

BULLETIN

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From the President

It is with great pleasure that I write my first 'From the President' for LDA. I officially became President at the LDA AGM held in November in Melbourne. At this meeting we also welcomed two new members of LDA Council. First, Anne Castles from Macquarie University, yet another eminent dyslexia researcher that LDA has been lucky enough to attract to its ranks. We were also pleased to welcome back to Council Elaine McLeish, with her depth of expertise and understanding of the issues facing LDA Consultant members. Elaine will be well known to Consultant members in her role as Victorian Referral Officer. The AGM also saw Louise Mercer become President-Elect, and Max Coltheart move to his role as Immediate Past President. Craig Wright continues as Treasurer and we are grateful that Molly de Lemos continues to give LDA her boundless energy and drive. Combine these individuals with the experience and wisdom of the remainder of Council, and the capable efficiency of Kerrie McMahon as Administration Officer, and I feel very lucky to be working with such a great team.

An opportunity to reflect

The LDA AGM was also an opportunity to reflect on what LDA had achieved over the past year. As I am sure you are aware, there were two major events: the biennial

combined conference of LDA, SPELD Qld and RSTAQ in Brisbane, which had the theme 'Consult and Collaborate – A Holistic Approach to Learning Needs', and the LDA Seminar in Melbourne 'Effective Reading Instruction for All: National and International Perspectives'. Part of the success of these events can be attributed to the presentations by Sir Jim Rose (plus, of course, the tireless energy and efficiency of the organising teams). LDA instigated and organised Sir Jim's visit to Australia, and with six meetings/presentations across the country with professionals, professional organisations, politicians and media, we can certainly consider the visit a success. It will undoubtedly have raised awareness of the critical issues faced in our quest to achieve universal effective literacy and greater understanding of current views on what constitutes best practice. Reports on many of the events that Sir Jim participated in appeared in the final *Bulletin* of last year (Vol 41, 3&4), and a report on the Brisbane



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LDA Mission Statement

Learning Difficulties Australia is an association of teachers and other professionals dedicated to improving the performance of underachieving students through effective teaching practices based on scientific research both in the classroom and through individualised instruction.

For more details of LDA activities, professional development opportunities and publications, visit our website at www.ldaustralia.org



Hard data to support the effectiveness of QuickSmart Numeracy

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The availability of structured intervention programs for students with learning difficulties in mathematics has always lagged significantly behind the availability of intervention programs for literacy. In the past decade, however, concern has grown in Australian schools and in the community about the high number of students who fail to develop adequate numeracy skills and who lose all motivation to persevere with middle school and high school mathematics (Commonwealth of Australia, 2008). The problem is not unique to Australia; similar concerns have been voiced in reports on educational standards in the US and in Britain. The general consensus from existing evidence is that some 5 per cent to 10 per cent of school-age children have significant difficulties mastering even the most basic number concepts and skills, and an even larger percentage of students finds mathematics a difficult and frustrating subject. Unfortunately, the achievement gap between these students' numeracy skills and the expected standard for their age group widens over time. In many cases, their problems are still evident when they become adults, often placing limitations on employment options (House of Commons Public Accounts Committee: UK, 2009).

Current teaching methods that favour open-ended investigation, activity, and problem-solving in mathematics are not always effective in building and reinforcing basic number concepts and computational skills, particularly in students with learning difficulties. Similarly, in-class intervention strategies such as differentiating and grading learning

activities according to students' ability levels do not appear to overcome the learning problems these students experience. In fact, research has consistently found that, regardless of the underlying causes of learning problems, these students learn best through explicit and systematic instruction that provides ample opportunities for fundamental knowledge and skills to become firmly established through guided practice and corrective feedback (e.g., Ellis, 2005; Rowe, 2006).

With these issues in mind, in 2001 a team from the University of New England's National Centre of Science, Information and Communication Technology and Mathematics Education for Rural and Regional Australia (SiMERR) designed an intervention program – titled *QuickSmart* – to reverse the trend of ongoing poor academic performance for students who have been struggling at school for several years and who are caught in a cycle of continued failure. *QuickSmart* targets students with learning difficulties in the middle school years and focuses on increasing their fluency (automaticity) in basic numeracy skills. The implementation of *QuickSmart* in Australia has been supported by research grants from the Australian Research Council, the Federal Government, project funds from SiMERR, and extensive cash and in-kind support from the Northern Territory and New South Wales. Since 2001 *QuickSmart* has been implemented on an increasingly expansive scale. In 2008/2009 the program extended to more schools in New South Wales and the Northern Territory and was introduced into South Australia, Victoria, and the Australian Capital Territory. To date, the total number of schools that have had involvement in the

implementation of *QuickSmart* programs is 148.

QuickSmart is a teacher or teacher aide-directed program that operates during three 30-minute lessons per week over a period of 30 weeks. Students participate in the sessions in pairs and are taught in a withdrawal setting, not in the mainstream classroom. They are taught to develop effective strategy use and participate in targeted practice activities. *QuickSmart* students spend considerable lesson time becoming 'quicker' at recalling number facts and performing simple calculations, and 'smarter' in strategy use. Both structured and incidental strategy instruction are important features of numeracy lessons, with the aim of moving students away from relying on slow and error-prone strategies (especially count-by-one strategies) to the use of more sophisticated and efficient strategies and automatic recall. Focusing on various domains in numeracy (but primarily mental computation and problem-solving), the program enables teachers and teacher aides to plan instruction that meets individual students' learning needs and also provides opportunities for them to self-monitor and to receive immediate, formative feedback.

The content of *QuickSmart* Numeracy covers (but it is not limited to) addition, subtraction, multiplication and division facts, and triple multiplication and addition tasks such as $7 + 4 + 3$ (where quick and effective mental strategies are encouraged, like recognising instantly that $7 + 3$ makes 10, and then add 4). The *QuickSmart* program emphasises the usefulness and relevance of facts and strategies to regular classroom activities.

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The learning and teaching strategies employed in *QuickSmart* sessions are drawn directly from research evidence identifying effective methods for students with learning difficulties (e.g., Bryant et al., 2008; Gersten, Jordan & Flojo, 2005). These include explicit strategy instruction, modelling, discussion, questioning, feedback, guided and independent practice, and frequent reviews. Each lesson involves brief revision of work covered in the previous session, a number of guided practice activities featuring overt self-talk, discussion and practice of memory and retrieval strategies, and games and worksheet activities followed by timed and independent practice activities.

Ongoing, formative assessment is an integral part of the *QuickSmart* intervention program and ensures that the learning program is tailored to extend the existing knowledge and skills of individual learners. Most lessons conclude with an assessment using the computer-based Cognitive Aptitude Assessment System (CAAS) to provide the student and the instructor with information about the accuracy and speed of recall of basic facts. This software was developed at the Laboratory for the Assessment and Training of Academic Skills (LATAS) at the University of Massachusetts (Royer & Tronsky, 1998).

A professional training and support component is an essential component of *QuickSmart* for those involved in delivering the program in schools. The program is focused on supporting teachers to understand and provide:

- effective instruction that maximises student on-task time and opportunities for meaningful feedback;
- learning scaffolds to ensure students experience improvement and success;
- deliberate practice that is integral to every lesson, allows for success and is focused on providing targeted feedback to improve learning;
- guided and independent timed

practice activities;

- strategy instruction and concept development;
- confidence in their students by encouraging a 'can do' attitude;
- appropriate teacher and peer modeling; and
- motivational academic activities that develop fluent performance.

Over the period 2001 to 2008 a great deal of valuable empirical evidence has been gathered from schools to allow evaluation of the value and applicability of the *QuickSmart* Numeracy program (SiMERR, 2009). The longitudinal accumulation of such evidence from multiple jurisdictions across a range of geographic and socio-economic contexts is, we believe, a more powerful evaluation procedure than any single controlled experimental study for establishing the veracity, usefulness, effectiveness and sustainability of the program.

The *QuickSmart* project uses a quasi-experimental research design involving collecting and analysing pre-test and post-test data from two groups of students: (i) the '*QuickSmart* Students', who participate in the numeracy intervention programs; and (ii) 'Comparison Students' who do not participate in the intervention programs. These comparison students are average achievers in mainstream mathematics, are the same age as the *QuickSmart* students, and are drawn from the same schools. They complete the selected CAAS sub-tests in numeracy at the beginning and the end of the intervention period and also participate in the standardised testing sessions. Pre-test and post-test data are collected by school-based *QuickSmart* coordinators for both sets of students using results from the CAAS tests and the independent state-wide or the standardised achievement test (Progressive Achievement Test Mathematics (PATM), ACER, 2005). These data help to quantify ways that *QuickSmart* narrows the achievement gap for low-achieving students, and serves to isolate any effects attributable to the instructional program.

Interviews and surveys of students,

parents, teachers, and principals involved in *QuickSmart* have also yielded important qualitative data on the program's effectiveness.

Using *QuickSmart* data from 2001 to 2008, effect sizes (ES) were calculated for each main region or Territory where *QuickSmart* has been implemented. Effect sizes were used here to quantify the effectiveness of interventions relative to comparison groups. Discussion of effect sizes enables researchers to move beyond the simplistic, 'Does it work or not?' to the more useful, 'How well does it work in a range of contexts?' In educational research it is generally accepted that an insignificant effect size is around 0.1, an average effect size is around 0.3, important effect sizes begin above 0.4, and significantly important effect sizes occur above 0.6.

The official report evaluating *QuickSmart* (SiMERR, 2009) contains effect size data tables for many separate regions participating in the program and for different years of involvement. The scope and length of this brief paper do not allow for reproduction of all these tables, so for convenience effect size results are summarised here.

In this longitudinal study, the effect sizes obtained across schools and jurisdictions are remarkably consistent, ranging from 0.49 to 0.80, with greater effects evident for the *QuickSmart* students over the comparison group's performance in all cases. Across the board, the effect sizes based on the scores of the *QuickSmart* students are well above the expected yearly average growth of around 0.3. For example:

- In the Northern Territory during 2006, 2007, and 2008 the effect size growth of many hundreds of *QuickSmart* students based on state-wide tests was 0.68, 0.60 and 0.78, respectively compared to a considerably lower effect size of approximately 0.3 or less calculated for the average-performing comparison cohorts. It is particularly pleasing to note that in 2008 data from the Indigenous students with

mathematics learning difficulties in the Northern Territory cohort revealed an effect size of 0.76.

- Students from the eight schools which participated in *QuickSmart* in the NSW North Coast Region in 2007 recorded an effect size of 0.75 on the ACER PAT tests. In contrast, the comparison cohort's effect size was calculated to be 0.19. The improvement of the *QuickSmart* students represents approximately three years' growth over the course of a single year. This result improved further in 2008 with an effect size of 0.80 calculated for the *QuickSmart* sample of 238 low-achieving students.
- An analysis by an independent statistician of the large data-sets of ACER PATM scores from several hundred NSW students found that the effect sizes for *QuickSmart* students ranged from 0.59 to 0.69, with the latter figure representing those students who completed the full thirty weeks of instruction.

Finally, the qualitative data obtained from interviews and surveys involving students, parents, teachers, and principals have indicated great support and enthusiasm for *QuickSmart*. Again the official report (SiMERR, 2009) contains many examples gleaned from the comments from administrators and from over 2,000 students and many hundreds of teachers and parents. Here we present just two sample comments, one from a student, and one from an administrator.

A female student's comment:

I know my times tables better than I did. I've improved my speed by finding short ways of doing the number facts. And I know about denominators and numerators. And how to change things into a decimal or a percentage and how to put things in the right groups. (2003, A student in Armidale, NSW).

An administrator's comment:

My experiences in viewing *QuickSmart* in action in the

schools in New England are all positive. I have found many students, who were previously disengaged with mathematical activities, totally engaged in the activities and process that form a major part of the intervention... Independent research in the New England region indicated that students, including Aboriginal students, make quick gains in their ability and confidence to use mathematics. (A/General Manager, Learning and Development, NSW DET)

It can be concluded from the quantitative and qualitative data collected over a period of eight years from a variety of settings that *QuickSmart* achieves its aim of 'narrowing the gap' in mathematics achievement for low-achieving middle-school students.

It should be noted that the *QuickSmart* intervention program also targets literacy skills, but data are still being processed on this aspect of the program. The official report (SiMERR, 2009) contains some provisional findings on literacy. Details of both numeracy and literacy programs can be found online at: www.une.edu.au/simerr/QuickSmart/pages/index.php.

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