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A Crosscultural Inquiry into the Levels of Implementation of Accelerated Reader and Its Effect on Motivation and Extent of Reading: Perspectives from Scotland and England

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In this study of the Accelerated Reader (AR) program, qualitative and quantitative analyses of the relationship between the implementation of AR and student motivation and extent of reading are drawn from data collected in three schools in Scotland and England. These schools represent low (Scotland, n= *53), middle (Scotland,* n= *40), and high (England,* n= *55) levels of implementation of AR. Observation, structured interviews with students and teachers, videotaped student focus groups, a student survey on self-reported reading, examination of AR artifacts, and administration of the Motivation for Reading Questionnaire are used to gather data. Major findings reveal that: motivational style interacts with gender in relation to the competitive and social aspects of the AR program; the level of program implementation does not correlate with extent of reading; and management aspects of the program are not effectively utilized. Results suggest that school library media specialists can take a leadership role in implementing the program effectively.*

The Accelerated Reader (AR) is a computerized reading-management program, introduced in the United States in 1986, that assesses the reading level of students, quizzes them on their comprehension after reading a book, and provides a variety of reports for teachers (Renaissance Learning 2005b). Students receive points according to the length and difficulty of the books they read, determined by a computer-administered readability program based on the Flesch-Kincaid readability index (Florida Center for Reading Research 2004). Extrinsic rewards are often offered to students as they gain points.

The AR program is gaining international popularity. By 2005, Renaissance Learning had offices in Canada, the United Kingdom, and Australia in addition to the United States. Renaissance Learning (2005b), the parent company of AR, reports that it is the world's most popular reading software and is currently being used in 60,000 schools. The number of public and private K–12 schools in the United States, currently 119,235, lends some context to this figure (U.S. Department of Education, National Center for Education Statistics 2003).

A growing body of research related to AR exists. Some researchers have found AR to be an effective method for improving the reading of young people in grades K–12. For example, the Renaissance Learning (2005b) Web site, as of April 15, 2005, reported that "126 scientific studies support the effectiveness of AR and Reading Renaissance." Out of these 126 studies, ninety-five were identified as research studies independent of Renaissance Learning sponsorship, and universities conducted eighteen out of that group. Other scholars find AR inhibits reading, particularly for students who excel in reading, and that it strictly circumscribes library collection development. For example, reference to some studies that do not support the effectiveness of the program can be found in the substantive reviews of the AR research by McQuillan (1997) and Krashen (2003; 2005). A recent study (Everhart et al. 2005) of 632 of the poorest U.S. schools shows a strong relationship between national information policy regarding achievement in the No Child Left Behind Act of 2001 and local decisions to use AR, expectations for literacy, and library collection development.

AR research includes twenty-nine dissertations listed in Proquest's Digital Dissertations. An April 2005 online search limited to peer-reviewed journals in Education Index and Library Literature produced twenty-two related articles. Despite the number of studies, whether or not the AR program is effective and what that effectiveness means in the long run are questions that still have no definitive answers. One response to this question is that of the Florida Center for Reading Research (2004), "its effectiveness . . . depends on its implementation" (2).

Review of the Literature

Motivation

There has been little formal examination of the motivational aspects of AR. Although "getting students excited about books" (Renaissance Learning 2005a) is widely promoted by the manufacturer of the program, it does not have the funding and policy-related consequences as does the claim of AR's potential to raise achievement test scores in reading. However, this aspect of the program may be of more interest to school library media specialists who have school-wide responsibilities in motivating students to read.

Everhart (1999) provided an analysis of motivational research as it applies to reading management programs and suggested that such programs provide quantitative evidence of reading that could be used in conjunction with instruments that measure reading motivation in order to test the manufacturer's assertions as is done in the current study. Pavonetti, Brimmer, and Cipielewski (2003) investigated the claim that AR motivates children to be lifelong readers by measuring if students exposed to AR in elementary school would be more likely to continue higher levels of recreational reading in middle school. Middle school students using AR who had also used AR in elementary school showed a significant increase in their amount of reading while those students not using AR in middle school after using it in elementary school showed a significant decrease. However, students not exposed to AR in elementary school were reading more relative to their AR-exposed peers. Putnam (2004) investigated the effects of AR on the reading motivation of fourth-grade students. The only significant outcome noted was that the higher the number of AR points accumulated, the smaller the decrease in motivational scores as measured by the Motivation to Read Profile (Gambrell et al. 1996). It has been noted by Guthrie (2001) that motivation for reading decreases as children go through school and might be explained by their increased sophistication at processing the evaluative feedback they receive,

and for some, a growing realization that they are not as capable as others. Instructional practices that focus too much on competition and social comparison between children and make little attempt to spark children's interests in different topics can lead to declines in intrinsic motivation and increases in extrinsic motivation (Eccles, Wigfield, and Schiefele 1998).

A review of the research (Harlen and Crick 2002) on the impact of summative assessment and testing on students' motivation for learning after the introduction of the National Curriculum Tests in England has the following findings related to this study: low-achieving pupils had lower self-esteem than higher-achieving pupils while there was no correlation between self-esteem and achievement prior to this; and a great emphasis on evaluation produces students with strong extrinsic orientation towards grades and social status.

Tangible rewards as motivational tools are often associated with the use of the AR program in the United States and this practice has been criticized (Kohn 1993; Carter 1996) as actually leading to diminished motivation in reading. A study by Vollands, Topping, and Evans (1999) found that even socio-economically disadvantaged elementary students in Scotland were totally disinterested in any tangible rewards, but they were highly motivated by the individualized performance feedback inherent in the program. Nontangible incentives of teacher praise and constructive feedback have proven more motivational than tangible rewards (Cameron and Pierce 1994).

Implementation

Topping (1999; Topping and Sanders 2000; Topping and Fisher 2003) has studied the implementation of AR in Scotland and England and has concluded that the effectiveness of AR might be influenced by variability in hardware and software configurations, nature and intensity of program use, level of teacher ability and interest in the program, degree of teacher training and support, and other human factors. However, on average across all schools studied, even those in socio-economically disadvantaged areas, gains on standardized tests in AR classrooms were in excess of normal rates and statistically significant. Implementation integrity varied a great deal, with only one school approximating implementation of the program as recommended by the manufacturer, but showed high gains on reading achievement tests.

The research reported in this paper does not address effectiveness of the AR program but rather focuses on the less examined areas of links between the implementation of AR, reader motivation, and reaction to AR.

Educational and Cultural Differences

Varied educational policies and cultural influences in Scotland and England allowed for study of the implementation of AR in diverse settings and to further investigate its impact on student motivation where it has been maintained that extrinsic rewards for reading would generally be considered inappropriate, if not unacceptable (Topping 1999).

Distinctions between the English and Scottish educational systems should be noted. As a result of the Education Reform Act of 1988, the National Curriculum is compulsory in England (British Broadcasting Corporation 2005a). Formulated and monitored by the Qualifications and Curriculum Authority, the aim of the curriculum is to raise standards and to ensure that schools

around the country are following the same courses. The National Curriculum also introduced key-stage tests, popularly known as "Sats," which are similar to high-stakes testing required by the No Child Left Behind Act in the United States. Children take national tests en masse at the ages of seven, eleven, and fourteen in reading, writing, and mathematics. Data that compare schools, often referred to as performance or league tables, are published in the newspaper for the purpose of informing parents. Scotland has a comprehensive education system. It is distinctive particularly for its flexible curriculum, which is not set by law. What and how students are taught is based on guidelines prepared by Learning and Teaching Scotland on behalf of the Scottish Executive. This flexibility is reflected in the management and funding of schools, which has been largely devolved to head teachers (British Broadcasting Corporation 2005b). Assessment policy in Scotland is also significantly different from that in England (Watson 2003). National testing has been established to monitor progress from the age of seven on, but teachers decide on the appropriate times during a child's primary career to administer the national tests. Schools have to meet targets set by the Scottish Executive, but the results are not published and the testing is not high stakes for the schools.

Research Questions

The following research questions address current gaps in the professional literature related to Accelerated Reader:

- How is AR related to motivation and extent of reading?
- How does the implementation of AR affect student reading practices and attitudes?
- What data do teachers use to manage AR?

Methods

Quantitative and qualitative methods were employed to collect and analyze data for each of the research questions. All statistical tests were performed using the Statistical Package for the Social Sciences (SPSS). Two schools in Scotland (one primary and one secondary) and one in England (primary) that had previously participated in AR research studies in the United Kingdom were identified through a literature search. The principal investigator of those studies, Keith Topping from the University of Dundee, Scotland, agreed to host this researcher and made contacts with schools for site visits. These schools had been involved in previous studies with Topping and relevant permissions had already been secured. These schools represent low (Scotland, n=53) middle (Scotland, n=40), and high (England, n=55) levels of implementation of AR. Levels of implementation were determined by Topping's criteria (1999; Topping and Sanders 2000; Topping and Fisher 2003) and include the following:

- intensity of the monitoring of student reading progress and intervention when needed;
- volume of AR reports;
- range of book selection;
- level of access to computers for testing;
- degree of teacher training and support;
- variability in hardware and software configurations;
- level of teacher ability and interest in the program;
- nature and intensity of program use;

- limited and appropriate use of rewards; and
- time allocated for reading practice.

A primary school with 8 percent of their students on free lunch and located in a suburban area of England, was identified as high implementation. The AR program has been used for nine years, evolving into the school's entire reading program for third grade and beyond. It is the first installation of AR in a U.K. school, which was a direct result of teachers in this school being introduced to the program by visiting a nearby American school on a U.S. air base. One senior female teacher, trained by Renaissance Learning, has assumed leadership for the program. She oversees the training of other teachers, and has created a nurturing environment resulting in a high level of teacher ability and support. Teachers monitor reading progress intensely. Most (but not all) teachers use the STAR diagnostic function of AR to determine a student's initial reading level and to set reading targets. More experienced teachers intervene and customize student targets based on their knowledge of the student. Teachers also use the class diagnostic report and pupil record report. Two twenty-minute periods of silent sustained reading are set aside each day when students read their AR books. Each class has approximately five hundred titles to choose from and books are shelved in the hallways throughout the school, labeled by reading level. Each class has at least one computer where students can take AR quizzes. There is no school library. Students move freely throughout the day, selecting, reading, and discussing books and taking quizzes. Teachers describe the school as having a "reading culture" and often take part in reading, discussing, and recommending the same books their students do. Some teachers construct quizzes for books their students want to read that are not part of the AR program. Rewards are limited in the high implementation school. There is some use of certificates that are a component of the AR software, student names are displayed on a bulletin board in the hall when they reach certain targets, and the principal affixes a sticker to a child's shirt during assembly when he or she has attained a particularly high level of achievement.

The Scottish schools are located in the same major city but in different socioeconomic areas. In the middle-level implementation school, set in a lower class neighborhood with 34 percent of children on free lunch, AR has been used by two teachers responsible for fifth and sixth grade for five years and provides supplemental reading activities. Similar to the high-level implementation school, one of the teachers is in charge of AR and has received training by Renaissance Learning. Teachers use the STAR diagnostic report, target history report, and top earners report to monitor student progress at regular intervals. Targets are adjusted based on student performance or teacher intervention at midyear. Classroom collections of approximately two hundred books supplement those in the school library. However, the library is a simple warehouse as there is no librarian. Students rely mostly on their classroom collections, which contain many low-level titles. Variable time is allotted in the morning and afternoon for reading practice and students take tests during their spare time throughout the day on a classroom computer.

The AR program is viewed as a method to motivate students and various extrinsic rewards are employed including small prizes, display of names on a bulletin board, and team competitions. The teachers acknowledge that it gets subsequently more difficult to maintain student enthusiasm about the AR program and reading in general as time goes on. One particularly successful motivator is a bulletin board called the Star Chamber, where only those students' names who reach 100 percent of their AR goal are displayed. This was less than 25 percent of students at the time of the researcher's site visit. The culture of reading detected in the high-implementation

school was not observed in this school but a culture of ownership was observed. Students took responsibility for meeting their targets and enjoyed using the system on their own and being evaluated by a computer that was deemed impartial.

In the low-level implementation school, a secondary school, language arts teachers in ninth and tenth grade who incorporate student performance into their term grade had been using AR for only one year. In this school, with 24 percent of students on free lunch, AR is used as homework and students are required to read one AR book every two weeks. Teachers employ class diagnostic reports and the head of the English department examines summary reports, although students are not initially tested to determine their reading levels or to set reading targets. Books are housed in a modern school library, staffed by an MLS librarian and a clerk who oversee book purchasing and processing but not program administration. Currently, 718 AR books are tagged in the automated circulation system, identified with orange stickers, and integrated with the rest of the library collection on the shelves. Students take AR quizzes on library computers. Library staff expressed displeasure in having responsibility for monitoring test-taking and using budget funds for AR books, noting that many new and quality non-AR titles sit on the shelves and that they have observed cheating on AR quizzes. A structured rewards system is in place whereby students get pens, highlighters, and book tokens for successfully passing a predetermined number of quizzes.

Data Collection and Analysis

Observation, structured interviews with students and teachers, videotaped student focus groups, a student survey on self-reported reading (appendix A), examination of AR artifacts, and administration of the Motivation for Reading Questionnaire (MRQ) (Wigfield and Guthrie 1997) (appendix B) were used to gather data. The MRQ measures the following dimensions of reading motivation: efficacy, challenge, curiosity, involvement, importance, recognition, grades, social, competition, compliance, and work avoidance. By combining the dimensions of curiosity, involvement, and efficacy an intrinsic motivation variable was calculated and by combining the scores on the recognition, grades, and competition scales, an extrinsic motivation variable was calculated. In addition to MRQ items, students were asked to respond in the survey to gender, age, and opinions of AR. AR reports were examined for total points to date (near the end of the school year) and total books read. In the primary schools, teachers read the survey aloud to students and in the secondary school students independently completed the survey. Students were assured that their survey responses would only be read by the researcher as student names were collected to make data comparisons with AR reports.

To obtain richer data on the instructional environments, focus group interviews with six groups of three students (two groups per school) were conducted by the researcher. Teachers were asked to identify students who would be representative of the reading ability and gender composition of their classroom for each focus group. The audio portion of the focus group videotape was transcribed and the contents consulted for clarification and expansion of the survey and MRQ data. Each teacher that used AR was individually interviewed. These interviews were not recorded but copious notes were taken.

Differences in the means of total books read per week and of scores on reading motivation dimensions across groups defined by implementation level were tested using ANOVA. Differences in mean scores on reading motivation dimensions across groups defined by gender

and by opinion of AR were tested using t-tests and ANOVA. Chi-square tests were used to examine the differences between genders and between implementation levels in students' opinions of AR. Spearman's correlation was performed to assess the relationship of total books read per week to number of AR points and to scores on reading motivation dimensions.

Motivation

In the United States, tangible (extrinsic) rewards as motivational tools are often associated with the use of the AR program. Renaissance Learning (1997) maintains that

> The use of extrinsic rewards is not an essential part of Accelerated Reader's use. AR provides learning information which teachers can use in a variety of ways, including reading incentive programs. Such programs, while not the only way to motivate student reading, can also serve as important, tangible feedback that helps students discover an intrinsic love of reading and learning within themselves.(3)

One of the reasons for seeking out schools in the United Kingdom was to study reading motivation in another cultural context—the absence of competition and related prizes because it has been asserted that extrinsic rewards for reading would generally be considered inappropriate, if not unacceptable (Topping 1999). But unexpectedly, teachers in the Scottish schools (low- and mid-level implementation) were eager to show this American researcher how they had implemented the AR program "American-style" with a large array of prizes ordered from the Renaissance Learning catalog that included school supplies and small toys. The mid-level implementation school also displays students' names who had reached 100 percent of their AR goal for the term on a bulletin board in a prominent area of the hallway as does the English school (high-level implementation) whose only other tangible reward is to have the principal affix a sticker to a student's shirt in assembly when he or she meets an AR goal. In each of the U.K. schools, the one distinct culturally related aspect of the implementation of AR is that there is no competition between students or classrooms of students to accumulate points. Students, with the help of their teachers and the diagnostic portion of the AR program, set individual goals and are rewarded by performance feedback inherent in the program and teacher praise, which have been shown to be highly motivating (Cameron and Pierce 1994).

Another finding is that some students are motivated to read a large number of non-AR books, despite the lack of rewards for this reading, and reportedly do so because AR quizzes are not available for books they were interested in reading. These books fall into two distinct categories— higher-level adult fiction and newly published books (the latest version of *Harry Potter*, due to be released at the time of this study, and such popular series books as the Olson Twins were mentioned). Teachers at the high-implementation school did demonstrate an effort to read these types of books and construct their own AR quizzes, an option of the software, and indicative of a higher-level of program implementation.

The number of books a student reads might be assumed to have some relationship to his or her motivation to read. In turn, this motivation might be related to something called motivational style. Through administration of the MRQ to students in England and Scotland, an attempt was made to distinguish among motivational styles and number of AR books read. However, most of the motivational styles were significantly correlated with the number of books read: efficacy ($r = .18$, $p < 0.05$), challenge ($r = .18$, $p < 0.05$), curiosity ($r = .25$, $p < 0.01$), aesthetic enjoyment ($r = .22$,

p<0.01), importance (r =.24, p<0.01), recognition (r =.23, p<0.01), social (r =.17, p<0.05), intrinsic composite (r =.31, p<0.01) and extrinsic composite (r =.19, p<0.05) (table 1); therefore, motivational style is not helpful as a distinguishing feature in determining impact on extent of reading, except when gender is taken into account as is explained later.

Table 1. Motivational styles & volume of reading—Spearman's correlation coefficient

Motivational style	**Correlation coefficient**	**P**
Efficacy	0.18	p<0.05
Challenge	0.18	p<0.05
Curiosity	0.25	p<0.01
Aesthetic enjoyment	0.22	p<0.01
Importance	0.24	p<0.01
Recognition	0.23	p<0.01
Social	0.17	p<0.05
Intrinsic composite	0.31	p<0.01
Extrinsic composite	0.19	p<0.05

Note: Outlying values of 20 and 28 books per week in the medium implementation school were not included in the analysis.

Students were also given the opportunity to respond to two open-ended questions in the survey: What do you like about AR? What don't you like about AR? These responses can be found in table 2. The most popular response is related to computer/software/test format for both likes (37 percent) and dislikes (30 percent). More specific responses in this category are that students like using the computer, taking tests, and the question format of AR. Dislikes include question difficulty, seeing mistakes, and quizzes being boring. Twenty-five percent of students dislike the selection of books associated with AR, an aspect of implementation that is frequently criticized (Carter 1996). Related to competition and achievement, 18 percent of students who enjoy this aspect of the program mention prizes and points, and the 14 percent who dislike this aspect cite scores being posted (if the student is not successful) and program pressure, a finding similar to Eccles et al. (1998).

Table 2. Student likes and dislikes regarding AR

	Like (%)	**Dislike (%)**
Reading	48 (33%)	10 (8%)
Selection of books	14 (10%)	32 (25%)
Computer/software/test format	55 (37%)	39 (30%)
Competition/achievement	26 (18%)	18 (14%)
Nothing	04 (03%)	30 (23%)
Total	147 (100%)	129 (100%)

An attempt was made to determine if students who have differing opinions of AR are motivated differently. These results are shown in table 3. The majority of students (66 percent) like AR, 21 percent do not like it, and 13 percent have no opinion. No significant differences were found in motivational style among students with different opinions of AR (ANOVA: F= 1.977, p>0.05). This could mean that AR appeals to students who are motivated both intrinsically and

extrinsically. But, because no specific motivational style could be associated with a particular student, it is also difficult to align a motivational style with a specific student opinion.

Table 3. Gender differences in opinions of AR

	Opinion of AR			
Sex	**Dislike**	**No feelings**	**Like**	**Totals**
Female count (% of Total)	12 (8.1)	5 (3.4)	52 (35.1)	69 (46.6)
Male count (% of Total)	19 (12.8)	15 (10.1)	45 (30.4)	79 (53.4)
Totals count (% of Total)	31 (20.9)	20 (13.5)	97 (65.5)	148 (100.0)

Chi square=6.44, 2 d.f., $p<0.05$

A significant gender difference exists in opinion of AR (table 3): a greater proportion of females like AR (Chi square=6.44, 2 d.f., $p>0.05$). This supports previous U.K. research that found more positive attitudes towards AR in girls (Topping and Fisher 2003) and that boys have shown a decline in reading for pleasure since the government's emphasis on improving literacy (Harlen and Crick 2002). Teachers in this study were shown AR reports and asked which students were helped by AR and which students had difficulty with AR. In all instances, teachers pointed out boy students as feeling pressured by AR. Topping (1999) notes that delayed readers (who are most often boys) might not want to be seen reading low-readability books and that they may therefore choose books that are too difficult for them. This would also lead to failing quizzes and unfavorable opinions of the program.

Boys and girls differ in the social and competition motivational scales on the MRQ with boys scoring significantly higher in competition—$t(146) = -2.852$, $p=.01$ and girls in social $t(146) = 2.08$, $p= .05$ scales. Scoring high on the social scale denotes the girls respond more positively to statements about reading with friends and family and discussing books. Scoring high on the competition scale indicates the boys respond more positively to statements about being recognized and attaining good grades. It could be suggested that one of the reasons girls like AR is that it provides a context for the social nature of reading, which they enjoy. It might also be suggested that boys enjoy the competition aspect of AR, which includes recognition when they do well.

Extent of Reading

If students are motivated to read, it is probable that they will read more books. This study found no correlation between the number of books read and the number of AR points (Spearman's correlation coefficient -0.075, $p>0.05$). One might expect there to be a direct correlation with the number of books read and AR points as the more books that are read, the more points can be accumulated. The reasons for there not being a correlation could be: (1) a large number of books with low point levels were read (as was observed in the mid-level implementation school); (2) books being read that were not AR books (as was the case in the school where students read books from outside the classroom); (3) a lower number of books with higher point values being read (more difficult books); and (4) failing AR tests and not receiving points for books that were read.

Implementation

More than thirty reports can be generated with AR to assist teachers and administrators as they serve as knowledge managers of reading. However, the average number of reports employed by all teachers in the three schools is two. All three schools used the diagnostic report collectively. This report summarizes student activity in the following areas:

- number of quizzes taken;
- number of quizzes passed;
- book-level target;
- book-level average;
- average percent of questions correctly answered;
- target points;
- target points earned;
- percentage of independent reading;
- percentage of fiction reading; and
- certification level.

If either an initial STAR quiz or a teacher using his or her professional judgment and inputting the student's reading level manually did not determine student targets, some of these reporting categories on the diagnostic report were blank because they could not be calculated, particularly in the case of the low-implementation school. Even though there is great potential to use data for decision making, it was not observed in the study schools.

If school personnel implement the AR program effectively, they should be able to realize its potential—one of which is getting students to read more books. And there is a significant difference in the number of books read among the levels of implementation (ANOVA: $F = 28.68$, $p<0.01$) in the U.K. schools. However, it is the school with the medium level of implementation reporting the highest mean volume of reading per week per student. Although this sounds counter-intuitive, observation and an AR report listing the most popular books reveal these to be twelve- to twenty-page picture books that ten-year-old students could finish reading in a matter of minutes. The teacher who administers AR produced this report at the request of this researcher, and was quite embarrassed at the results, having done it for the first time. He felt it was important to have a large number of easy books for students to gain confidence in their abilities, but admitted a lack of guidance for students in their reading choices. Students in this low socio-economic school are also interested in accumulating AR points for prizes and having their name displayed on a bulletin board in the hallway, which has been shown to be highly motivating (Vollands, Topping, and Evans 1999) and was confirmed by students in the focus groups. In addition, student focus groups noted that an easy way to accumulate the points needed to receive these rewards was to read a large number of lower-level books.

Levels of implementation are related to the following types of motivation at significant levels: aesthetic enjoyment ($F=4.07$, $p<0.05$), recognition ($F=4.25$, $p<0.05$), and social ($F=5.22$, $p<0.01$), which are all higher for both the high and middle-levels of implementation schools than the low-level of implementation school. Results are presented in table 4. This relationship can probably be attributed to age differences as the students in the low-implementation school are in secondary school (ages thirteen and fourteen) and students the other two schools are in elementary school (ages ten and eleven). Interest in reading tapers off as children get older and they might also be indifferent to the social and recognition aspects of the AR program and reading in general.

Table 4. Level of implementation and opinion of AR—Chi Square

	Level of implementation			
Opinion of AR	**Low**	**Medium**	**High**	**Totals**
Dislike count (% of Total)	12 (8.1)	8 (5.4)	11 (7.4)	31 (20.9)
No feelings count (% of Total)	8 (5.4)	7 (4.7)	5 (3.4)	20 (13.5)
Like count (% of Total)	33 (22.3)	25 (16.9)	39 (26.4)	97 (65.5)
Totals count (% of Total)	53 (35.8)	40 (27.0)	55 (37.2)	148 (100.0)

Chi square=1.86, 4 d.f., $p<0.05$

There is no relationship between students' opinions of AR and level of implementation (Chi-square = 1.86, 4 d.f., $p>0.05$) as shown in table 4. Opinions of AR are very similar regardless of how it is implemented. In the focus group interviews, teachers noted that students like being responsible for their own learning and being evaluated by a computer that was deemed impartial. AR is also a novelty in the United Kingdom—very few schools have it and these students may feel they have something special in their classrooms, even if it is not implemented at the highest level.

Conclusions

Conclusions drawn from the U.K. data sets in this cross-cultural, cross-methodological study provide the impetus for further research.

The data support the conclusion that motivational style interacts with gender in relation to the competitive and social aspects of the AR program. One might conclude that AR prizes are more effective with boys, but that boys are equally motivated by praise and recognition, and that girls are motivated more by discussing books and reading with others and generally like the AR program better. In the area of knowledge management, the data leads to the conclusions that teachers tend to ignore the many possible AR reports, thus neglecting data that could be used for reading guidance, and that level of program implementation (high, medium, or low) does not correlate with breadth of reading. These conclusions prompt seeking comparable U.S. schools and probing, along with knowledge management issues, how students' opinion toward the AR extrinsic rewards and the program in general might differ between boys and girls or whether this is more of a culturally specific finding given the less competitive nature of AR program implementation in the United Kingdom.

School Library Media Specialists

Findings from this motivation and implementation study can be applied to school library media specialists in the United States in several areas. For those already serving as AR managers, contributions can be made to the effective implementation particularly in the area of book selection, reading guidance and motivation, organization of materials, and teacher professional development. In each of the schools, the teachers found it difficult to coordinate the numbers of tests and books—for many tests there are no books available and for books students wanted to read there are no tests available. School library media specialists can facilitate this effort by synchronizing their AR database, encouraging Renaissance Learning to be more responsive to recent book releases, and constructing in-house quizzes or training teachers in the process—an

option that has mostly gone unrealized. It has been established in this and other studies that more simple recognition for reading such as names on display can be more highly motivating than complex and expensive extrinsic prize structures (Everhart 1999). One highly visible area for maintaining such a display is in the school library media center. The media center can also serve as a student ownership space whereby students can independently select books and take quizzes. On a higher level, school library media specialists can serve as knowledge managers to collaborate closely with teachers in utilizing and interpreting the myriad of reports available and incorporating motivational techniques.

School library media specialists who do not have the AR program can employ findings from this study that are not software dependent. They can collaborate with teachers to set individual reading goals for students and develop a responsive collection. Because girls were found to enjoy the more social aspects of reading, school library media specialists can instigate book discussion groups for girls, and provide social areas whereby girls might recommend books to friends. Promotional programs that involve family reading activities would be motivating for girls, and might also develop more social motivation for boys. A selection of age appropriate, high-interest, low-readability books should be provided for boys who do not like to be seen reading low-level books. School library media specialists might also develop a method of recognizing boys for reading that is consistent with boys' motivational needs.

In all circumstances, school library media specialists should assume a leadership role in reading in their schools by incorporating independent research concerning AR that is now becoming more frequently conducted and disseminated.

Appendix A. Student Demographic Data Reading Questionnaire

Please answer the following questions honestly and to the best of your ability.

1. Name:

2. Age:

3. Class:

4. School:

5. I am a

_____ boy

_____ girl

6. In one week, about how many books do you read to the end? _____

7. Of the books you read, how many are Accelerated Reader books? (mark the one which applies):

_____ all of them are Accelerated Reader books
_____ most of them are Accelerated Reader books
_____ most of them are not Accelerated Reader books
_____ none of them are Accelerated Reader books
_____ I don't read any books

8. Where do you get the books you read? (put a number 1 in front of the place where you get the most books, a number 2 in front of the place where you get the next most number of books; up to number 5 where you get the least number of books.)

_____ school
_____ library
_____ book store
_____ home
_____ friends

9. The way I feel about Accelerated Reader is: (mark one)

_____ I like using it a lot.
_____ I like using it.
_____ I dislike using it.
_____ I dislike using it a lot
_____ I don't have any feelings one way or another

10. Since I have been using Accelerated Reader: (mark one)

_____ I read a lot more books.
_____ I read some more books.
_____ I read less books.
_____ There is no difference in the number of books I read

11. What I like most about using Accelerated Reader is:

12. What I dislike about using Accelerated Reader is:

Appendix B. Motivation to Read Questionnaire

Circle one answer for each question using these answers:
1. Very different from me
2. A little different from me
3. A little like me
4. A lot like me

1. I visit the library often with my family. 1 2 3 4

2. I like hard, challenging books. 1 2 3 4

3. I know that I will do well in reading next year. 1 2 3 4

4. I do as little schoolwork as possible in reading. 1 2 3 4

5. If the teacher discusses something interesting I might read more about it. 1 2 3 4

6. I read because I have to. 1 2 3 4

7. I like when questions in books make me think. 1 2 3 4

8. I read about my hobbies to learn more about them. 1 2 3 4

9. I am a good reader. 1 2 3 4

10. I read stories about fantasy and make believe. 1 2 3 4

11. I often read to my brother or sister. 1 2 3 4

12. I like being the only one who knows an answer in something we read. 1 2 3 4

13. I read to learn new information about topics that interest me. 1 2 3 4

14. My friends sometimes tell me I am a good reader. 1 2 3 4

15. I learn more from reading than most students in my class. 1 2 3 4

16. I like to read about new things. 1 2 3 4

17. I like hearing the teacher say I read well. 1 2 3 4

18. I like being the best at reading. 1 2 3 4

19. I look forward to finding out my reading grade. 1 2 3 4

20. I sometimes read to my parents. 1 2 3 4

21. My friends and I like to trade things to read. 1 2 3 4

22. It is important for me to see my name on a list of good readers. 1 2 3 4

Circle one answer for each question using these answers:
1. Very different from me
2. A little different from me
3. A little like me
4. A lot like me

23. I don't like reading something when the words are too difficult. 1 2 3 4

24. I make pictures in my mind when I read. 1 2 3 4

25. I always do my reading work exactly as the teacher wants it. 1 2 3 4

26. I usually learn difficult things by reading. 1 2 3 4

27. I don't like vocabulary questions. 1 2 3 4

28. Complicated stories are fun to read. 1 2 3 4

29. I am happy when someone recognizes my reading. 1 2 3 4

30. I feel like I make friends with people in good books. 1 2 3 4

31. My parents often tell me what a good job I'm doing in reading. 1 2 3 4

32. Finishing every reading assignment is very important to me. 1 2 3 4

33. I like mysteries. 1 2 3 4

34. I talk to my friends about what I am reading. 1 2 3 4

35. If I am reading about an interesting topic, I sometimes lose track of time. 1 2 3 4

36. I like to get compliments for my reading. 1 2 3 4

37. Grades are a good way to see how I'm doing in reading. 1 2 3 4

38. I like to help my friends with their schoolwork in reading. 1 2 3 4

39. I read to improve my grades. 1 2 3 4

40. My parents ask me about my reading grade. 1 2 3 4

41. I enjoy a long, involved story or fiction book. 1 2 3 4

42. I like to tell my family about what I am reading. 1 2 3 4

43. I try to get more answers right than my friends. 1 2 3 4

44. If the project is interesting, I can read difficult material. 1 2 3 4

45. I enjoy reading books about people living in different countries. 1 2 3 4

46. I read a lot of adventure stories. 1 2 3 4

Circle one answer for each question using these answers:
1. Very different from me
2. A little different from me
3. A little like me
4. A lot like me

47. I always try to finish my reading on time. 1 2 3 4

48. If a book is interesting, I don't care how hard it is to read. 1 2 3 4

49. I like to finish my reading before other students. 1 2 3 4

50. In comparison to my other school subjects, I am best at reading. 1 2 3 4

51. I am willing to work hard to read better than my friends. 1 2 3 4

52. I don't like it when there are too many people in the story. 1 2 3 4

53. It is very important to me to be a good reader. 1 2 3 4

54. In comparison with other activities I do, it is very important for me to be good at reading. 1 2 3 4

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