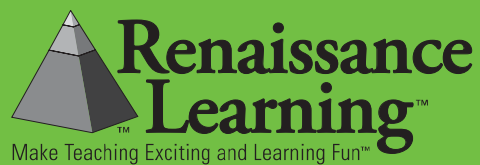


| 2007 Edition |

# Research Summary

**Renaissance Learning UK**

- Accelerated Reader
- Accelerated Maths
- AlphaSmart
- 2Know! Classroom  
Response System
- STAR Early Literacy
- STAR Reading
- STAR Maths



Make Teaching Exciting and Learning Fun™

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04/07

To obtain copies of the research summarised in this document, access information has been provided after each citation, including a web address to download an electronic version, if available, or an email address to request a print copy from the Renaissance Learning Research Department.

Some research studies in this summary are identified by the following notations: **E** (experimental or quasi-experimental), **I** (independent), **P** (peer-reviewed) and/or **UK** (conducted in the United Kingdom).

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# I. INTRODUCTION

by **Keith Topping, Professor of Educational & Social Research, School of Education, Social Work & Community Education, University of Dundee**

Reading and mathematics are skills that require practice. Typically, the more you do, the better you become. It sounds simple, but in fact, practice needs to be of high quality if it is to have a substantial impact upon learning.

Do we get as much practice as we think we do? Well, no. For instance, generally the amount of reading practice in school is really quite small, and little different from the amount of reading practice at home. On the other hand, even if we get a lot of practice, is it the right sort of practice? Is it strategically targeted, and does it have any consequences? Monitoring the effectiveness of such practice within the time available is the difficult part. Technology can help here.

Practice must be targeted and relevant, accountable and guided, and feedback is important. Black and Wiliam (1998a, 1998b) concluded from their review that assessment that precisely indicated pupil strengths and weaknesses and provided frequent constructive, individualised feedback led to significant learning gains, compared to traditional summative assessment. The active engagement of pupils in the assessment process was seen as critical, and self-assessment was an essential tool in self-improvement. Affective aspects, such as the motivation to respond to feedback and the belief that it made a difference, were also important.

Furthermore, practice should be personalised (Hargreaves, 2006). It should be uniquely appropriate to the individual, and involve co-construction of learning between teacher and pupil. When teachers display a readiness to treat pupils as active partners in the construction of their education, pupils respond with engagement that sets in train a powerful spiral. Of course, co-construction can also be between pupils, or between pupils and adults other than teachers. When assessment for learning is added to pupil voice in deep learning, learners play an active role in shaping how the teacher teaches, as much as how they themselves learn. Assessment for learning ensures personalised learning by fostering a dialogue between teacher and pupil to relay feedback and monitor progress throughout the learning process.

Great schools are those that facilitate the maximum amount of effective personalised learning. The characteristics of great schools are examined in Taylor & Ryan (2005). Educators at great schools strategically use accountability and value-added models, consider data when making decisions and setting individual and group targets, monitor progress towards targets and incorporate computer technology.

This *UK Research Summary* summarises UK, European and recent US-based studies that have evaluated the impact of technology that monitors personalised practice in reading and mathematics. The studies summarised vary in focus and rigor, and range from randomised peer-reviewed trials to case study reports about educators who have successfully implemented the systems in their schools.

## **Personalised Reading Practice**

Personalised, guided reading practice with feedback is highly effective. Renaissance Learning's computerised, progress-monitoring tools Accelerated Reader and STAR Reading enable and support this type of practice and feedback, as the studies mentioned below maintain.

Accelerated Reader provides reliable and valid feedback on comprehension of books and other materials pupils have read. For pupils, this feedback is motivational. For teachers, the information is used to carefully monitor each pupil's independent reading practice, including guiding pupils to books at appropriate levels, closely monitoring their progress and intervening with appropriate instruction when necessary.

STAR Reading is a reliable, valid and efficient assessment of general reading achievement and reading comprehension. It provides accurate, norm-referenced reading scores, criterion-referenced measures of pupils' instructional reading levels and a way for teachers to track pupil growth throughout the year.

The Program for International Student Assessment (PISA) studies found that engagement in reading was the third largest individual pupil factor to impact on performance (after year and immigration status) and accounted for twice as much of the difference in performance as socio-economic status (SES). Youth from the lowest SES who were highly engaged readers performed as well on the assessment as highly engaged youth from the middle SES group and youth with medium levels of engagement in the high SES group (Kirsch, et al., 2002). This suggests that highly motivated youth may compensate for low family income and parents' limited educational attainment by reading more.

Beyond this, many studies have found high positive correlation between levels of reading practice (at school or home) and reading achievement. A smaller number of studies evidenced a causal direction from practice to achievement, rather than vice versa or confounded. However, simply increasing time allocated to reading practice might not be effective in raising achievement. *Reading practice* is not a homogeneous, unitary activity, and the quality and effectiveness of reading practice also requires consideration. Arguably, pupils need to practise reading at a level at which they are appropriately challenged by exposure to new vocabulary and concepts but not confronted with failure, avoiding unproductive reading at levels too low or high for effective learning to take place.

Personalised, guided independent reading is the cornerstone of Renaissance Learning's research-based best classroom practices for implementing Accelerated Reader. Key recommendations are that teachers ensure that pupils read books within their zone of proximal development (ZPD) range—that level where books are neither too difficult nor easy—and that they maintain an average percent correct score on Accelerated Reader assessments that indicates whether the ZPD range is appropriate or should be adjusted.

In the first UK study of Accelerated Reader, Vollands, Topping and Evans (1999) found that the program, even when less than fully implemented, yielded gains in reading achievement for at-risk readers that were superior to gains from regular classroom teaching and an alternative intensive method, even with less time devoted to class silent reading practice than comparison classes.

Topping and Fisher (2003) investigated Accelerated Reader in 13 schools of different types spread across the UK, the majority socio-economically disadvantaged. On both paper- and computer-based reading tests, on aggregate, pupils in the 13 schools gained in reading at abnormally high and statistically significant rates. However, implementation integrity was very variable—some teachers failed to intervene in response to Accelerated Reader data indicating that pupils were reading ineffectively.

Rudd and Wade (2006) matched Specialist Schools implementing Accelerated Reader, and its maths counterpart Accelerated Maths, with similar schools where the programs were not implemented. Average standardised test scores for reading improved in five out of six treatment schools; in the two comparison schools, one saw a decline in average score and one saw an improvement. One of the main advantages was the personalised learning aspect of the programs. In schools using Accelerated Reader, surveys administered to both teachers and pupils indicated that pupils were motivated by the immediate feedback the programs provides and that the number of pupils interested in reading and reporting feelings of independence while reading increased.

A parallel report, Topping (2006), examined 10 primary and secondary schools. Overall, the mean gain in reading ability was statistically significant. The gains in reading score were statistically significant in 12 out of 15 classes. The average percent correct (APC) varied, and the mean APC was considerably below the 85 per cent minimum recommended by Renaissance Learning's best classroom practices. APC is important because the higher the APC, the higher mean scaled score gain. APC was even more crucial if the amount of reading was small. A case study of an apparently successful school found variation even within the school.

In three studies accepted to be published in European journals, Topping, Samuels and Paul (in press-a, b, c) found that Accelerated Reader measures of quantity (engaged reading volume) and quality (success on reading comprehension quizzes) showed a positive relationship with achievement gain at all levels of achievement. However, both high quantity and high quality in combination were necessary for high

## INTRODUCTION

achievement gains, especially for older pupils. When minimum implementation quality criteria were met, the positive effect of computerised assessment was higher in the earlier years and for lower achieving pupils. With higher implementation quality, reading achievement gains were higher for pupils of all levels of achievement and across all years, but especially in the upper years. Moderate levels of challenge were positively associated with achievement gain, but non-fiction reading was generally more challenging than fiction.

In the US, Nunnery, Ross and MacDonald (2006) found in a randomised study that pupils in classes using Accelerated Reader exhibited significantly higher growth rates than those in control classes. Ross and Nunnery (in press) also found that Accelerated Reader, STAR Reading and Accelerated Math contributed to the increased achievement of pupils who used the tools. Pupils with high levels of implementation intensity experienced significantly higher achievement levels in both reading and maths, compared to pupils in control schools.

In another US study, Husman, Brem and Duggan (2005) examined the effect of Accelerated Reader and recommended classroom practices on the target orientations of 239 pupils in grades 3 through 6 at an urban primary school. The results of the study indicated that pupils using Accelerated Reader were less performance oriented (both performance-approach and performance-avoid) by the end of the year, while mastery target orientation (“learning for the sake of learning”) remained consistently high. The researchers also found that pupils who perceived the targets of their teachers as being performance-approach or -avoid oriented tended to hold similar personal targets.

All of this suggests that Accelerated Reader and STAR Reading can be extremely helpful in aiding effective reading practice and feedback that leads to higher attainment. However, these programs assist the teacher; they do not replace the teacher. When teachers intervene as appropriate with the help of data provided by the software, pupils are able to realise the most growth.

### **Personalised Maths Practice**

Just as with reading practice, personalised, guided maths practice accompanied by feedback is highly effective. Renaissance Learning’s Accelerated Maths and STAR Maths computerised, progress-monitoring tools both facilitate and support effective maths practice, as the studies that follow show.

Accelerated Maths helps educators manage day-to-day tasks by producing daily, personalised math practice, scoring pupils’ work and reporting results immediately. As a supplement to any core maths curriculum, it helps teachers personalise instruction for every pupil and provides teachers with feedback needed to make better instructional decisions.

STAR Maths is a reliable, valid and efficient assessment of general maths achievement. It provides teachers with accurate estimates of pupils’ maths abilities relative to national norms, criterion-referenced diagnostic assessments of maths skills development and a way to track pupil growth throughout the year.

According to the Trends in International Mathematics and Science Study (TIMSS), pupils who enjoyed and valued learning mathematics and those who possessed higher levels of self-confidence with learning maths tended to obtain higher levels of mathematical achievement (Mullis, Martin, Gonzalez & Chrostowski, 2004), a fact which cements the importance of pupil engagement while learning. The TIMSS report also highlights the significance placed on maths practice internationally with data showing that teacher-guided pupil practice and independent (in-class) pupil practice consume 40 per cent or more of the time pupils spend learning mathematics during a typical week. These findings suggest that schools the world over may benefit from instructional tools which increase pupil engagement while providing individualised, guided practice with feedback that informs instruction.

In his review of research on expertise in mathematics, Butterworth (2006) concluded that there is no support for the notion of inborn capacity for mathematics, but there is substantial evidence that exceptional

mathematicians tend to demonstrate a combination of high interest and extensive practice. Studies of brain activity seem to support this finding, as researchers have found that practice and experience of mathematics can change the functioning and structure of brain systems.

The best practice recommendations that guide the use of Accelerated Maths and the very nature of the program—individualised practice followed by immediate feedback, followed by individualised practice, and so on—underscore the importance of personalised, guided maths practice.

As mentioned under Personalised Reading Practice, the UK Rudd and Wade (2006) study examined schools implementing Accelerated Maths, and its reading counterpart Accelerated Reader, with similar schools where the program was not being implemented. In primary schools, average standardised test scores for maths improved in two out of four treatment schools; in the three comparison schools, one saw a decline in average score and two saw improvements. For maths in secondary schools, two treatment schools returned their tests, and in both cases the average standardised score improved. One comparison secondary school returned their mathematics tests and the average standardised score in this school also improved, but not to the extent that was evident in the treatment schools. In surveys administered, teacher interviewees agreed that one of the most significant strengths of the programs was that they motivated pupils; specifically, pupils using Accelerated Maths responded well to being in charge of their own rate of progress and seeing that progress confirmed.

In a study in Nottingham (Renaissance Learning, 2001), Accelerated Maths was implemented at an urban secondary school. Prior to using the program, the school pretested all year 7 pupils using the Mathematics 12 test from the National Foundation for Educational Research (NFER 12). The study examined 9 pupils that participated in a Maths Club, which met for 30 minutes a day to use Accelerated Maths, and a matched comparison group of 9 pupils. After 2 terms, the mean score for pupils in the Maths Club increased by 11.2 while the mean score for the pupils in the parallel group increased by only 4.7.

In Europe, Lehmann and Seeber (2005) reported on Accelerated Math in grades 4–6 in Germany—22 Accelerated Math classes and 25 control classes participated in the study. Achievement gains were unexpectedly high in both the Accelerated Math and control classes; however, pupils using Accelerated Math intensively experienced larger gains than control pupils. Survey results showed the majority of Accelerated Math teachers expressed positive views about the progress-monitoring tool, and most teachers indicated that levels of pupil motivation and interest in mathematics increased using Accelerated Math.

There is also considerable US research on Accelerated Math. For example, in McKinney, Texas, Nunnery and Ross (in press) compared pupil achievement between 11 elementary/middle schools using Accelerated Math, and its reading counterpart Accelerated Reader, and matched controls over a 5-year period. Results showed that these progress-monitoring tools contributed to increased achievement of McKinney pupils who used the programs over the entire period studied. Pupils designated as having high levels of implementation intensity experienced significantly higher achievement levels in both reading and maths, compared to pupils in control schools.

Ysseldyke and Tardrew (in press) compared classes that used Accelerated Math to same-school control classes that did not use it. At every year level there were large differences in percentile gains for pupils in the experimental and control classes. An analysis of low-, middle-, and high-achieving pupils showed consistent rates of gain for each maths objective mastered. Significantly more pupils using Accelerated Math reported that they liked maths, helped each other with maths and liked maths better the current school year than the previous year.

In a recent study, Ysseldyke and Bolt (in press) randomly assigned classes to within-school experimental and control groups. Participating pupils were pre- and posttested using two normed tests of maths achievement. When teachers used the data from Accelerated Math to manage and differentiate instruction, pupils gained significantly more than those for whom implementation was limited or nil. However, it was found that as much as 40 per cent of the time, teachers did not comply with best classroom practice recommendations, and that there was considerable variability in fidelity or integrity of implementation.

## INTRODUCTION

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Failure to consider implementation integrity may mask the actual effectiveness of specific instructional interventions. When teachers implement continuous progress monitoring, such as with a program like Accelerated Math, and use data derived from progress monitoring to make instructional decisions for individual pupils, those pupils can profit significantly.

As these studies indicate, Accelerated Maths and STAR Maths can be extremely helpful in enabling effective maths practice and feedback that leads to higher attainment. However, as with reading, the programs are an aid to the teacher, not a replacement for the teacher. To maximise their effectiveness, the teacher must follow up on the progress-monitoring data that the programs provide.

### Conclusion

The research shows that personalised practice in reading and maths using progress-monitoring tools such as those developed by Renaissance Learning can make a difference. However, this does not happen by magic. The teacher must act upon the immediate feedback provided by the programs and intervene with pupils at risk to guide them along a more effective path. When such support is in place, the results can be remarkable.



## REFERENCES

*Other studies referred to in the Introduction appear in the pages of the Research Summary that follow.*

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## II. COMPANY OVERVIEW

In 1984, American teacher Judi Paul developed Accelerated Reader as a way to manage her children's reading and encourage them to read more and better books. Shortly afterward, she began selling the program to schools to provide teachers with assessment information to inform reading instruction and build more excitement for reading.

Today, Renaissance Learning is the leading provider of technology for personalised practice and continuous progress monitoring of reading, maths and writing in pre-K–12 schools and districts in the US. Adopted by more than 70,000 North American schools, Renaissance Learning's tools provide the practice component essential to any core reading, maths and writing curriculum.

In 1999, Renaissance Learning UK was formed and quickly became a provider of literacy and numeracy solutions for primary and secondary schools across the UK. Our mission is to accelerate learning for all children, of all ability levels and ethnic and social backgrounds.

Renaissance Learning's motto is to "Make Teaching Exciting and Learning Fun". The software and hardware products make reading, maths and writing practice fun and exciting for all pupils, and give teachers ongoing feedback to help them make data-driven instructional decisions. Educators who use these products are able to devote more time each day to reading, maths and writing practice. As a result, they accelerate learning, achieve higher scores on national tests and get more satisfaction from teaching.

Not only do we believe that providing teachers and administrators with timely data on pupil performance can help to accelerate learning, but also we believe that evaluating our own products and services is essential for continuous improvement. In our 20-year history, Renaissance Learning has invested heavily in research and has gathered a body of knowledge that is unrivalled among similar companies. This was done to ensure that our software and hardware do what they are intended to do and that they are grounded in scientific research. We seek to better understand how our software and hardware are being used in classrooms and what their impact is on pupil learning so that we can make adjustments to the products as well as the training and assistance that support them.

This *Research Summary* demonstrates that Renaissance Learning software, hardware, and best classroom practices for implementation are supported by scientific research. Each product is grounded in theory, backed by a considerable body of evidence of effectiveness and continuously evaluated by independent researchers (with findings often published in peer-reviewed journals). The results of these studies have proven to be sustainable and replicable, and are often experienced in schools with diverse settings. It is not surprising that numerous independent studies have documented successful outcomes.

The vast majority of the research summarised here has been conducted independently or externally by university researchers, research firms or school personnel. The rest has been authored by Renaissance Learning researchers, psychometricians and product developers. Study designs include experimental, quasi-experimental, correlational and case studies to determine the effectiveness of Renaissance Learning products. For assessments, reliability, validity and efficiency data are provided. The final products include peer-reviewed journal articles, full technical reports, report summaries, foundational white papers and short success stories from the field. Almost all research pieces are available from Renaissance Learning at no charge.

## III. READING RESEARCH

For more than 20 years, **Accelerated Reader (AR)** software has provided pupils with personalised reading practice and teachers with immediate, progress-monitoring feedback. Using Accelerated Reader, pupils take quizzes on books they have read to check their comprehension. Teachers use information about those quizzes to guide pupils' reading practice by helping them find books to read at appropriate levels, closely monitoring their progress and intervening with instruction when necessary.

As of May 2007, more than 100 research studies support the effectiveness of Accelerated Reader. This section of the summary contains AR research from the UK and Europe, as well as some recent US-based studies.

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### **Renaissance Learning Research Library**

To access the Renaissance Learning Research Library in its entirety, please visit <http://research.renlearn.com/>, where you may search the collection by topic, state/country, year level, demographic information and type of research. Web addresses for research studies summarised on the following pages are provided after each citation, or an email address is provided in the event an electronic version is unavailable.

## **E, I, P** 1. The Effects of Accelerated Reader and Accelerated Math on Student Achievement in Reading and Mathematics

Nunnery, J. A., & Ross, S. M. (in press). The effects of the School Renaissance program on student achievement in reading and mathematics. *Research in the Schools*.

Article is based on this report:

[http://crep.memphis.edu/web/research/pub/McKinney\\_Renaissance\\_CR\\_09-09-03.pdf](http://crep.memphis.edu/web/research/pub/McKinney_Renaissance_CR_09-09-03.pdf)

This retrospective, quasi-experimental, longitudinal study compares pupil achievement as measured by the Texas Assessment of Academic Skills (TAAS) and Texas Learning Index (TLI) between 11 primary and middle schools using Renaissance Learning progress-monitoring tools and matched controls. Nine primary and 2 middle schools in the McKinney Independent School District implemented Accelerated Reader over a 5-year period. Accelerated Math was implemented for the last year of the study district wide, but was piloted in some schools the previous year. The comparison schools were selected from the Texas Education Agency's list of comparable schools for each McKinney school based on prior use of Renaissance Learning progress-monitoring systems, accountability rating and percentage of economically disadvantaged pupils. Results indicate that Renaissance progress-monitoring tools contributed to increased achievement of McKinney pupils who used the tools over the entire period studied (Cohen's  $d \approx 0.2$  for most groups analysed). These findings are comparable to other established CSR models. The researchers also examined the impact of implementation intensity on pupil outcomes compared to their matched controls. In McKinney schools, pupils designated as having high levels of implementation intensity experienced significantly higher achievement levels in both reading and maths compared to pupils in control schools. Lower intensity implementation resulted in directionally higher achievement, but the difference between control and McKinney schools was not significant.

## **E, I, P** 2. Computerized Assessment of Independent Reading: Effects of Implementation Quality on Achievement Gain

Topping, K. J., Samuels, J., & Paul, T. (in press-a). Computerized assessment of independent reading: Effects of implementation quality on achievement gain. *School Effectiveness and School Improvement*.

Full article: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

This study elaborated the "what works?" question by exploring the effects of variability in program implementation quality on achievement. Particularly, the effects on achievement of computerised assessment in reading were investigated, analysing data on 51,000 pupils in grades 1–12 who read over 3 million books. When minimum implementation quality criteria were met, the positive effect of computerised assessment was higher in the earlier years and for lower achieving pupils. Implementation quality tended to decline at higher year levels. With higher implementation quality, reading achievement gains were higher for pupils of all levels of achievement and across all years, but especially in the upper years. Very high gains and effect sizes were evident with very high implementation quality, particularly in grades 1–4. Implications for practice, the interpretation of research and policy are noted.

## **E, I, P** 3. Does Practice Make Perfect? Independent Reading Quantity, Quality and Student Achievement

Topping, K. J., Samuels, J., & Paul, T. (in press-b). Does practice make perfect? Independent reading quantity, quality and student achievement. *Learning and Instruction*.

Full article: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

Does reading practice make perfect? Or is reading achievement related to the quality of practice as well as the quantity? To answer these questions, data on 45,670 pupils in grades 1–12 who read over 3 million books were analysed. Measures largely of quantity (engaged reading volume) and purely of quality (success in reading comprehension) showed a positive relationship with achievement gain at all levels of achievement. However, both high quantity and high quality in combination were necessary for high achievement gains, especially for older pupils. Both were weakly associated with pupil initial reading achievement, but more strongly associated with the class in which the pupil was enrolled, possibly suggesting the properties of teacher intervention in guiding independent reading were important. Implications for theory building, research and practice are explored.

## **E, I, P** 4. Independent Reading: The Relationship of Challenge, Non-Fiction and Gender to Achievement

Topping, K. J., Samuels, J., & Paul, T. (in press-c). Independent reading: The relationship of challenge, non-fiction and gender to achievement. *British Educational Research Journal*.

Full article: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

To explore whether different balances of fiction/non-fiction reading and challenge might help explain differences in reading achievement between genders, data on 45,670 pupils who independently read over 3 million books were analysed. Moderate (rather than high or low) levels of challenge were positively associated with achievement gain, but non-fiction read was generally more challenging than fiction. Non-fiction reading was negatively correlated with successful comprehension and reading achievement gain. Overall, boys appeared to read less than girls, but proportionately more non-fiction. In the upper years, boys also had lower reading achievement than girls. Differences between classes in promoting successful comprehension of non-fiction were evident, suggesting intervention could improve achievement. Implications for research and practice are explored.

## **E, I, P** 5. A Randomized Experimental Evaluation of the Impact of Accelerated Reader/Reading Renaissance Implementation on Reading Achievement in Grades 3 to 6

Nunnery, J. A., Ross, S. M., & McDonald, A. (2006). A randomized experimental evaluation of the impact of Accelerated Reader/Reading Renaissance implementation on reading achievement in grades 3 to 6. *Journal of Education for Students Placed At Risk*, 11(1), 1–18.

Summary: <http://research.renlearn.com/research/pdfs/198.pdf>

Full article: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

This randomised field experiment was designed to gauge the impact of Accelerated Reader and recommended classroom practices (formerly known as Reading Renaissance) on the reading achievement of 978 urban pupils in grades 3 to 6. Schools and teachers within schools volunteered to participate in the study, with the foreknowledge that teachers would be randomly assigned to either implement Accelerated Reader or serve as controls. A 3-level hierarchical linear model was used to estimate the impact of AR on pupil reading growth trajectories on the STAR Reading Test. Pupils in classes using AR exhibited significantly higher growth rates than those in control classes, with effect size estimates ranging from 0.07 to 0.34 across years. Quality of implementation did not predict pupil achievement growth but was correlated with a reduction in the negative effect of learning disability status.

## 6. Accelerated Reader: Understanding Reliability and Validity

Renaissance Learning. (2006). *Accelerated Reader: Understanding reliability and validity*. Wisconsin Rapids, WI: Author.

UK report: Email [info@renlearn.co.uk](mailto:info@renlearn.co.uk) to request a copy from the Renaissance Learning Research Department.

US report: <http://research.renlearn.com/research/pdfs/212.pdf>

Accelerated Reader is a reading practice and progress-monitoring system that provides feedback on the comprehension of books and other materials that pupils have read. It also tracks pupil reading over time. Currently, more than 100,000 different Accelerated Reader quizzes have been developed and are in use. This report provides reliability and validity data for Accelerated Reader quizzes. The reliability analyses use a large database of nearly 8 million quiz records. Validity is established through correlations with scores from 14 standardised reading tests and through a study that confirms that the quizzes are effective at discriminating between instances of pupils having read the book versus not having read the book. The report also includes descriptions of the purpose and intended class use of Accelerated Reader, descriptions of the types of quizzes and the processes for quiz development.

## 7. The Design of Accelerated Reader Assessments

Renaissance Learning. (2006). *The design of Accelerated Reader assessments*. Madison, WI: Author.

Full report: <http://research.renlearn.com/research/pdfs/39.pdf>

The assessments that are part of Accelerated Reader are reliable and valid, scientifically research-based and provide teachers with relevant information that can guide teaching. This paper summarises the purpose and design of Accelerated Reader quizzes, including Reading Practice, Literacy Skills, Vocabulary Practice and Other Reading quizzes. It also discusses assessment topics in general, such as the initial and ongoing development process, cheating and solutions to issues like cheating that Accelerated Reader may provide. Also covered are AR best practices for classroom implementation and evidence of the impact of AR on pupil learning.

## **E, I** 8. Evaluation of Renaissance Learning Mathematics and Reading Programs in UK Specialist and Feeder Schools

**UK**

Rudd, P., & Wade, P. (2006). *Evaluation of Renaissance Learning mathematics and reading programs in UK Specialist and feeder schools*. (Final Report). Slough, England: National Foundation for Educational Research (NFER).

Summary: <http://research.renlearn.com/research/pdfs/250.pdf>

Full report: <http://www.nfer.ac.uk/nfer/index.cfm?77A0C6B3-C29E-6E91-4137-3EA457EACEC0#study>

This study reports on an independent evaluation of the use of Accelerated Reader in UK Specialist and feeder schools. Researchers at the National Foundation for Educational Research (NFER) examined changes in school-level standardised test scores and pupil survey responses to gauge the impact of the program on reading achievement. Additionally, the researchers visited schools and conducted interviews with teachers using Accelerated Reader. In most cases, schools that implemented Accelerated Reader with higher quality and quantity experienced greater gains. The results of the standardised tests and pupil surveys for pupils using Accelerated Reader were compared to the results for pupils at carefully matched control schools. At both the Specialist treatment and control schools, test scores decreased, while scores increased at both treatment and control feeder schools. For pupils using Accelerated Reader, responses on pupil surveys indicated that fewer pupils found reading to be difficult at the end of the year, while the number of pupils interested in reading and reporting feelings of independence while reading increased. Finally, teachers using Accelerated Reader indicated that they would recommend the program to a colleague, and that they appreciated the excitement Accelerated Reader created in their pupils.

## **E, I** 9. Accelerated Reader in Specialist Schools

**UK**

Topping, K. J. (2006). *Accelerated Reader in Specialist Schools*. Dundee, Scotland: University of Dundee, Centre for Paired Learning.

Full report:

<http://www.dundee.ac.uk/eswce/research/projects/lis/download/Accelerated%20Reader%20in%20Specialist%20Schools%202.doc>

This report is parallel to Rudd and Wade (2006). The sample was Specialist Schools in the greater London area who had expressed an interest in developing reading. It included 10 schools (6 primary schools, 1 junior school, 2 high schools, and the girls' technical college). Overall, the mean gain in reading ability was statistically significant. The gains in reading score were statistically significant in 12 out of 15 classes. The average percentage correct varied. The mean was considerably below the 85 per cent minimum recommended by Renaissance Learning. The higher average percent correct (APC), the higher mean scaled score gain. APC was even more crucial if the amount of reading was small. A case study of an apparently successful school found variation even within the school.

**I, P** 10. Student Goal Orientation and Formative Assessment

Husman, J., Brem, S., & Duggan, M. A. (2005). Student goal orientation and formative assessment. *Academic Exchange Quarterly*, 9(3), 355–359.

Summary: <http://research.renlearn.com/research/pdfs/196.pdf>

Full article: <http://www.drbrm.net/renlearn/publications/AEQip.pdf>

This study examined the effect of Accelerated Reader and recommended classroom practices on the target orientations of 239 pupils in grades 3 through 6 at an urban primary school. Thirty-six per cent of the student body qualified for free school meals, and 24 per cent of the pupils came from a minority background. Researchers used the Patterns of Adaptive Learning Scales (adapted) to measure both the target orientation of the pupils, as well as how the pupils perceived their teachers' target orientations. The results of the study indicated that pupils using AR were less performance oriented (both performance-approach and performance-avoid) by the end of the year, while mastery target orientation ("learning for the sake of learning") remained consistently high. The researchers also found that pupils who perceived the targets of their teachers as being performance-approach or -avoid oriented tended to hold similar personal targets. When teachers were perceived as holding mastery-oriented targets, the pupils themselves tended to be both more mastery oriented and more performance oriented, possibly due to pupils' inability to differentiate between trying to learn and trying to get a high score in response to their teacher's encouragement to just try.

**E, I** 11. The Effect of School Renaissance on Student Achievement in Two Mississippi School Districts

Ross, S. M., & Nunnery, J. A. (2005). *The effect of School Renaissance on student achievement in two Mississippi school districts*. Memphis, TN: University of Memphis, Center for Research in Educational Policy.

Full report: [http://crep.memphis.edu/web/research/pub/Mississippi\\_School\\_Renaissance\\_FINAL\\_4.pdf](http://crep.memphis.edu/web/research/pub/Mississippi_School_Renaissance_FINAL_4.pdf)

This report summarises the results of the 1st year of a 2-year study that was designed to evaluate the pupil achievement and organizational climate at 23 schools implementing Accelerated Reader and Accelerated Math (as part of a school reform model called School Renaissance), which includes training and strategies for class implementation. The researchers compared these schools with 18 control schools that were carefully matched based on the size of their pupil populations, location (rural, urban, etc.), years served, prior Mississippi Curriculum Test (MCT) score averages, percentage of minority pupils and the percentage of economically disadvantaged pupils. An additional criterion for control schools was that they have no usage, or very limited usage, of Accelerated Reader or Accelerated Math. To determine the effectiveness of Accelerated Reader and Accelerated Math, the researchers utilised 2003 MCT data for reading, language arts and mathematics (grades 3–8), as well as Mississippi Writing Assessment data (grades 4, 7) from more than 10,000 pupils (both treatment and control). Results favouring Accelerated Reader and Accelerated Math were found for reading subtests in grades 4–8 (mean effect size 0.11), for language arts in grades 3 and 5–8 (mean effect size 0.12), for maths in grades 6 and 7 (effect sizes of 0.22 and 0.27, respectively) and for writing in grade 4 (effect size 0.45). The researchers also found that the organisational climates reported by Accelerated Reader and Accelerated Math teachers were significantly more favourable than those reported by control teachers on all 7 dimensions of the School Climate Inventory, with effect sizes ranging from 0.20 to 0.54.

### **1** 12. Testing the Reading Renaissance Program Theory: A Multilevel Analysis of Student and Classroom Effects on Reading Achievement

Borman, G. D., & Dowling, N. M. (2004). *Testing the Reading Renaissance program theory: A multilevel analysis of student and classroom effects on reading achievement*. Unpublished manuscript, University of Wisconsin–Madison.

Summary: <http://research.renlearn.com/research/pdfs/180.pdf>

Full report: <http://www.education.wisc.edu/elpa/people/faculty/Borman/BormanDowling2004.pdf>

The authors of this independent analysis of data from the Reading Practice Database applied a 2-level hierarchical linear model. Pupils were nested within Accelerated Reader classrooms to assess the relationships between pupils' individual reading behaviours and achievement, and the relationship between class-level implementation of AR and recommended classroom practices and its overall and compensatory effects on achievement outcomes. The analyses distinguished between pupil-level and class-level effects of a greater amount of reading, a high reading success rate and use of reading material that is appropriately matched to pupils' abilities. Results showed that even after using rigorous statistical controls for the pupils' initial reading ability levels, their reading success rate and their reading challenge level, the amount of text that a lower or middle school child reads was a key predictor of his or her literacy development over the school year. Additionally, a high success rate (as measured by average percentage correct on Accelerated Reader quizzes) over the course of the school year predicted better outcomes at the end of the year. In addition, pupils reading at levels above their initial optimum zone of proximal development (ZPD) had better outcomes. These two findings suggest that if pupils' success rates are not suffering, teachers should modify their plans and assign material to pupils that are above their apparent baseline ability. In the lower years, Accelerated Reader classes taught by teachers that effectively encouraged a greater overall amount of guided independent reading showed statistically significant improvements in the overall achievement level of the pupils in that class. In the middle and upper years, those teachers who promoted a greater overall reading success rate within their classes realised improved posttest outcomes. Beyond these results, there were additional statistically significant positive effects for lower and middle year classes taught by educators who attained Renaissance Learning Master Certification.



**E 13. Guided Independent Reading: An Examination of the Reading Practice Database and the Scientific Research Supporting Guided Independent Reading as Implemented in Reading Renaissance**

Paul, T. D. (2003). *Guided independent reading: An examination of the Reading Practice Database and the scientific research supporting guided independent reading as implemented in Reading Renaissance*. Madison, WI: Renaissance Learning, Inc.

UK Summary: Email [info@renlearn.co.uk](mailto:info@renlearn.co.uk) to request a copy from the Renaissance Learning Research Department.

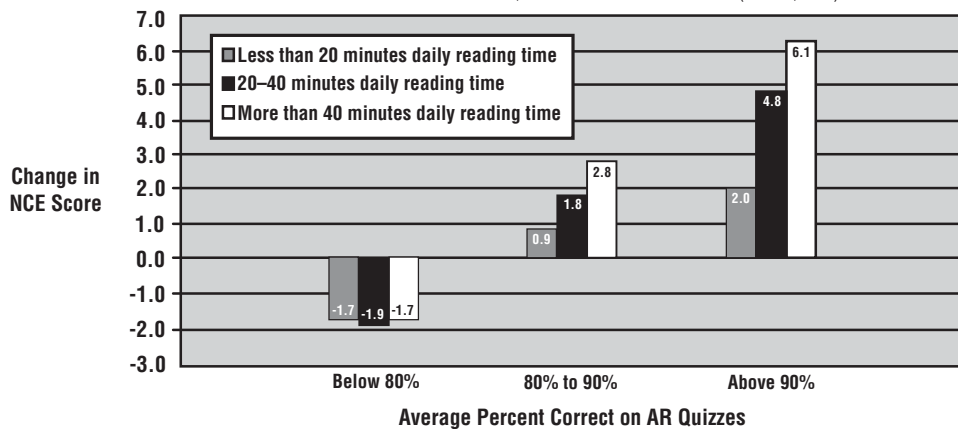
US Summary: <http://research.renlearn.com/research/pdfs/172.pdf>

Full report: <http://research.renlearn.com/research/pdfs/165.pdf>

This study of 50,823 pupils in grades 1–12 who used Accelerated Reader during the 2001–2002 school year provided strong support for the effectiveness of guided independent reading. The study showed that increased time spent reading led to gains in reading achievement for all pupils regardless of prior ability. Furthermore, increased engaged reading time combined with high levels of comprehension (as measured by high average percentage correct on Accelerated Reader quizzes) was associated with accelerated reading growth in all pupils. In the primary years, this could also close the reading gap between high- and low-achieving pupils. Regression analysis revealed that the single most important factor influencing both time spent reading and average percentage correct was a pupil’s teacher, not prior achievement. Second- through 8th-grade pupils in Renaissance Learning Model- and Master-certified classrooms (which have educators who adhere to the principles of Accelerated Reader) consistently outperformed pupils in non-certified classrooms (Cohen’s  $d = 0.49$ ) and low-implementing classrooms (Cohen’s  $d = 1.04$ ).

**Impact of Guided Independent Reading and Average Percent Correct**

2001–2002 School Year, Grades 2–12 Combined (N=45,670)



## 14. The Research Foundation for Accelerated Reader Goal-Setting Practices

Renaissance Learning. (2003). *The research foundation for Accelerated Reader goal-setting practices*. Madison, WI: Author.

Full report: <http://research.renlearn.com/research/pdfs/162.pdf>

The Target-Setting Chart assists educators in establishing appropriate targets for their pupils. The chart helps educators set individual targets for percentage correct on Accelerated Reader Reading Practice Quizzes, quantity of AR points earned and book-level ranges. The guidelines for setting individual and classroom targets are supported by research and have been validated empirically. When combined with educators' professional judgment, they help ensure the best outcomes for pupils. This paper summarises the research supporting the guidelines for each type of target-setting. Findings include: 1) Research shows that high levels of success in academic tasks lead to improved educational outcomes. Consistent with this research and Renaissance Learning's research, it is recommended that pupils average 85 per cent correct or higher on their AR Reading Practice Quizzes. 2) The Target-Setting Chart includes suggested zone of proximal development (ZPD) ranges. The ZPD (book-level) ranges in the target-setting chart have been validated based on the actual reading of more than 20,000 pupils. 3) AR points are a measure of academic learning time—the amount of time in which a pupil is successfully engaged in activities related to valued educational outcomes. The Target-Setting Chart shows the number of points pupils should be expected to earn based on their reading ability and the amount of time they spend reading. The point targets are consistent both with independent studies of pupils' reading rates and with Renaissance Learning internal research.

## **E, I, P** 15. Computerised Formative Assessment of Reading Comprehension: Field Trials in the UK



Topping, K. J., & Fisher, A. M. (2003). Computerised formative assessment of reading comprehension: Field trials in the UK. *Journal of Research in Reading*, 6(3), 267–279.

Summary: <http://research.renlearn.com/research/pdfs/92.pdf>

Full article: Email [info@renlearn.co.uk](mailto:info@renlearn.co.uk) to request a copy from the Renaissance Learning Research Department.

Increased curriculum time allocated to reading might not be effective in raising achievement. Teachers need to closely monitor and manage both the quality and quantity of individualised reading of all their pupils for optimal effectiveness. "Learning Information Systems" (LIS) for reading such as Accelerated Reader enable this through individualised computerised assessment of pupil comprehension of "real books," with feedback to both pupil and teacher. This study explored the impact of AR on reading achievement in 13 schools of different types spread across the UK, the majority socio-economically disadvantaged. Participating pupils were aged 7–14 years. Pre–post norm-referenced gains in reading achievement were measured by group, paper-based reading tests and a computer-based adaptive reading test. The implementation integrity of AR was assessed through direct observation by researchers and through data generated by the program itself. On both paper- and computer-based reading tests, on aggregate, pupils in the 13 schools gained in reading at abnormally high and statistically significant rates. Boys tended to show larger gains than girls on the paper test. However, implementation integrity was very variable. In particular, some teachers failed to intervene in response to AR data indicating that pupils were reading ineffectively. AR appears to have potential for raising reading achievement when it is implemented appropriately.

## **I** 16. Accelerated Reader: UK Pilot 1999–2000

UK

Topping, K. J., & Fisher, A. M. (2001). *Accelerated Reader: UK pilot 1999–2000*. (Summary Report). Dundee, Scotland: University of Dundee, Centre for Paired Learning.

Full report: Email [info@renlearn.co.uk](mailto:info@renlearn.co.uk) to request a copy from the Renaissance Learning Research Department.

Researchers at the Centre for Paired Learning at the University of Dundee, Scotland, investigated the impact of Accelerated Reader, a computer-assisted assessment of reading comprehension, on reading achievement in more than a dozen UK schools. The study sample consisted of schools representing diverse geographic and economic areas of the UK, as well as a wide age range of pupils (ages 7–14). Pupils were pre- and posttested with 2 different group-administered tests of reading achievement, normed in the UK; as well as pre-, mid-, and posttested with the STAR Reading test, normed in the US. Taken as a whole, pupils using Accelerated Reader experienced significant gains on both the UK tests and the STAR Reading assessment. To examine the impact of level of Accelerated Reader implementation, 4 schools with low or very low implementations were excluded from a secondary analysis. When the scores for the 9 better-implementing schools were analysed separately, the researcher found that pre–post changes remained significant on all measures, and that the average gains on the UK tests increased nearly 60 per cent. The researchers were also interested in examining change scores separately by gender, and found that males and females using Accelerated Reader experienced significant pre–post gains on both the UK and STAR Reading tests.

## **I** 17. Inspection Report: Godmanchester Primary School, UK

UK

The Office for Standards in Education (OFSTED). (2000). *Inspection Report: Godmanchester Primary School, UK* (Unique Reference No. 110677). London: Author.

Full report: <http://www.ofsted.gov.uk/reports/110/110677.pdf>

The report found that use of Accelerated Reader motivated pupils, encouraged independent work and fostered interest in a wide range of literature.

# ACCELERATED READER

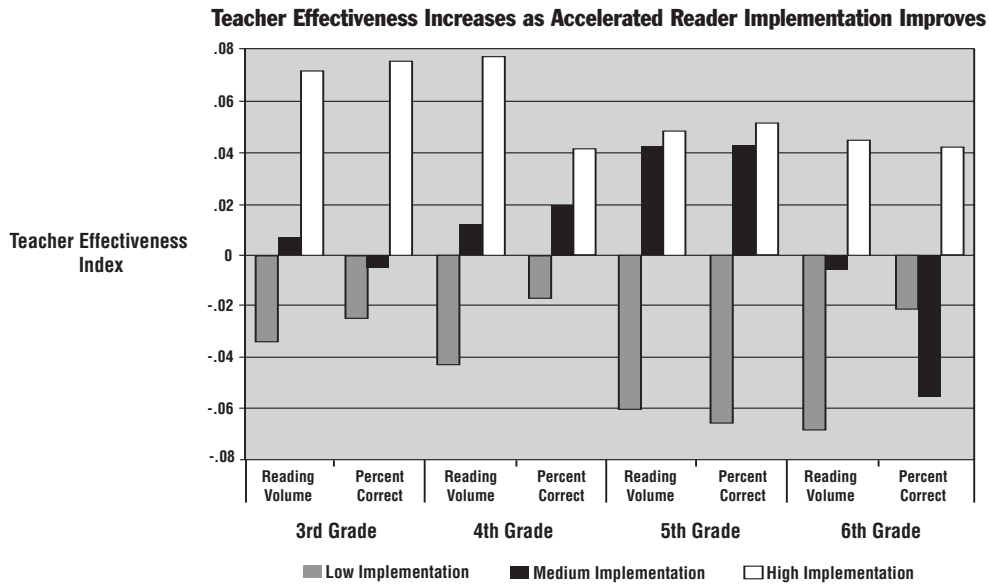
## E, I, P 18. Teacher Effectiveness and Computer Assessment of Reading: Relating Value-Added and Learning Information Systems Data

Topping, K. J., & Sanders, W. L. (2000). Teacher effectiveness and computer assessment of reading: Relating value-added and learning information systems data. *School Effectiveness and School Improvement, 11*(3), 305–337.

Summary: <http://research.renlearn.com/research/pdfs/19.pdf>

Full article: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

Accelerated Reader and Tennessee Value Added Assessment System (TVAAS) data were collected from nearly 63,000 Tennessee pupils, grades 2 through 8, during the 1996–1997 school year. Analysis showed that both pupil reading volume and percentage correct on Accelerated Reader quizzes had a positive impact on teacher effectiveness as measured by TVAAS. In particular, the recommended 85 per cent correct level for Accelerated Reader quizzes and the zone of proximal development (ZPD) principle taught with AR recommended practices, were confirmed in this study. Furthermore, teachers completing recommended practices training were significantly more effective than control teachers who had not completed training. Renaissance-certified Model Classrooms in reading also showed higher effectiveness than non-certified classrooms in 4th and 5th grades.



**I** 19. Formative Assessment of Reading Comprehension by Computer

Topping, K. J. (1999). Formative assessment of reading comprehension by computer. *Reading OnLine (I.R.A.)*.

Available online from <http://www.readingonline.org/critical/topping/>

This multimedia review sought to consider the advantages and disadvantages of the Accelerated Reader LIS, and the evidence for its effectiveness. The full text is freely available by clicking the address above. The conclusions are given below:

Of 12 studies of AR that cite substantial outcome data, mostly on norm-referenced test scores, only 1 failed to find evidence of a positive impact. However, these studies are of mixed quality, with many failing to control confounding variables or to provide data on implementation integrity; they are consequently unable to be definitive about causal direction. However, more recent studies suggest that, with good quality implementation, the AR program can contribute to teacher effectiveness, in terms of value added in reading and other core curricular areas. In short, it is not whether you have the software but rather what you do with it that makes a difference.

The characteristics of good and poor implementation were outlined, together with the potential advantages and disadvantages of the program. Whatever its advantages, AR is not a substitute for balanced reading teaching. Rather, it is intended as a supplementary and complementary resource—albeit a powerful one under the right circumstances—that can help the teacher deliver the curriculum effectively.

These conclusions have implications for guidelines on literacy teaching that aim to raise teacher effectiveness and standards of achievement. Placing intelligent software in classrooms does not guarantee it will be used intelligently. Information technology is not a replacement for the teaching professional, but a tool with the potential to enhance teacher effectiveness. In the case of AR, as for other Learning Information Systems, appropriate and sufficient high-quality training and support for teachers are needed if implementation integrity is to be sustained at the level necessary to raise pupil attainment.

**E, I, P** 20. Computerized Self-Assessment of Reading Comprehension With the Accelerated Reader: Action Research**UK**

Vollands, S. R., Topping, K. J., & Evans, H. M. (1999). Computerized self-assessment of reading comprehension with the Accelerated Reader: Action research. *Reading and Writing Quarterly*, 15(3), 197–211.

Summary: <http://research.renlearn.com/research/pdfs/17.pdf>

Full article: Email [info@renlearn.co.uk](mailto:info@renlearn.co.uk) to request a copy from the Renaissance Learning Research Department.

This study was a quasi-experimental action research evaluation of a program for computerised self-assessment of reading comprehension (the Accelerated Reader). It looked at the formative effects on reading achievement and motivation in 2 schools in severely socio-economically disadvantaged areas. The results suggested that the program, even when less than fully implemented, yielded gains in reading achievement for these at-risk readers that were superior to gains from regular class teaching and an alternative intensive method, even with less time devoted to class silent reading practise than in comparison classes. Additionally, the program yielded significant improvement in measured attitudes to reading for girls.

## ACCELERATED READER SUCCESS STORIES

### 21. 100% Increase in Book Borrowing: Balerno High School, Edinburgh

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_balerno\\_high\\_school\\_edinburgh.pdf](http://www.renaissance-learning.co.uk/pdf/cs_balerno_high_school_edinburgh.pdf)

"The cultural change among teachers is in some ways even more significant. For some, seeing the power of a new focus on reading practice has been a 'road-to-Damascus' experience. They are total advocates for this system and are pushing for more reading practice, and on ways to involve parents." -*Clare Duncan, librarian*

### 22. Changing the Attitudes and Behaviour of Difficult Pupils One Book at a Time: Barrs Hill School, Coventry

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_barrs\\_hill\\_coventry.pdf](http://www.renaissance-learning.co.uk/pdf/cs_barrs_hill_coventry.pdf)

"I believe many pupils remember the stress of first learning to read in primary school, and it puts them off going any further. What they need is some positive reinforcement. When we praise them, they do not always believe us—however, if the computer says they're good, they believe it must be true!" -*Janet Oliver, learning resource manager*

### 23. Has Stimulated Children to the Point Where They Have Developed a Genuine Love of Reading: Boothville Primary School, Northampton

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_boothville\\_primary\\_northampton.pdf](http://www.renaissance-learning.co.uk/pdf/cs_boothville_primary_northampton.pdf)

Accelerated Reader has kept the pupils really fixed on the task. "I think we would have struggled to be sure of getting to the position where this level of motivation was possible, without this method." -*Andy Elyard, teacher*

### 24. The Program Has Proved Itself Many Times Over, in a Very Short Space of Time: Bressay Primary, Shetlands

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_bressay\\_primary\\_shetlands.pdf](http://www.renaissance-learning.co.uk/pdf/cs_bressay_primary_shetlands.pdf)

Pupils were "falling over themselves" to discuss books, not just in class but outside lesson time—and clearly at home, too, judging by the amount of feedback from parents happy to contact the school and express their amazement at their children's progress.

### 25. Reports and Results Bring Certainty to Reading Practice and Progress: Carr Hill High School, Lancashire

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_carr\\_hill\\_high\\_school\\_lancashire.pdf](http://www.renaissance-learning.co.uk/pdf/cs_carr_hill_high_school_lancashire.pdf)

Real measurement data was a principal outcome for many of the staff, who found that the structured results and reports removed the guesswork and uncertainty about reading practice and progress. "When a pupil says they have read the book and have understood it, staff have little concrete data to back this up, without Accelerated Reader."

### 26. Parents Truly Amazed by the Amount of Time Their Children Spend Reading at Home: Carradale Primary, Argyle

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_carradale\\_primary\\_argyll.pdf](http://www.renaissance-learning.co.uk/pdf/cs_carradale_primary_argyll.pdf)

Within months of its introduction, Accelerated Reader had stimulated such a motivational surge that head teacher Marion Morris called a special parents' evening to explain how effective it was proving to be and how well their youngsters were doing.

## 27. Developing a Good Reading Habit: Chatham Grammar School for Girls, Kent

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_chatham\\_grammar\\_school\\_for\\_girls\\_kent.pdf](http://www.renaissance-learning.co.uk/pdf/cs_chatham_grammar_school_for_girls_kent.pdf)

"It has certainly been successful enough for me to want to carry on and I would happily recommend it to other schools." -*Diane White, English teacher*

## 28. Constant Requests for More Books: Churchgate C.E. Primary, Harlow

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_churchgate\\_primary\\_harlow.pdf](http://www.renaissance-learning.co.uk/pdf/cs_churchgate_primary_harlow.pdf)

Now boys and girls alike can be heard comparing notes on what they've read and recommending books to one another. They corner members of staff to tell them how many books they've read, and are constantly demanding new books in the classroom.

## 29. Library is Overflowing at Lunchtime: City of London Academy

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_city\\_of\\_london\\_academy\\_london.pdf](http://www.renaissance-learning.co.uk/pdf/cs_city_of_london_academy_london.pdf)

"It has definitely created a buzz around the school. Boys in particular, have got much more involved than we expected, and I think it's the competitive element that has prompted them. If you look at the results board, there are a lot of boys' names towards the top of the list." -*Greg John, English teacher*

## 30. Very Successful With Special Needs Children: The Colleton Primary School, Twyford

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_the\\_colleton\\_primary\\_twyford.pdf](http://www.renaissance-learning.co.uk/pdf/cs_the_colleton_primary_twyford.pdf)

"They enjoy being able to choose their own books—we mark the appropriate range in the library with a gold band—and doing the quizzes, but most of all they like being able to do the same work as everyone else. It has definitely helped their reading." *Shirley Gibson, deputy head*

## 31. Encourages Children to Read Books of Their Own Choosing to Suit Their Ability: Coulter Primary School, S. Lanarkshire

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_coulter\\_primary\\_s\\_lanarkshire.pdf](http://www.renaissance-learning.co.uk/pdf/cs_coulter_primary_s_lanarkshire.pdf)

In the 2 years since it was introduced, virtually all the children who have used Accelerated Reader have made significant progress—with one 9-year-old found to have a reading age of 13.

## 32. Has Changed Class Restlessness to Silent Reading: Crossroads Primary, Keith, Banffshire

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_crossroads\\_primary\\_keith.pdf](http://www.renaissance-learning.co.uk/pdf/cs_crossroads_primary_keith.pdf)

A handful of exceptionally motivated pupils are so eager to complete their online tests that they come into school half an hour early, but even the former "skimmers" always seem to have a book open in front of them.

## 33. It Produces a Great Sense of Achievement and Satisfaction: Daisyfield Primary, Blackburn

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_daisyfield\\_primary\\_blackburn.pdf](http://www.renaissance-learning.co.uk/pdf/cs_daisyfield_primary_blackburn.pdf)

The children in Steve's class are so keen to read and to progress to more involving stories that they will seek every opportunity to open a book, either in spare time in class or in their own breaks.

## ACCELERATED READER SUCCESS STORIES

### 34. Children Have Become Thoroughly Immersed in the Program: Dallas Primary School, Moray

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_dallas\\_primary\\_moray.pdf](http://www.renaissance-learning.co.uk/pdf/cs_dallas_primary_moray.pdf)

"I would never have any hesitation in recommending Accelerated Reader as a program that is worth every penny and every ounce of effort." -*Arlene Wilson, head teacher*

### 35. Encourages Them to Read the Books Properly: Denny High School, Falkirk

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_denny\\_high\\_school\\_falkirk.pdf](http://www.renaissance-learning.co.uk/pdf/cs_denny_high_school_falkirk.pdf)

"One of our second years was a total non-reader, and was convinced he could not read. He's now getting nine out of ten in quizzes, and his confidence has soared." -*Fiona MacDougall, librarian*

### 36. Results Show Steady Upward Climb in Ability: Doon Academy, Ayrshire

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_doon\\_academy\\_ayrshire.pdf](http://www.renaissance-learning.co.uk/pdf/cs_doon_academy_ayrshire.pdf)

"The figures showed a clear and steady upward climb in ability. It was the proof of what we already knew, that the system was giving us positive results, and it was quite uplifting." -*Kirsten Bax, librarian*

### 37. Lure of the Computer Motivates Children: Geoffrey Chaucer Technology College, Southwark

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_geoffrey\\_chaucer\\_technology\\_college\\_southwark.pdf](http://www.renaissance-learning.co.uk/pdf/cs_geoffrey_chaucer_technology_college_southwark.pdf)

"Looking back over the first year of using Accelerated Reader, girls are easier to encourage reading. It can be harder to interest boys in reading, but they will do anything to get their hands on a computer." -*Jeanne Lockwood, librarian*

### 38. Competitiveness is a Great Motivator: Girvan Academy, Ayrshire

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_girvan\\_academy\\_ayrshire.pdf](http://www.renaissance-learning.co.uk/pdf/cs_girvan_academy_ayrshire.pdf)

"The level of book they are taking is also indicative of their progress. Some groups used to take the easiest book they thought they could get away with—but not now. They are going for books in their own range, which is what we wanted to achieve." -*Carol Morrison, librarian*

### 39. Marked Increase in Enthusiasm With Reluctant Readers; Boys in Particular: Hazelbury Junior School, London

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_hazelbury\\_junior\\_london.pdf](http://www.renaissance-learning.co.uk/pdf/cs_hazelbury_junior_london.pdf)

According to Zeenat Hussain, confidence and interest is rising, and she expects far better SATS results in the future on reading levels. She is convinced that reading ages will improve, just as she has seen happen with other schools.

### 40. Astonished to Find So Many Gaps on Library Shelves: Heathcote School, Chelmsford

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_heathcote\\_school\\_chelmsford.pdf](http://www.renaissance-learning.co.uk/pdf/cs_heathcote_school_chelmsford.pdf)

Success has also been noticed by parents, one of whom states, "I do not know what you've done to her but she will not stop reading. It's not normal, she usually will not pick up a book."



### 41. Makes Library Time More Meaningful and Helps Teacher to Personalise Learning: Hilbre High School, Merseyside

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_hilbre\\_high\\_school\\_merseyside.pdf](http://www.renaissance-learning.co.uk/pdf/cs_hilbre_high_school_merseyside.pdf)

"The children have enjoyed it as they get structure for their library time. The quizzes provide opportunities for rewards, which creates incentives to try harder. It is making library time more meaningful and helping teachers to personalise learning, matching pupils to books suited to their needs." -*Jane Scott, learning resource manager*

### 42. Fool-Proof Way of Measuring Comprehension: Hockerhill Anglo-European College, Bishops Stortford

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_hockerill\\_college\\_bishops\\_stortford.pdf](http://www.renaissance-learning.co.uk/pdf/cs_hockerill_college_bishops_stortford.pdf)

This increased interest in reading has led to noticeable improvements in pupils' reading and comprehension skills. Teachers have found it easy to link the system with class reading, and keep track of each individual's progress.

### 43. Instant Results Give Immediate Positive Boost and Motivator to Do Better: Holmesdale Technology College, Snodland

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_holmesdale\\_tech\\_college\\_snodland.pdf](http://www.renaissance-learning.co.uk/pdf/cs_holmesdale_tech_college_snodland.pdf)

"There is no question Accelerated Reader has brought about a notable raising of standards. Its success springs from the fact that it makes reading positively enjoyable. Children actually want to read, which these days is quite extraordinary."

### 44. Reading Ages Are Going Up, Particularly for Those Who Use to Struggle: Knockando Primary School, Moray

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_knockando\\_primary\\_moray.pdf](http://www.renaissance-learning.co.uk/pdf/cs_knockando_primary_moray.pdf)

"The children loved it from the start. They like to do the quizzes and get points. When they see someone else doing a quiz, they start to get a little competitive, especially the boys, and want to do the same thing themselves." -*Lindsay Scott, head teacher*

### 45. Major Improvement in NFER Test Scores: Lavant House, Chichester

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_lavant\\_house\\_chichester.pdf](http://www.renaissance-learning.co.uk/pdf/cs_lavant_house_chichester.pdf)

Head of Juniors Meg Gardner is "absolutely delighted" with the results. "We get a lot of new things in school, and while we're always willing to have a go, sometimes it's more in hope than expectation. But this has returned much more than we would have expected."

### 46. Able to Measure and Keep Track More Closely: The Meadows Primary School, Oswestry

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_the\\_meadows\\_primary\\_ostwestry.pdf](http://www.renaissance-learning.co.uk/pdf/cs_the_meadows_primary_ostwestry.pdf)

"Setting challenges has been very useful for assessment, showing us there's been a real boom in reading in the lower KS2 classes, which have particularly improved. This gave us the confidence to focus later in the year on average comprehension accuracy of 85 per cent across the school." -*Di Rogers, deputy head*

## ACCELERATED READER SUCCESS STORIES

### 47. The Structure of the Program Helps the Children Obtain a Purpose to Their Reading: Rimbleton Primary School, Glenrothes

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_rimbleton\\_primary\\_glenrothes.pdf](http://www.renaissance-learning.co.uk/pdf/cs_rimbleton_primary_glenrothes.pdf)

The children themselves like the reading program, and have become very knowledgeable about how it works. They understand that it is designed to encourage them to read more books more often, know their target ranges and constantly monitor their own progress.

### 48. The Children Now Read Lots of Different Kinds of Books, Including Non-Fiction: Rockfield Primary, Argyll

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_rockfield\\_primary\\_argyll.pdf](http://www.renaissance-learning.co.uk/pdf/cs_rockfield_primary_argyll.pdf)

Rockfield has had a visit from a Quality Improvement Officer since the HM Inspectors report, and Deputy Head Sylvia Clark was delighted to find that the school's work to improve interest and attainment in reading was found to be going in the right direction.

### 49. Accelerated Reader Creates a New Reader, and an Enthusiastic Reader: Ross High School, East Lothian

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_ross\\_high\\_school\\_lothian.pdf](http://www.renaissance-learning.co.uk/pdf/cs_ross_high_school_lothian.pdf)

"Close scrutiny of pupil reading strengths is possible with Accelerated Reader. The quizzes are in depth and well targeted—they're also hard to bluff your way through."

### 50. Helps Create a Buzz Around Reading and Has Improved the Way We Track Progress: Rush Green Junior School, Romford

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_rush\\_green\\_junior\\_romford.pdf](http://www.renaissance-learning.co.uk/pdf/cs_rush_green_junior_romford.pdf)

Speed and certainty is the main outcome for this school. The critical task of measuring reading skills on a regular basis has fallen from 5 weeks to a few days, for the entire school. Tracking can now be done "comfortably" every half term, and done better.

### 51. Accelerated Reader Is a Winner: St. Johns Senior School, Enfield

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_st\\_johns\\_senior\\_school\\_enfield.pdf](http://www.renaissance-learning.co.uk/pdf/cs_st_johns_senior_school_enfield.pdf)

"Today TV and computer games are big time! Both exercise a truly major influence in our children's lives and getting many of them to read is so difficult. Now the computer software developed by Renaissance Learning has come to the rescue!" -*Andrew Tardios, headmaster*

### 52. Accelerated Reader Takes Over From Gameboys: St. Margaret's Primary School, Roxburghshire

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_st\\_margarets\\_primary\\_roxburghshire.pdf](http://www.renaissance-learning.co.uk/pdf/cs_st_margarets_primary_roxburghshire.pdf)

"After the program had been running for a month or so the 'Read a book time' developed into a far more significant time of the day for the pupils than it had ever been before. Pupils began to 'count down' from other lessons so that could be sure they started their RAB time right on schedule." -*Mr Boyle, head teacher*

### 53. Reading Levels Improve Remarkably: St. Treas, County Derry

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_st\\_treas\\_county\\_derry.pdf](http://www.renaissance-learning.co.uk/pdf/cs_st_treas_county_derry.pdf)

The school has seen reading levels improve remarkably, particularly those with reading ages 2 years beneath the norm. "They have closed the 2 year gap within just a year and I can prove that." -*Kevin Devlin*

### 54. Sandilands Junior Continue to Raise Standards in Literacy: Sandilands Junior School, Manchester

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_sandilands\\_junior\\_school\\_manchester.pdf](http://www.renaissance-learning.co.uk/pdf/cs_sandilands_junior_school_manchester.pdf)

"Accelerated Reader has kick-started reading at Sandilands and has helped break down barriers in communication, between home and school!" -*Paul Vale, former AST*

### 55. Create a Reading Frenzy: Sir William Burrough Primary School, London

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_sir\\_william\\_burrough\\_primary\\_london.pdf](http://www.renaissance-learning.co.uk/pdf/cs_sir_william_burrough_primary_london.pdf)

"Accelerated Reader, our popular computerised reading system, tests, tracks and records reading progress and gets girls and boys hooked on books! As a result, we have narrowed the large gender gap in performance from 54 per cent to 17 per cent in the KS2 English SATs." -*Avril Newman, head teacher*

### 56. Stops Children From Skimming Books, They Read Them Properly Now: Sound Primary, Lerwick, The Shetlands

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_sound\\_primary\\_lerwick\\_the\\_shetlands.pdf](http://www.renaissance-learning.co.uk/pdf/cs_sound_primary_lerwick_the_shetlands.pdf)

Creative writing skills have spiralled upwards at the same time, as pupils' advanced spellings and vocabulary skills open up their horizons and deepen their confidence.

### 57. Biggest Help Is Easily Determining Where Pupils Are Having Problems: Stoberry Park Primary School, Wells

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_stoberry\\_park\\_primary\\_wells.pdf](http://www.renaissance-learning.co.uk/pdf/cs_stoberry_park_primary_wells.pdf)

"Its biggest help to us is in showing problems where pupils can read the words but do not understand what they're reading."

### 58. Builds a Reading Culture Where Children Can't Help but Get Hooked: Stukeley Meadows Community Primary School, Huntingdon

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_stukeley\\_meadows\\_primary\\_huntingdon.pdf](http://www.renaissance-learning.co.uk/pdf/cs_stukeley_meadows_primary_huntingdon.pdf)

Accelerated Reader has motivated boys to engage in books knowing they will have to answer a question on them, which in turn has prompted them to think about the books.

### 59. Makes Assessing the Pupils Easier for Teachers: Tingwall Primary School, Shetland

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_tingwall\\_primary\\_shetland.pdf](http://www.renaissance-learning.co.uk/pdf/cs_tingwall_primary_shetland.pdf)

Using Accelerated Reader takes place against a backdrop of other endeavours Tingwall undertakes to encourage reading. One of these projects has been to encourage pupils to write their own kinds of books then stage a mock book launch.

### 60. Kirkcaldy Kids in Reading Frenzy: Valley Primary School, Kirkcaldy

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_valley\\_primary\\_kirkcaldy.pdf](http://www.renaissance-learning.co.uk/pdf/cs_valley_primary_kirkcaldy.pdf)

"The use of Accelerated Reader, which combines computer technology with reading assessment, has motivated pupils to increase the number of books they are reading while encouraging them to remember and recount significant details. Our pupils' increased enthusiasm for reading is evident to all." -*Lorna Palmer, assistant head teacher*

## ACCELERATED READER SUCCESS STORIES

### 61. Accelerated Reader Helps Pupils With Behavioural Problems: Victoria Road School, Aberdeen

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_victoria\\_road\\_aberdeen.pdf](http://www.renaissance-learning.co.uk/pdf/cs_victoria_road_aberdeen.pdf)

"Accelerated Reader has simplified my mornings in that the children come in, read books and take tests on the computer with minimal input from me. With a few clicks of my mouse button, I can get information about each pupil that would have been time-consuming and difficult to amass manually." -*Dave Gibson, teacher*

### 62. Pupils Have Achieved Two Years' Improvement in One Year: Walnut Tree Walk Primary School, London

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_walnut\\_tree\\_primary\\_london.pdf](http://www.renaissance-learning.co.uk/pdf/cs_walnut_tree_primary_london.pdf)

Using SATS results as a yardstick, pupils have achieved 2 years' improvement in 1 year and teachers report that interest in literature has rocketed, with turnover of books in the school library described as little short of remarkable.

### 63. Success Means Widening the Program Throughout the Entire School: Warblington School, Havant

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_warblington\\_school\\_havant.pdf](http://www.renaissance-learning.co.uk/pdf/cs_warblington_school_havant.pdf)

"It clearly shows how effective the program is in accelerating the rate at which children not only enhance reading ability but comprehension and retention." -*Julie Rose, head teacher*

### 64. Notable Progress in Vocabulary, Spelling and Comprehension: Wennington Hall School, Lancaster

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_wennington\\_hall\\_lancaster.pdf](http://www.renaissance-learning.co.uk/pdf/cs_wennington_hall_lancaster.pdf)

Vocabulary, spelling and comprehension have all seen notable progress, as has the confidence that comes from encouraging boys to read aloud in class and take part in open discussion—which has had the knock-on effect of improving behaviour and self-belief.

### 65. Caters for Everyone From Reluctant Readers to Stronger Readers: Ysgol Gynradd Bro Cernyw Primary School, Conwy

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_ysgol\\_gynradd\\_bro\\_cernwy\\_primary\\_conwy.pdf](http://www.renaissance-learning.co.uk/pdf/cs_ysgol_gynradd_bro_cernwy_primary_conwy.pdf)

According to Deputy Head Teacher Rhodri Evans, the system is powerful because it lets pupils all work at their own level, caters for everyone from reluctant readers to stronger readers, allows each pupil to achieve some success and so steadily raise their confidence with no loss of face among peers.

## IV. MATHEMATICS RESEARCH

**Accelerated Maths** software produces daily, personalised maths practice assignments for pupils and helps teachers manage their classrooms by scoring completed assignments, keeping records of pupils' work and providing immediate results and progress-monitoring information each day.

As of May 2007, more than 60 research studies support the effectiveness of Accelerated Maths. This section summarises Accelerated Maths research from the UK and Europe, as well as some recent US-based studies.

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### Renaissance Learning Research Library

To access the Renaissance Learning Research Library in its entirety, please visit <http://research.renlearn.com/>, where you may search the collection by topic, state/country, year level, demographic information and type of research. Web addresses for research studies summarised on the following pages are provided after each citation, or an email address is provided in the event an electronic version is unavailable.

**E, I, P** 66. **The Effects of Accelerated Reader and Accelerated Math on Student Achievement in Reading and Mathematics**

Nunnery, J. A., & Ross, S. M. (in press). The effects of the School Renaissance program on student achievement in reading and mathematics. *Research in the Schools*.

Article is based on this report: [http://crep.memphis.edu/web/research/pub/McKinney\\_Renaissance\\_CR\\_09-09-03.pdf](http://crep.memphis.edu/web/research/pub/McKinney_Renaissance_CR_09-09-03.pdf)

This retrospective, quasi-experimental, longitudinal study compares pupil achievement as measured by the Texas Assessment of Academic Skills (TAAS) and Texas Learning Index (TLI) between 11 primary and middle schools using Renaissance Learning progress-monitoring tools and matched controls. Nine primary and 2 middle schools in the McKinney Independent School District implemented Accelerated Reader over a 5-year period. Accelerated Math was implemented for the last year of the study district wide, but was piloted in some schools the previous year. The comparison schools were selected from the Texas Education Agency's list of comparable schools for each McKinney school based on prior use of Renaissance Learning progress-monitoring systems, accountability rating and percentage of economically disadvantaged pupils. Results indicate that Renaissance progress-monitoring tools contributed to increased achievement of McKinney pupils who used the tools over the entire period studied (Cohen's  $d \approx 0.2$  for most groups analysed). These findings are comparable to other established CSR models. The researchers also examined the impact of implementation intensity on pupil outcomes compared to their matched controls. In McKinney schools, pupils designated as having high levels of implementation intensity experienced significantly higher achievement levels in both reading and maths, compared to pupils in control schools. Lower intensity implementation resulted in directionally higher achievement, but the difference between control and McKinney schools was not significant.

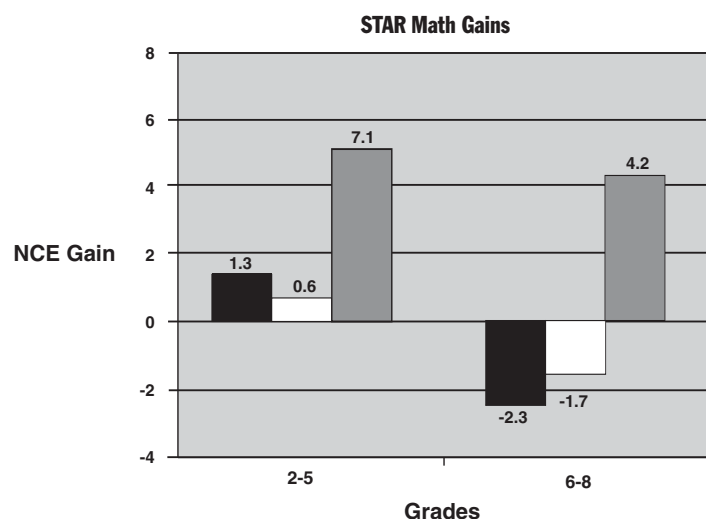
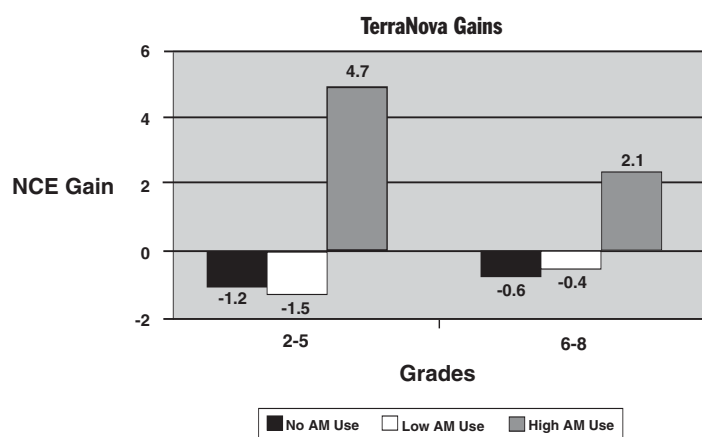
## **E, I** 67. Effect of Technology-Enhanced Continuous Progress Monitoring on Math Achievement

Ysseldyke, J., & Bolt, D. (in press). Effect of technology-enhanced continuous progress monitoring on math achievement. *School Psychology Review*.

Summary: <http://research.renlearn.com/research/pdfs/186.pdf>

Full article: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

This is an interim report from an ongoing, independent, 2-year randomised experiment. Researchers from the University of Minnesota and the University of Wisconsin–Madison examined the extent to which a progress-monitoring system in mathematics, Accelerated Math, is an effective enhancement to ongoing maths instruction. More importantly, they sought to determine whether Accelerated Math has differential impact as a function of the extent to which teachers implement it as intended. Pupil participants came from 8 primary and middle schools across the United States, including several in large cities. Classes were randomly assigned to experimental and control groups. Teachers in the experimental classes implemented Accelerated Math along with their existing maths curriculum during the 2003–2004 school year. Control teachers implemented their existing maths curriculum only. Pupils were pre- and posttested using 2 standardised, nationally-normed tests of maths achievement. Analysis of 1st-year data shows that there are big differences in the extent to which teachers implemented Accelerated Math as intended. The result was that some pupils spent much time using Accelerated Math, while others spent little time, and still others virtually no time. The researchers developed a method to differentiate low-, moderate-, and high-implementing pupils. The gain in maths achievement for pupils as a function of implementation integrity, while controlling for prior pupil achievement, was examined. The key finding is that when Accelerated Math is implemented as intended, pupils gain significantly more than those for whom implementation is limited or nil.



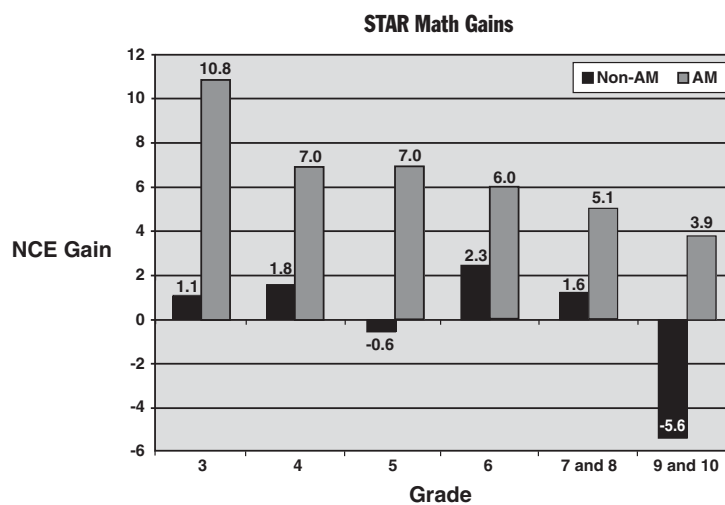
## E, I, P 68. Use of a Progress-Monitoring System to Enable Teachers to Differentiate Math Instruction

Ysseldyke, J. E., & Tardrew, S. (in press). Use of a progress-monitoring system to enable teachers to differentiate math instruction. *Journal of Applied School Psychology*.

Full article: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

This quasi-experimental study explored how a progress-monitoring and instructional management system can be used to help educators differentiate teaching and meet the wide-ranging learning needs of their increasingly diverse classes. The study compared classes in 24 states that used a curriculum-based instructional management system, Accelerated Math, to same-school control classes that did not use it. The major findings were as follows:

- At every year there were large differences in percentile gains for pupils in the experimental and control classes.
- Gains were experienced across the achievement spectrum. An analysis of low-, middle- and high-achieving pupils showed consistent rates of gain for each maths objective mastered.
- Intervention integrity had a significant effect on pupil achievement.
- Teachers using the progress-monitoring and instructional management system spent more time providing individual versus group teaching and felt better able to meet the individual needs of their pupils.
- Significantly more pupils who were in classes where teachers used the progress-monitoring and instructional management system reported that they like maths, help each other with maths, and like maths better this year than last year.





E, I

**69. Evaluation of Renaissance Learning Mathematics and Reading Programs in UK Specialist and Feeder Schools**

UK

Rudd, P., & Wade, P. (2006). *Evaluation of Renaissance Learning mathematics and reading programs in UK Specialist and feeder schools*. (Final Report). Slough, England: National Foundation for Educational Research (NFER).

Summary: <http://research.renlearn.com/research/pdfs/250.pdf>

Full report: <http://www.nfer.ac.uk/nfer/index.cfm?77A0C6B3-C29E-6E91-4137-3EA457EACEC0#study>

During the 2005–2006 school year, selected primary and secondary schools in the UK implemented Accelerated Maths, an individualised maths management program. An independent research group, the National Foundation for Educational Research (NFER), conducted a study to examine the impact of Accelerated Maths on standardised test scores and teacher and pupil attitudes. Pupils at schools using Accelerated Maths and at carefully matched control schools were pre- and posttested with a standardised assessment of mathematics, and completed surveys at the beginning and end of the school year regarding their feelings about maths. The research team also visited schools and conducted interviews with teachers using Accelerated Maths. In most cases, higher test score gains at treatment schools resulted when Accelerated Maths was used more often and with higher implementation quality. Average test scores increased at both Specialist and feeder schools using Accelerated Maths, while scores decreased on average at matched schools not implementing the program. Attitudes regarding mathematics changed little at schools using Accelerated Maths, though pupils did indicate an overall strengthening in their perceptions of mathematics ability. Finally, teachers using Accelerated Maths indicated that they would recommend the program to a colleague, and that they appreciated the timesaving aspects of Accelerated Maths, allowing them more time to personalise pupil teaching.

E, I

**70. Accelerated Mathematics in Grades 4–6: Summary of a Quasi-Experimental Study in North Rhine-Westphalia, Germany**

Lehmann, R. H., & Seeber, S. (2005). *Accelerated Mathematics in grades 4–6: Summary of a quasi-experimental study in North Rhine-Westphalia, Germany*. Madison, WI: Renaissance Learning, Inc.

Summary: <http://research.renlearn.com/research/pdfs/192.pdf>

Full report: [http://www2.hu-berlin.de/empir\\_bf/accelerate.pdf](http://www2.hu-berlin.de/empir_bf/accelerate.pdf)

This quasi-experimental study of the effectiveness of Accelerated Math took place in North Rhine-Westphalia, Germany. A developmental German adaptation of Accelerated Math was used. The study sample consisted of pupils in grades 4–6, including pupils from different secondary school types (basic, intermediate, comprehensive and academic). A total of 47 classes participated in the study: 22 Accelerated Math classes and 25 control classes. In all, more than 1,200 pupils participated in the study. In only 4 months, results showed that achievement gains were unexpectedly high in both Accelerated Math and control classes; however, pupils using Accelerated Math intensively experienced larger gains than control pupils and pupils using Accelerated Math to a lesser extent. Some teachers who used Accelerated Math also taught same school, same year control classes using traditional methods. In these cases, the influence of the teacher was controlled while examining results. In most of these class pairs (6 out of 9), Accelerated Math class gains were greater than their counterparts. Survey results revealed that the majority of Accelerated Math teachers expressed positive views about the progress-monitoring tool. Most teachers also indicated that levels of pupil motivation and interest in mathematics increased after being exposed to Accelerated Math.

## ACCELERATED MATHS

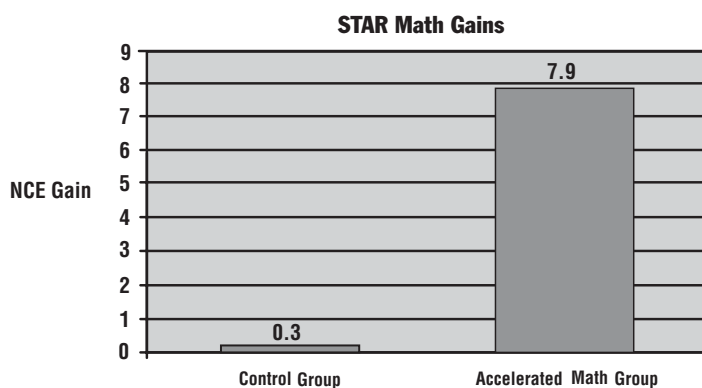
### **E, I, P** 71. Use of an Instructional Management System to Improve Mathematics Skills for Students in Title I Programs

Ysseldyke, J. E., Betts, J., Thill, T., & Hannigan, E. (2004). Use of an instructional management system to improve mathematics skills for students in Title I programs. *Preventing School Failure, 48*(4), 10–14.

Summary: <http://research.renlearn.com/research/pdfs/161.pdf>

Full article: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

This quasi-experimental study examined the effects of Accelerated Math on the mathematics achievement of 3rd- through 6th-grade Title I and non-Title I pupils. A 2-group pretest/posttest comparison was used to evaluate the hypothesis that pupils in a Title I programme ( $n = 132$ ) whose teachers used Accelerated Math would show greater gains in mathematics achievement than similar pupils in a Title I programme ( $n = 138$ ) who received no intervention other than their regular maths teaching. Results show that pupils using Accelerated Math significantly outperformed the comparison group with an average gain of 7.9 normal curve equivalents (NCEs) compared to an average gain of 0.3 NCEs for pupils not using Accelerated Math—a difference in gain of 7.6 NCEs. Thus, evidence was found to support the claim that Accelerated Math can improve the maths achievement of Title I pupils.



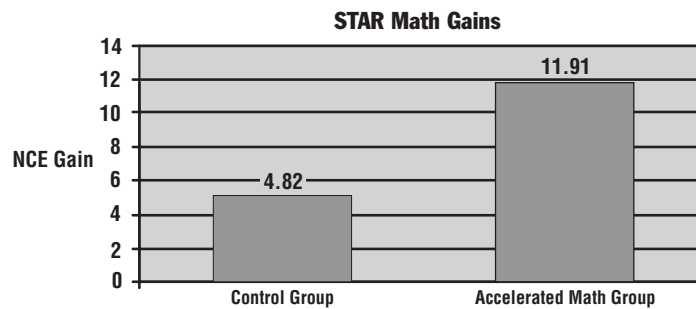
**E, I, P 72. Use of an Instructional Management System to Enhance Math Instruction of Gifted and Talented Students**

Ysseldyke, J. E., Tardrew, S., Betts, J., Thill, T., & Hannigan, E. (2004). Use of an instructional management system to enhance math instruction of gifted and talented students. *Journal for Education of the Gifted*, 27(4), 293–310.

Summary: <http://research.renlearn.com/research/pdfs/160.pdf>

Full article: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

This quasi-experimental study evaluated the effect of an instructional management system on the maths achievement of pupils who are gifted and talented (GT). Accelerated Math was used to assign teaching, monitor pupil progress and provide teachers with the information necessary to differentiate maths teaching for GT learners. The intervention spanned a 4-month period and set out to provide evidence that GT pupils (n = 48) would show greater gains in mathematics achievement than similar GT pupils (n = 52) who received no intervention other than their regular maths teaching. There was a significant difference in normal curve equivalent (NCE) gains for the group that used Accelerated Math compared to those that did not. The mean NCE gain for the experimental group was 11.9 NCEs, and the mean NCE gain for the control group was 4.8, a difference of 7.1 NCEs. Thus, evidence was found to support the hypothesis that Accelerated Math can enhance the academic achievement of gifted and talented pupils.



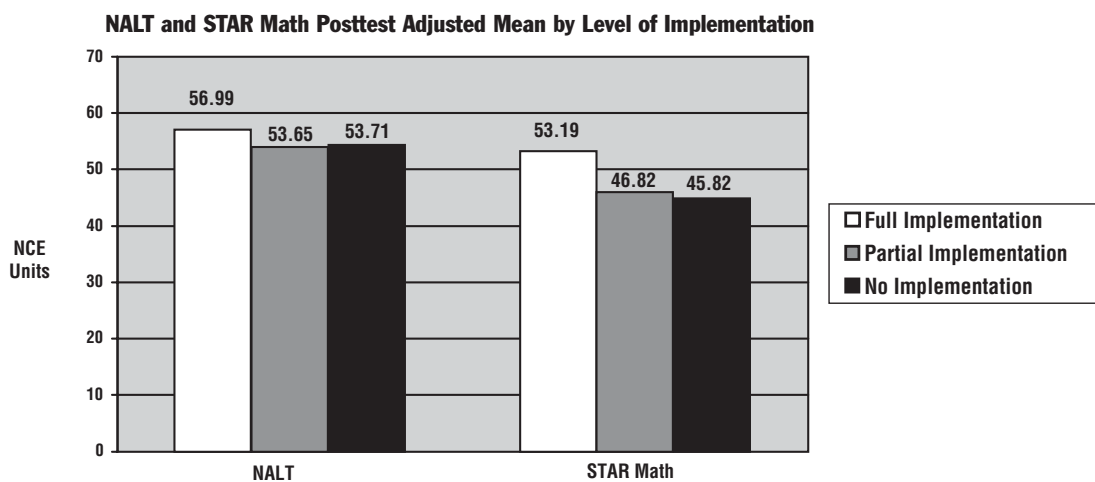
## **E, I, P** 73. Using a Curriculum-Based Instructional Management System to Enhance Math Achievement in Urban Schools

Ysseldyke, J. E., Spicuzza, R., Kosciolk, S., Teelucksingh, E., Boys, C., & Lemkuil, A. (2003). Using a curriculum-based instructional management system to enhance math achievement in urban schools. *Journal of Education for Students Placed at Risk*, 8(2), 247–265.

Summary: <http://research.renlearn.com/research/pdfs/119.pdf>

Full article: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

Maths performance gains in urban schools, especially those with high minority and/or low socio-economic status populations, have traditionally lagged behind the rest of the country. The purpose of this study was to examine the effect of Accelerated Math on overall pupil achievement for grades K–8 in 4 primary schools in a large urban district composed of approximately 75 per cent minority pupils and with 67 per cent of pupils receiving free or reduced-price lunch. An additional focus of the study was to explore differences in pupil achievement between classes at 3 levels of Accelerated Math implementation. Overall, the study shows positive outcomes for pupils in classes using Accelerated Math as measured by both STAR Math and the Northwest Achievement Levels Test (NALT). Accelerated Math pupils ( $n = 397$ ) were compared to a within-school comparison group of pupils not using Accelerated Math ( $n = 484$ ) and a random sample from the district’s annual testing database ( $n = 429$ ). In the within-school group analysis, pupils in classes designated as having a high level of implementation of Accelerated Math demonstrated more growth than those with low or partial levels of implementation. A 20/20 analysis comparing the top quintile, middle quintile and bottom quintile of pupils showed that all ability groups in classes with full implementation demonstrated significantly accelerated performance as measured by increased normal curve equivalent (NCE) scores on both STAR Math tests and the NALT. In the district-wide analysis, pupils participating in Accelerated Math again showed accelerated growth compared to the randomly selected comparison group. This study demonstrates the positive impact of Accelerated Math on urban pupils’ maths performance.



**I** 74. **Case study: The Achievement of Ethnic Minority Children Through Accelerated Maths Programme**

UK

Brooks, A., & Godsman, K. (2002). *Case study: The achievement of ethnic minority children through Accelerated Maths programme*. Unpublished action research project, Hertfordshire Local Education Authority, St. Andrew's C of E Voluntary Aided Primary School.

Full report: Email [info@renlearn.co.uk](mailto:info@renlearn.co.uk) to request a copy from the Renaissance Learning Research Department.

During the 2001–2002 school year, teachers at St. Andrew's Primary School implemented Accelerated Maths with their year 2 and year 4 pupils in an effort to raise mathematical achievement and aid classroom management. The teachers decided to test the program after observing its use in a North Carolina school they called on as part of an Ethnic Minority Achievement Raising Study Visit to the US. The teachers liked that fact that Accelerated Maths can be used in classrooms with only 1 computer, and saw the program as an opportunity to individualise instruction, provide immediate feedback and ensure accurate assessment of pupil ability. According to surveys administered as part of the action research project, the program was well received by parents and pupils alike. Parents and children also reported increased motivation and confidence in mathematics, and the authors reported achievement gains for the majority of pupils. The teachers planned to expand implementation of Accelerated Maths the following school year.

75. **Reading Ability Levels Increase in Scottish Schools**

UK

Renaissance Learning. (2002). *Reading ability levels increase in Scottish schools*. Madison, WI: Author.

Full report: <http://research.renlearn.com/research/pdfs/120.pdf>

All told, 74 per cent of primary pupils and 68 per cent of secondary pupils achieved higher-than-expected gains on nferNelson GRT II.

**E, I** 76. **The Impact of the Accelerated Maths Pilot Program in Australia**

Anamourlis, A. (2001). *The impact of the Accelerated Maths pilot program in Australia*. Unpublished master's thesis, St. John's College, Australia.

Full report: <http://research.renlearn.com/research/pdfs/110.pdf>

Pilot pupils using Accelerated Maths showed higher achievement levels and maintained achievement between pre- and posttest in many areas where control classes decreased in ability.

**E, I** 77. **Nottingham Pupils Improve Mathematics Achievement With Accelerated Maths**

UK

Renaissance Learning. (2001). *Nottingham pupils improve mathematics achievement with Accelerated Maths*. Madison, WI: Author.

Full report: <http://research.renlearn.com/research/pdfs/83.pdf>

Elliott Durham School is an urban, secondary school with a high mobility rate, where 60 per cent of the pupils are eligible for free school meals. In an effort to improve the mathematics achievement of their pupils, they implemented a quasi-experimental Accelerated Maths pilot programme. Prior to the start of the programme, the school pretested all year 7 pupils using the Mathematics 12 test from the National Foundation for Educational Research (NFER 12). Nine pupils with a range of pretest scores were selected to participate in Maths Club (study group). Pupils in the Maths Club met for 30 minutes a day during their lunch hour to practise maths using Accelerated Maths. A comparison group of 9 pupils were chosen who had pretest scores matching the Maths Club pupils. These pupils received only their regular maths teaching. After 2 terms, the NFER 12 tests were administered again to both pupil groups. Pupils in the Maths Club showed substantially more improvement than pupils in the comparison group. The mean score for pupils in the Maths Club increased by 11.2 while the mean score for the comparison pupils increased only 4.7. The Wilcoxon signed rank test indicates that the difference in test scores is significant with  $p < .05$ .

# ACCELERATED MATHS

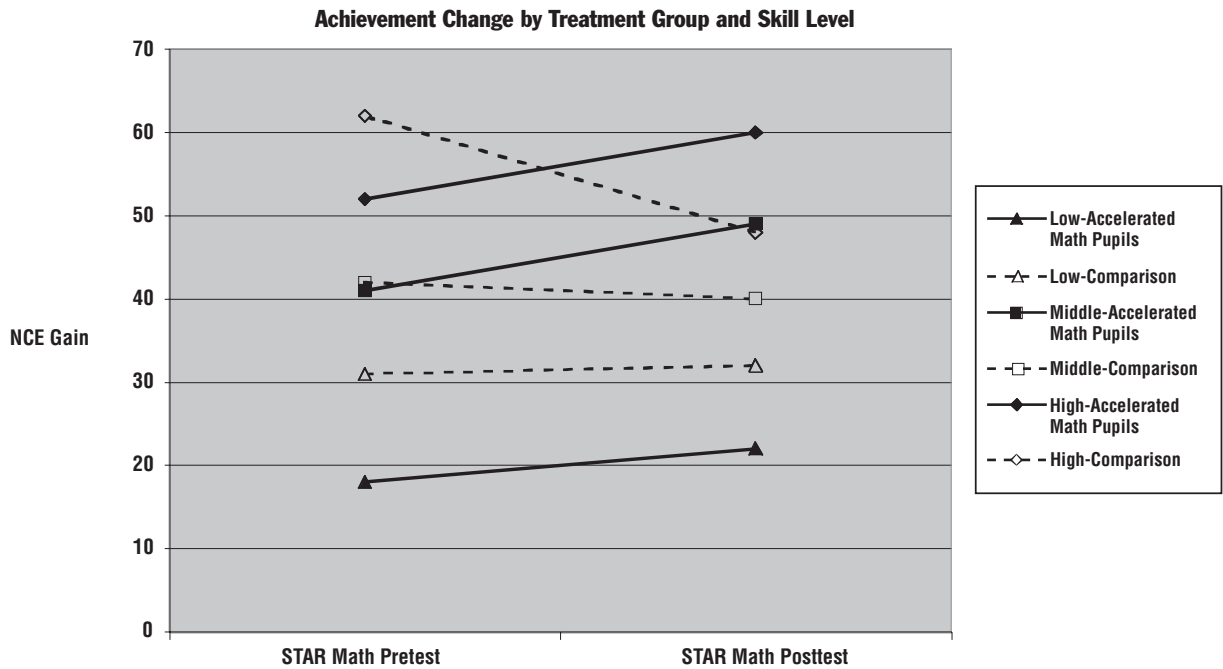
## E, I, P 78. Effects of Curriculum-Based Monitoring on Classroom Instruction and Math Achievement

Spicuzza, R., Ysseldyke, J., Lemkuil, A., McGill, S., Boys, C., & Teelucksingh, E. (2001). Effects of curriculum-based monitoring on classroom instruction and math achievement. *Journal of School Psychology, 39*(6), 521–542.

Summary: <http://research.renlearn.com/research/pdfs/97.pdf>

Full article: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

This study was designed to determine whether the implementation of an instructional management system (Accelerated Math) served to improve 4th- and 5th-grade pupils' maths achievement and the classroom instructional environment. In addition, the study examined the extent to which adding Accelerated Math to an ongoing maths curriculum (Everyday Math) would result in positive changes in the classroom instructional environment and in achievement. Using carefully matched comparison groups, the study found that pupils in Accelerated Math classes experienced more components of effective teaching than pupils in Everyday Math classes. The study also found that greater achievement gains on 2 measures of achievement, the Northwest Achievement Levels Test (NALT) and the STAR Math test, were made by pupils in Accelerated Math classes than pupils in Everyday Math classes. On the NALT, the adjusted Normal Curve Equivalent (NCE) mean for Accelerated Math pupils was 51.25; for the comparison group it was 46.50. The STAR Math adjusted mean for Accelerated Math pupils was 42.96, while comparison pupils had an adjusted mean of only 31.45. Further, these greater gains were observed at all 3 levels of pupil performance: low, middle and high.



## 79. Accelerated Maths Helps Boost SATs Results: Sacred Heart Catholic Primary School, Wythenshawe, Manchester

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_sacred\\_heart\\_primary\\_manchester.pdf](http://www.renaissance-learning.co.uk/pdf/cs_sacred_heart_primary_manchester.pdf)

An after-school Accelerated Maths project involving parent volunteers has been helping to raise standards of attainment at Sacred Heart Catholic Primary School. The Club uses the Accelerated Maths software developed by Renaissance Learning and runs for 4 evenings per week. The pupils have christened it the Whizz Kids Club. The club itself is co-ordinated and run by Mrs Kerris Torkington, a teaching assistant at the school.

Mr Aelred Whelan, head teacher of the school, went on to say: "This is one of a range of initiatives here at Sacred Heart, which are making a real impact on standards. With the Whizz Kids Club and Accelerated Maths, we have taken a very good idea and turned it into a real focus of teamwork between staff, parents and pupils to raise standards. One of the most important features for the pupils is the immediate feedback they receive on how well they have done on a particular worksheet, and the fact that Accelerated Maths ensures that the worksheets produced are tailored to meet each pupil's individual learning needs in a particular area. Above all, the pupils love it! They are seeing success and improvement on a daily basis that has really enhanced their self-esteem. This, for me, has been the greatest success story of the project."

## 80. No More Problems Teaching, Now That There is Accelerated Maths: Gatehouse School, Buckinghamshire

UK

Full story: [http://www.renaissance-learning.co.uk/pdf/cs\\_gatehouse\\_school\\_buckinghamshire.pdf](http://www.renaissance-learning.co.uk/pdf/cs_gatehouse_school_buckinghamshire.pdf)

The Gatehouse School, a special school for pupils with emotional and behavioural difficulties, based in Buckinghamshire, have been using Accelerated Maths for the past 15 months. Hilary Bowman, who heads the programme gives her account of Accelerated Maths and believes it to be a true asset for motivating the boys at this school. She says: "I have found that it is particularly motivating for the quieter and more marginalised pupils. They enjoy gaining success at something, which is under their control. The best thing about Accelerated Maths is that it allows those who want to get on with their maths as soon as they are in the room and they will often work solidly for an hour on it. I think the format of Accelerated Maths is very motivating for those that engage with it. There is instant feedback and I have time to teach individuals knowing that all pupils will have their work marked automatically."

Accelerated Maths has been implemented in years 8, 9, 10 and 11. One of the interesting points Accelerated Maths has highlighted is the enthusiasm and initiative the pupils have shown when using this program. Pupils choose to stay behind at the end of lessons or use their break time to finish off worksheets generated by Accelerated Maths. Pupils are also eager to show their results to the head teacher and take reports home to show their parents, which has helped enhance communication between teachers and home. The system has generated a lot of enthusiasm overall for both staff and pupils.

## V. HARDWARE RESEARCH

**AlphaSmart** laptops improve pupils' basic skills and engage them in the process of learning, while motivating them to learn more. Designed specifically for schools, the AlphaSmart Neo is an affordable, portable, easy-to-use laptop with a full-sized keyboard, large LCD screen and extraordinary battery life making it ideal for writing, keyboarding and quizzing.

The **2Know! Classroom Response System** allows teachers to attain 100 per cent classroom participation and quickly assess pupil performance and target instruction. With radio frequency communication technology between the software and pupils' hand-held devices, teachers can communicate with every pupil in class at the same time while pupils become actively engaged in the learning process.

This section summarises the research supporting the effectiveness of AlphaSmart laptops and the 2Know! Classroom Response System.

### Renaissance Learning Research Library

To access the Renaissance Learning Research Library in its entirety, please visit <http://research.renlearn.com/>, where you may search the collection by topic, state/country, year level, demographic information and type of research. Web addresses for research studies summarised on the following pages are provided after each citation, or an email address is provided in the event an electronic version is unavailable.



**81. Keyboarding: An Essential Skill for the 21st Century**

Renaissance Learning. (2007). *Keyboarding: An essential skill for the 21st century*. Madison, WI: Author.

Full report: <http://research.renlearn.com/research/pdfs/252.pdf>

The purpose of this report is to summarize the research supporting the importance of keyboarding and outline the best methods for teaching this skill. It also discusses problems educators may encounter when teaching keyboarding in elementary school, and how these problems may be solved with technology.

**I, P 82. Telementoring as a Collaborative Agent for Change**

Friedman, A. A., Zibit, M., & Coote, M. (2004). Telementoring as a collaborative agent for change. *The Journal of Technology, Learning, and Assessment*, 3(1).

Full article: <http://escholarship.bc.edu/cgi/viewcontent.cgi?article=1000&context=jtla>

To assist with telementoring, AlphaSmart devices were provided to 49 ninth-grade pupils of various ethnicities and English abilities. Pupils submitted more drafts, wrote more text and were able to communicate with their telementors more effectively after the introduction of AlphaSmart devices.

**I, P 83. An AlphaSmart for Each Student: Does Teaching and Learning Change With Full Access to Word Processors?**

Russell, M., Bebell, D., Cowan, J., & Corbelli, M. (2002). *An AlphaSmart for each student: Does teaching and learning change with full access to word processors?* Chestnut Hill, MA: Technology and Assessment Study Collaborative.

Full report: <http://www.bc.edu/research/intasc/studies/AlphaSmartEachStudent/description.shtml>

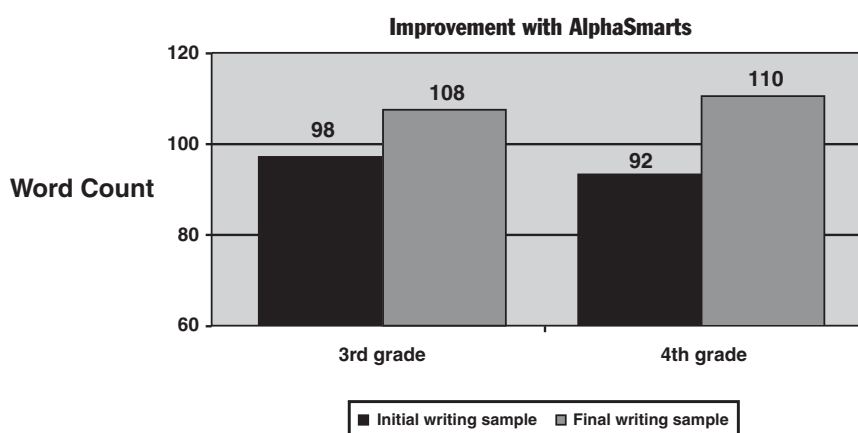
By increasing the ratio of pupils to AlphaSmart 3000s from 3:1 to 1:1 pupils were able to use the devices more, teachers were able to be more efficient with their time and the quality of pupil work improved.

## I 84. Writing With Technology

Hagerman, S. (2001, June). *Writing with technology: Denver Public Schools, Department of Educational Policy*. Paper presented at the Technology in Education Conference, Denver, CO.

Full report: [http://www.spectronicsinoz.com/downloads/general/AlphaSmart%20\\_study\\_results.pdf](http://www.spectronicsinoz.com/downloads/general/AlphaSmart%20_study_results.pdf)

A researcher from Denver Public Schools investigated whether AlphaSmart portable computing devices could improve the quality and quantity of pupil writing, as well as pupils' motivation to write. Four 3rd- and 4th-grade classes submitted initial writing samples, used the AlphaSmart devices for 4 months, and then submitted final writing samples at the end of the study. The AlphaSmart units assisted in improving 7 areas of writing, including idea development, organisation, sentence fluency and text length. Moreover, pupils and teachers responded positively to the AlphaSmart devices. Pupils commented on how much they enjoyed using the AlphaSmart devices, and they appeared more willing to write. Over time, teachers became more comfortable with integrating technology, and by the end of the study, every teacher used the devices to a greater degree in their teaching.

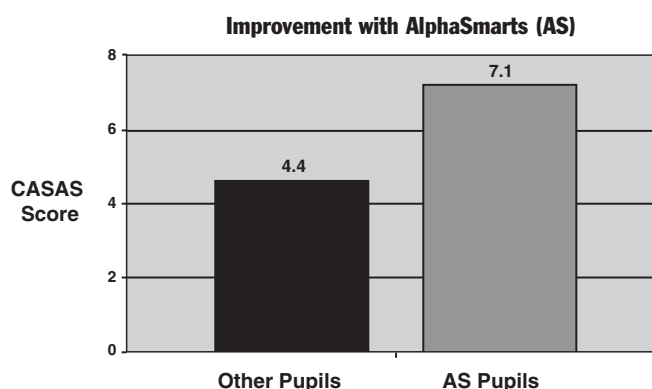


## E, I 85. Instructional Technology Agency Intervention Project: AlphaSmart Evaluation Report: 2000–2001

Outreach and Technical Assistance Network (OTAN). (2001). *Instructional Technology Agency intervention project: AlphaSmart evaluation report: 2000–2001*. Sacramento, CA: Author.

Full report: [http://www.alphasmart.com/pdf/OTAN\\_AS\\_Report.PDF](http://www.alphasmart.com/pdf/OTAN_AS_Report.PDF)

A quasi-experimental study was conducted from 2000–2001 in 2 adult education schools, with the intent to assist pupils and teachers with using technology in the classroom and to identify the recommended practices for using classroom technology. Sixty adult pupils (mostly Hispanic) in 4 English as additional language (EAL) adult-education classes participated in the study and used AlphaSmart 3000 portable computing devices in the classroom. The pupils gained 1.2 levels over the year on a primary writing rubric, and the pupils outscored others who did not use AlphaSmart 3000s by 2.69 points on the Comprehensive Adult Student Assessment System (CASAS) listening and reading test. Additionally, teachers and pupils responded favourably to the use of the AlphaSmart 3000 devices.



**I** 86. **A Report to the Texas Legislature: Report on Ed Tech Pilots, Highland Park ISD: Highland Park Elementary**

Texas Education Agency. (2001). *A report to the Texas legislature: Report on ed tech pilots, Highland Park ISD: Highland Park Elementary* (pp. 10-1–10-7). Austin, TX: Author.

Full report: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

Fourth- and 5th-grade pupils improved their keyboarding skills and achievement following the use of AlphaSmart devices.

**E, I** 87. **Quantitative and Qualitative Dimensions of Writing in Technology and Nontechnology Elementary Classrooms**

Donovan, M. E. (1998). *Quantitative and qualitative dimensions of writing in technology and nontechnology elementary classrooms*. Unpublished doctoral dissertation, Seattle Pacific University.

Full report: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

This comparison shows that pupils who compose writing assignments on a classroom computer show more competence than pupils who compose using a pencil and paper. Pupils using a computer show a .34 mean difference compared to those using pencil and paper.

**E, I** 88. **Project ELWAT Final Evaluation Report**

Weaver, D. (1997). *Project ELWAT final evaluation report*. Portland, OR: RMC Research Corporation.

Full report: Email [research@renlearn.com](mailto:research@renlearn.com) to request a copy from the Renaissance Learning Research Department.

Pupils in grades 4 through 6 wrote more and were more willing to revise and edit, more motivated to write better and more proud of their work than before using AlphaSmart devices in the classroom.

### 89. The 2Know! Classroom Response System: A Tool for the Effective Teacher

Renaissance Learning. (2006). *The 2Know! Classroom Response System: A tool for the effective teacher*. Madison, WI: Author.

Full report: <http://research.renlearn.com/research/pdfs/215.pdf>

In order to be more effective in the classroom, teachers should strive to create an environment that is efficient and engages pupils, and they should adopt classroom practices that are proven to increase pupil achievement. This report explores the benefits of incorporating the 2Know! Classroom Response System into daily teaching. It also describes the technology used by the system and how this technology surpasses that used by competing responder systems. Teachers using the Classroom Response System can keep pupils engaged, devote more time to teaching and are easily able to assess pupil knowledge and provide pupils with immediate feedback.

1

### 90. AlphaSmart CRS Evaluation

Schoolzone.co.uk. (2006). *AlphaSmart CRS evaluation*. Cheltenham, England: Author.

Full report: Email [info@renlearn.co.uk](mailto:info@renlearn.co.uk) to request a copy from the Renaissance Learning Research Department.

Evaluations: <http://www.schoolzone.co.uk/resources/evaluations/evaluation.asp?evalID=4862>

<http://www.schoolzone.co.uk/resources/evaluations/evaluation.asp?evalID=4863>

<http://www.schoolzone.co.uk/resources/evaluations/evaluation.asp?evalID=4864>

This evaluation was performed to provide pedagogically sound evaluation feedback on the Classroom Response System (CRS) and its use in a classroom setting. The CRS system was installed in 3 participating schools and a classroom teacher in each was given preliminary training in its use with further support available as the project progressed. The teachers used the CRS with classes and were asked to explore the full potential of the product and then complete an evaluation template.

UK

## VI. ASSESSMENT

Renaissance Learning’s STAR Assessments are reliable, valid and efficient, progress-monitoring tests.

**STAR Early Literacy** measures the literacy skills of emergent, transitional and probable readers in Reception through year 4. It tracks development of general readiness, graphophonemic knowledge, phonemic awareness, phonics, comprehension, vocabulary and structural analysis. The criterion-referenced scores provided by STAR Early Literacy help teachers effectively plan instruction and monitor the progress of each pupil throughout the year.

**STAR Reading** measures general reading achievement and reading comprehension. It provides accurate, norm-referenced reading scores for years 2–13, criterion-referenced measures of pupils’ instructional reading levels and a way for teachers to track pupil growth throughout the year.

**STAR Maths** measures general maths achievement. It provides teachers with quick, accurate estimates of pupils’ maths abilities for years 2–13 relative to national norms, criterion-referenced diagnostic assessments of maths skills development and a way to track pupil growth throughout the year.

This section summarises the research supporting the effectiveness of STAR Early Literacy, STAR Reading and STAR Maths.

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### Renaissance Learning Research Library

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## **I** 91. NCSPM Review of Progress Monitoring Tools

US Department of Education: National Center on Student Progress Monitoring. (n.d.). *Review of progress monitoring tools*. Washington, DC: Author.

Available online from <http://www.studentprogress.org/chart/chart.asp>

STAR Early Literacy meets all National Center on Student Progress Monitoring (NCSPM) criteria for scientifically based progress-monitoring tools.

## **I** 92. SEDL Reading Assessment Database

US Department of Education: Southwest Educational Development Laboratory. (n.d.). *Reading assessment database*. Austin, TX: Author.

Available online from <http://www.sedl.org/reading/rad/>, Search for: STAR Early Literacy

STAR Early Literacy was favourably reviewed by the Southwest Educational Development Laboratory (SEDL).

## **I** 93. Review of STAR Early Literacy Computer-Adaptive Diagnostic Assessment

Salvia, J., Ysseldyke, J. E., & Bolt, S. (2007). STAR Early Literacy computer-adaptive diagnostic assessment. In *Assessment: In special and inclusive education* (10th ed., pp. 439–440). Boston: Houghton Mifflin.

*Assessment: In Special and Inclusive Education* is an educational psychology textbook that contains reviews of numerous assessment instruments. The review of STAR Early Literacy in this textbook confirms the reliability and validity of the assessment.

## 94. STAR Early Literacy: Understanding Reliability and Validity

Renaissance Learning. (2006). *STAR Early Literacy: Understanding reliability and validity*. Wisconsin Rapids, WI: Author.

Full report: <http://research.renlearn.com/research/pdfs/134.pdf>

The STAR Early Literacy computer-adaptive diagnostic assessment is an achievement-level progress-monitoring system that incorporates state-of-the-art testing technology, including item response theory and Rasch scores, to provide teachers with criterion-referenced scores for pupils' emergent reading skills. Research conducted during the development of STAR Early Literacy confirms that the test is reliable, valid and correlates highly with other reading tests. The test items were calibrated by administering more than 46,000 tests to a nationwide sample of pupils in Reception through year 4 in more than 300 schools. The reliability of STAR Early Literacy was established with a pilot study that included more than 9,000 pupils from 84 schools in the US and Canada during April and May 2001. Reliability estimates from this study were high. Test-retest and generic reliability estimates for all years were .86 and .92, respectively. The validity of STAR Early Literacy was established by examining the patterns of results by age and grade in the calibration and pilot studies and by correlating pupils' STAR Early Literacy scores to teacher-reported skills ratings ( $n = 7,428$ ). Additionally, correlations between STAR Early Literacy scores and 20 other tests, such as the Gates-MacGinitie Reading Test and the Developing Skills Checklist, were calculated ( $n = 2,400$ ). The high correlation between STAR Early Literacy scores and scores on other tests confirms both the validity of STAR Early Literacy for assessing reading skills and its ability to predict performance on other tests. This report contains results from each of these studies, details on the test's standard error of measurement and an explanation of the domain and skill scores provided by STAR Early Literacy.

## I 95. A Cost Analysis of K–2 Early Literacy Assessments: STAR Early Literacy, DIBELS, and TPRI

Laritis R. Christensen Associates. (2005). *A cost analysis of K–2 early literacy assessments: STAR Early Literacy, DIBELS, and TPRI*. Madison, WI: Author.

Summary: <http://research.renlearn.com/research/pdfs/217.pdf>

Full report: <http://research.renlearn.com/research/pdfs/209.pdf>

Christensen Associates, an economics consulting firm, conducted a study to determine the true costs associated with 3 widely-used early literacy assessments: STAR Early Literacy, DIBELS and TPRI. The researchers interviewed staff from 7 schools in 5 states to calculate the average costs of using the 3 tests. Two types of costs were measured: direct costs (the price of testing materials, licensing fees and or fees for access to scoring and reporting services) and opportunity costs (time to administer, score and report results; time that could be spent on teaching if testing was not taking place). The results confirmed that both in terms of direct costs and opportunity costs, STAR Early Literacy, which is a computer adaptive assessment, is a much more cost effective assessment relative to DIBELS and TPRI, which must be administered one-on-one. STAR Early Literacy is about one-third the cost of DIBELS and about one-sixth the cost of TPRI on a per pupil basis.

### Direct Costs for Assessment Materials

Annual, over 3 years

Direct Costs, annually	STAR Early Literacy	DIBELS	TPRI	
		paper	paper	handheld
Per test kit/software	\$1,299	\$69	\$150	\$167
Annual, over 3 years	\$433	\$1,035	\$2,250	\$2,505
Per pupil fees	\$0.39	\$1.00	\$0	\$6.50
Average annual fees per school year	\$105	\$268	\$0	\$1,739
<b>Total Direct Costs/Year</b>	<b>\$538</b>	<b>\$1,303</b>	<b>\$2,250</b>	<b>\$4,244</b>

### Opportunity Costs

Based on average respondent school

Opportunity Costs (per round of testing)	STAR Early Literacy	DIBELS	TPRI	
		paper	paper	handheld
Per pupil (minutes)	15	10.56	17.80	27.80
Per classroom (minutes)	30	190	320	500
Per school (minutes)	450	2851	4,806	7,506
<b>Per school (hours)</b>	<b>7.5</b>	<b>47.5</b>	<b>80.1</b>	<b>125.1</b>
Average hourly compensation	\$28.91	\$28.91	\$28.91	\$28.91
<b>Total Costs per round</b>	<b>\$434</b>	<b>\$1,374</b>	<b>\$3,616</b>	<b>\$2,315</b>

### Summary of Total Costs

Assessment		Annual	Per Administration	Per Pupil
STAR Early Literacy		\$1,838	\$613	\$6.86
DIBELS (paper)		\$5,423	\$1,808	\$20.24
TPRI	paper	\$13,098	\$4,366	\$48.87
	handheld	\$11,190	\$3,730	\$41.75

## **1** 96. Assessment Committee Analysis of Reading Assessment Measures Coding Form: STAR Early Literacy (SEL)

Borman, G., & Dowling, M. (2004). *Assessment committee analysis of reading assessment measures coding form: STAR Early Literacy (SEL)*. Madison: University of Wisconsin–Madison, Department of Educational Leadership and Policy Analysis.

Full report: <http://www.education.wisc.edu/elpa/people/faculty/Borman/AssessmentCommitteeCodingFormSEL.pdf>

In May of 2002, the Analysis of Reading Assessment Instruments for K–3 was published by the University of Oregon. In the executive summary of their final report, the University of Oregon Assessment Committee identified some of the limitations of their work: "The most conspicuous limitation to the Assessment Committee's effort is the limited number of assessment instruments analysed, coded, reviewed and evaluated. Clearly, more assessment instruments must be reviewed and evaluated" (p. 10). The University of Oregon could not evaluate Renaissance Learning's computer-adaptive early literacy assessment, STAR Early Literacy, because it was released after the Oregon Committee began their work. For this reason, researchers from the University of Wisconsin–Madison reviewed STAR Early Literacy using the same rigorous methodologies employed by the Oregon group. In order to replicate the process as closely as possible, they analysed how the Oregon Committee evaluated other instruments, including DIBELS and TPRI. Then, following the same procedures used by the Oregon Committee, the researchers reviewed STAR Early Literacy separately using the Analysis of Reading Assessment Instruments for K–3. After completing the reviews, an inter-rater reliability check was performed to identify discrepancies. Researchers then discussed and resolved any discrepancies between their two reviews. Through their analysis, researchers found STAR Early Literacy to be a reliable and valid instrument, like the other assessments reviewed by the University of Oregon.



## **I** 97. NCSPM Review of Progress Monitoring Tools

US Department of Education: National Center on Student Progress Monitoring. (n.d.). *Review of progress monitoring tools*. Washington DC: Author.

Available online from <http://www.studentprogress.org/chart/chart.asp>

STAR Reading meets all National Center on Student Progress Monitoring (NCSPM) criteria for scientifically based progress-monitoring tools.

## **I** 98. SEDL Reading Assessment Database

US Department of Education: Southwest Educational Development Laboratory. (n.d.) *Reading assessment database*. Austin, TX: Author.

Available online from <http://www.sedl.org/reading/rad/>, Search for: STAR Reading

STAR Reading was favourably reviewed by the Southwest Educational Development Laboratory (SEDL).

## **I** 99. Review of Standardized Test for the Assessment of Reading (S.T.A.R.)

Salvia, J., Ysseldyke, J. E., & Bolt, S. (2007). Standardized test for the assessment of reading (S.T.A.R.). In *Assessment: In special and inclusive education* (10th ed., pp. 440–442). Boston: Houghton Mifflin.

*Assessment: In Special and Inclusive Education* is an educational psychology textbook that contains reviews of numerous assessment instruments. The review of STAR Reading in this textbook confirms the reliability and validity of the assessment.

## **I** 100. NFER Study Investigates Correlation Between STAR Reading and Suffolk Reading Scale 2 Test



Sewell, J., Sainsbury, M., Pyle, K., Keogh, N., & Styles, B. (2007). *Renaissance Learning equating study report*. Slough, England: National Foundation for Education Research (NFER).

Full report: Email [info@renlearn.co.uk](mailto:info@renlearn.co.uk) to request a copy from the Renaissance Learning Research Department.

An equating study was carried out in autumn 2006 by the National Foundation for Educational Research (NFER) on behalf of Renaissance Learning, to provide validation evidence for the use of the STAR Reading and STAR Maths tests in English schools. The study aimed to investigate the correlation between the STAR tests and established tests. Between 11 and 16 schools were involved in the study. Suffolk Reading Scale 2 tests were completed by 1,968 primary pupils and 1,034 secondary pupils. A strong correlation was established between STAR Reading and the Suffolk Reading Scale 2 tests (Pearson correlation coefficient of 0.91). STAR Reading scores were related to reading ages derived from the Suffolk Reading Scale 2, providing an equating graph for comparative purposes. STAR tests and English national curriculum teacher assessment levels correlated well (0.85 for reading and 0.81 for mathematics), particularly in view of the short length of the tests. The strong correlations provide evidence that STAR Reading is suitable for use in England.

**E**

## 101. An International Linking Study of a Computerized Adaptive Test of Reading With a Traditional Paper-and-Pencil Test of Reading Comprehension

**UK**

Betts, J., Topping, K., & McBride, J. (2006). *An international linking study of a computerized adaptive test of reading with a traditional paper-and-pencil test of reading comprehension*. Manuscript submitted for publication.

Full report: Email [info@renlearn.co.uk](mailto:info@renlearn.co.uk) to request a copy from the Renaissance Learning Research Department.

Progress in reading is important for children. However, time spent measuring progress is time not spent enhancing it. Computerised adaptive reading testing might help resolve this tension, but can it do so reliably and validly and generate metrics of relevance to practitioners internationally? This pilot study linked data gathered in the UK from a computer-based adaptive test of reading developed and normed in the US to those from a different paper reading test normed in the UK and yielding different output metrics. It thus explored the effects of gender, mode of presentation and the linkage between different output metrics. Concurrent validity and concordance between tests was substantial, suggesting it is possible to use a US computer adaptive test of reading skills to estimate reading ages for pupils in the UK. Results held similar for both males and females. Implications for future research and practice were explored.

## 102. STAR Reading: Understanding Reliability and Validity

Renaissance Learning. (2006). *STAR Reading: Understanding reliability and validity*. Wisconsin Rapids, WI: Author.

Full report: <http://research.renlearn.com/research/pdfs/133.pdf>

The STAR Reading computer-adaptive, norm-referenced reading test and database is a periodic progress-monitoring system that incorporates state-of-the-art testing technology, including item response theory, to provide teachers with accurate reading scores for pupils in years 2–13. Research conducted during the development of STAR Reading confirms that the test is reliable, valid and correlates highly with national reading tests. The test was normed in spring 1999 using a nationally representative sample of 30,000 pupils from 269 schools in 47 states across the US. The reliability of STAR Reading was established with 3 reliability studies: test-retest ( $n = 2,095$ ), alternative forms ( $n = 4,551$ ) and generic reliability ( $n = 29,169$ ). The grade-level reliability estimates from all 3 studies were extremely high, ranging from .79 to .92 with most estimates greater than .85. An additional study ( $n > 12,000$ ) demonstrated the validity of STAR Reading by comparing pupils' scores on STAR Reading to their scores on other popular national tests such as the California Achievement Test and the Iowa Test of Basic Skills. The high correlation (most were above .70) between STAR Reading scores and scores on other tests establishes both the validity of STAR Reading for measuring reading achievement and its ability to predict performance on other tests. This report contains results from each of these studies, details on the test's standard error of measurement and an explanation of the criterion- and norm-referenced scores provided by STAR Reading.

**I**

## 103. The Fifteenth Mental Measurements Yearbook

Plake, B. S., Impara, J. C., & Spies, R. A. (Eds.). (2003). *The fifteenth mental measurements yearbook*. Lincoln, NE: Buros Institute of Mental Measurements.

The Buros Institute of Mental Measurements publishes independent, critical reviews of assessment instruments. Two reviewers evaluate each assessment. They provide a description of the assessment, document the development of the assessment and examine the assessment's reliability and validity data.

**I** 104. **NCSPM Review of Progress Monitoring Tools**

US Department of Education: National Center on Student Progress Monitoring. (n.d.). *Review of progress monitoring tools*. Washington, DC: Author.

Available online from <http://www.studentprogress.org/chart/chart.asp>

STAR Math meets all National Center on Student Progress Monitoring (NCSPM) criteria for scientifically based progress-monitoring tools.

**I** 105. **Review of STAR Math**

Salvia, J., Ysseldyke, J. E., & Bolt, S. (2007). STAR Math. In *Assessment: In special and inclusive education* (10th ed., pp. 467–468). Boston: Houghton Mifflin.

*Assessment: In Special and Inclusive Education* is an educational psychology textbook that contains reviews of numerous assessment instruments. The review of STAR Math in this textbook confirms the reliability and validity of the assessment.

**I** 106. **NFER Study Investigates Correlation Between STAR Maths and Progress in Mathematics Test**

Sewell, J., Sainsbury, M., Pyle, K., Keogh, N., & Styles, B. (2007). *Renaissance Learning equating study report*. Slough, England: National Foundation for Education Research (NFER).

Full report: Email [info@renlearn.co.uk](mailto:info@renlearn.co.uk) to request a copy from the Renaissance Learning Research Department.

An equating study was carried out in autumn 2006 by the National Foundation for Educational Research (NFER) on behalf of Renaissance Learning, to provide validation evidence for the use of the STAR Reading and STAR Maths tests in English schools. The study aimed to investigate the correlation between the STAR tests and established tests. Between 11 and 16 schools were involved in the study, with completed Progress in Mathematics paper tests received from 2,006 primary pupils and 883 secondary pupils. STAR Maths and Progress in Mathematics (PiM) tests were shown to correlate reasonably strongly (correlation coefficients ranging from 0.58 to 0.75 for different PiM tests). STAR tests and English national curriculum teacher assessment levels correlated well (0.85 for reading and 0.81 for mathematics), particularly in view of the short length of the tests. STAR Maths was equated to the English national curriculum level equivalents given in Progress in Mathematics; the correlation was good (0.84). The strong correlations provide evidence that STAR Maths is suitable for use in England.

**107. STAR Math: Understanding Reliability and Validity**

Renaissance Learning. (2006). *STAR Math: Understanding reliability and validity*. Wisconsin Rapids, WI: Author.

Full report: <http://research.renlearn.com/research/pdfs/135.pdf>

The STAR Math computer-adaptive, norm-referenced maths test and database is an achievement-level progress-monitoring system that incorporates state-of-the-art testing technology, including item response theory, to provide teachers with accurate maths scores for pupils in years 4–13. Research conducted during the development of STAR Math confirms that the test is reliable, valid and correlates highly with national maths tests. The test was normed using a nationally representative sample of 25,800 pupils from 256 schools in 42 states across the US. The reliability of STAR Math was established with 2 reliability studies: test-retest ( $n = 1,541$ ) and generic reliability ( $n = 25,795$ ). The grade-level reliability estimates from both studies were extremely high, ranging from .78 to .88 with most estimates greater than .84. An additional study ( $n > 9,000$ ) demonstrated the validity of STAR Math by comparing pupils' scores on STAR Math to their scores on other widely used national tests such as the California Achievement Test and the Iowa Test of Basic Skills. The high correlation between STAR Math scores and scores on other tests (most are above .70) establishes both the validity of STAR Math for measuring maths achievement and its ability to predict performance on other tests. This report contains results from each of these studies, details on the test's standard error of measurement and an explanation of the criterion- and norm-referenced scores provided by STAR Math.

## **1** 108. The Sixteenth Mental Measurements Yearbook

Spies, R. A., Plake, B. S., & Murphy, L. L. (Eds.). (2005). *The sixteenth mental measurements yearbook*. Lincoln, NE: Buros Institute of Mental Measurements.

The Buros Institute of Mental Measurements publishes independent, critical reviews of assessment instruments. Two reviewers evaluate each assessment. They provide a description of the assessment, document the development of the assessment and examine the assessment's reliability and validity data.

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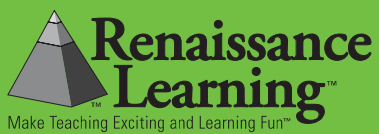
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