some students read and understand what they read, and others seem to read just as well but don’t understand what they read.” For many teachers, students with reading comprehension difficulties do not appear any different than their classmates.

The self-selection of students into three types of AR Usage(Low, Average, and High) needs further investigation. Without students being randomly assigned to the AR Usage groups, it is difficult to separate out the effects of the AR program from motivational and/or intelligence effects. That is, the more motivated and/or verbally intelligent students may have self-selected themselves into the High Usage Group and, therefore, would have increased their reading comprehension regardless of their participation in the AR program.

Although implementing randomization in the public schools is very difficult, future research whereby students are randomly assigned into Usage Groups would provide more control over internal validity threats. Perhaps, a private school would allow for the randomization of students into User Groups. Of course, the results from a private school, might not generalize to public schools.

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Dr. Roger A. Johnson, Phi Beta Kappa, earned his Ph.D. in psychology from the University of Georgia. He has published in leading educational journals such as the *Kappan*, *The Reading Teacher*, *Journal of Research in Mathematics Education*, and *The Gifted Child Quarterly*. He has also published in psychology journals such as the *Journal of Educational Psychology* and *The Journals of Mental Imagery*.

Dr. Carol Howard, Administrator, Norfolk Public Schools, earned her Ph. D. in urban education at Old Dominion University. She is currently a building program specialist for the Norfolk Public Schools.