

Australian Journal of  
**LEARNING  
D**ISABILITIES  
Volume 11 Issue 4 2006



LEARNING DIFFICULTIES AUSTRALIA  
Registered by Australia Post Publication No. VBP 1929

# Australian Journal of Learning Disabilities

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This issue of the *Australian Journal of Learning Disabilities* was published in June 2007.

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This journal is subject to a peer review process and is published four times a year by Learning Difficulties Australia, PO Box 349, Carlton South Vic 3053, Australia. These four issues constitute one volume.

# Australian Journal of Learning Disabilities

## *Volume 11, Issue 4, 2006*

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### Contents

Editorial <i>Kevin Wheldall</i>	155
Learning to read in Australia <i>Max Coltheart and Margot Prior</i>	157
School-related social adjustment of Chinese primary school students with specific learning difficulties: a perspective from Hong Kong <i>Man Tak Yuen, Peter Westwood, and Gunter Wong</i>	165
A history of Learning Difficulties Australia: part four – managing change <i>Josephine C. Jenkinson</i>	175
A history of Learning Difficulties Australia: part five – the journal (continued) <i>Josephine C. Jenkinson</i>	185
An international perspective of early number sense: identifying components predictive of difficulties in early mathematics achievement <i>Sally Howell and Coral Kemp</i>	197

Note: This issue of the journal was published in June 2007.

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ISSN 1324-8928

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# Editorial

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It is my pleasure to announce that the editorship of *AJLD* will be shared from 2007, when Alison Madelaine will join me as a joint editor of the journal.

It is my sad duty to let you know, however, that LDA Council has reluctantly taken the decision to reduce the frequency of issues of the journal from four to two issues per year, also from 2007, until sufficient appropriate material is received to again warrant publishing three or four issues each year. This decision was not taken lightly. *AJLD* has struggled to maintain a quarterly publishing regime for many years. Moreover, in its new expanded form, the *Bulletin* now carries the less academic articles that might previously have been published in the journal. Even by publishing special issues and the forthcoming conference proceedings we cannot maintain the current schedule. If we attempted to do so, the likely outcome would be that we would fall further and further behind.

As I mentioned earlier, it has never been easy to attract sufficient articles of a good standard but the situation has become more acute in recent years. This is due largely, I suspect, to the (some might say spurious) pursuit of 'quality' by our institutions of higher education. Challenged by government to provide evidence for the quality of university research, they have tended to opt for the 'quick and dirty' method of judging research on where it is published rather than what is published. Consequently academics are being bullied into publishing in less appropriate, but more prestigious, so-called 'international' journals. Curiously most of these international journals tend mainly to emanate from one country, the United States. The problem with this for educational research, of course, is that much of it is context-specific and our American friends are not exactly renowned for their interest in, or knowledge of, what takes place outside its borders (except perhaps on the international political level ...).

The implication of this for LDA is to make *AJLD* a more desirable place for academics to publish, since academics are the main source of our journal articles. We have to be frank about this: *AJLD* is not (yet) an international journal. A few readers from overseas, or even the occasional non-Australian article, does not an international journal make. Our aim must be to attempt to keep the Australian character of our journal but to make it more accessible to the world outside Australia. We can only do this, in my view, by attempting to have our journal published by an international well-respected journal publisher. Council is currently exploring this possibility.

Kevin Wheldall  
Editor, *Australian Journal of Learning Disabilities*  
Executive Editor of LDA Publications  
Email: kevin.wheldall@mq.edu.au



## Learning to read in Australia

Max Coltheart<sup>1</sup> and Margot Prior<sup>2</sup>

Macquarie University<sup>1</sup>, University of Melbourne<sup>2</sup>

### Abstract

Reading scientists have learned a good deal over the past 40 years about how children learn to read, why some find this so hard, and how such children can be helped. But this science has not reached many classrooms. National governments in the USA, UK and Australia have all recently been so concerned about the incidence of poor reading ability amongst their children that they have commissioned national surveys of reading and the teaching of reading. The Australian review committee issued its report and recommendations in December 2005. The report found that in most teacher training courses around Australia very little time was devoted to material on how children learn to read and how best to teach them, and that a majority of senior staff in schools consider that beginning teachers are not adequately prepared to teach children to read. The report recommended various ways in which this problem might be solved; and it also recommended, on the basis of a review of relevant research, that the teaching of reading in Australian schools should always include in the early years extensive systematic explicit instruction in synthetic phonics. We await implementation of these recommendations.

Learning to read is not easy, and a substantial number of children struggle to do it. Children who read substantially less well than most children of their age may be referred to as exhibiting 'specific learning difficulties' or 'specific reading impairment' or 'developmental dyslexia' ('dyslexia' for short). These different terms are typically used interchangeably. Learning to write and spell is not easy, either, and some children lag behind their peers here, too. The distinction between difficulty in learning to read and difficulty in learning to write and spell is worth making because there are children who are normal readers for their age but poor spellers: these children are dysgraphic (poor at writing and spelling) while not being dyslexic (poor at reading). Children who have had difficulty in learning to read but have managed to catch up with their peers as far as reading is concerned often still exhibit poor writing and spelling.

It is natural to ask: what is the incidence of difficulties in learning to read amongst Australian children? This question has no answer. How far a child is lagging behind in reading compared to other children of the same age is a matter of degree. There is no way of making any qualitative distinction between 'children with dyslexia' and 'children without dyslexia'; the distinction is purely quantitative (i.e., it depends on how far behind in reading a child is required to be before he warrants the label dyslexia) and therefore arbitrary. This is because reading is a skill that is distributed continuously rather than dichotomously across any group of children.

Or, to be more exact, reading is a set of skills, each distributed continuously rather than dichotomously across any group of children. If that is so, it follows that if we want to understand how children learn to read (and why some find this so difficult), we first need to identify

the set of reading skills that children will need to acquire. That in turn means that we first need to understand skilled reading – we need to know exactly what are the cognitive skills that skilled readers possess which enable them to achieve the act of reading so quickly and so effortlessly.

About a century ago, in his book *The Psychology and Pedagogy of Reading*, experimental psychologist Edmund Burke Huey wrote:

... to completely analyse what we do when we read would almost be the acme of a psychologist's achievements, for it would be to know very many of the most intricate workings of the human mind, as well as to unravel the tangled story of the most remarkable specific performance that civilisation has learned in all its history. (Huey, 1908, p. 6)

Today, a century later, experimental psychologists and other cognitive scientists certainly have not achieved the goal of completely analysing what we do when we read. But this question has been intensively investigated by reading scientists over the past 35 years, and at least some of the workings of the mind upon which skilled reading depends are now well understood.

Reading researchers are still a very long way from understanding exactly how someone can, from reading *The Brothers Karamazov*, have a view of what it must have been like to live in Imperial Russia in the 19th century (a full understanding of how a reader achieves this would certainly count as having a complete analysis of what we do when we read). Nevertheless, we do have a good understanding now of some of the basic building blocks of skilled reading that are part of the cognitive system we use to extract an understanding of life in Imperial Russia. One of these elements of the skilled reading

system is letter-sound translation. This simple process plays a part even in complex reading tasks such as the comprehension of novels. *The Brothers Karamazov* has 48 characters, and it is not easy to keep track of all of them: for example, Marfa Ignatyevna appears in Chapter 37 and her previous appearance in the book is way back in Chapter 14. How does the reader store knowledge of this woman in Chapter 14 which can last until it is needed in Chapter 37? Those of you who read Russian novels will know the answer. You create a representation of the pronunciation of her name when you come across it in Chapter 14, and then you again translate the letter strings Marfa Ignatyevna from print to speech when you come across them again in Chapter 37. This allows you access to the information you have already associated with the pronunciation of her name when you read about her in Chapter 14.

But how do you generate a pronunciation for a string of letters that you have never seen before, such as Marfa Ignatyevna when she first occurs in the book? You do this by applying what you have learned, as you learned to read, about the rules that relate particular letters to their particular sounds. You've learned these rules for English, and it may be that Russian letter-sound rules are rather different, so that the pronunciation you assign to Marfa Ignatyevna may be wrong; but that won't matter. As long as the pronunciation you assigned in Chapter 14 via your letter-sound rules coincides with the pronunciation you assign that way in Chapter 37, you will be able to keep track of this minor character.

Reading would be tedious and inaccurate, however, if it were always based on applying letter-sound rules to all the words on the page. It would be tedious because slow: it takes time to generate pronunciations from print via application of letter-sound rules. And it would be inaccurate, at least for English, because many English words disobey the standard letter-sound rules of English. Applying the rules to yacht will give you something that rhymes with 'matched'; applying the rules to aunt will give you something that rhymes with 'haunt'. About 25 per cent of the 8000-odd monosyllabic words of English have pronunciations which disobey the letter-sound rules: these are the exception or irregular words of English, and many of them are amongst the most commonly-occurring words of the language (have, good, do, are, said, were, etc). Skilled readers escape the tedium and the error of reading via pronouncing to themselves because they have learned to rapidly and automatically recognise words to which they have frequently been exposed; this rapid automatic recognition of familiar words as wholes makes no use of letter-sound translation.

Thus skilled reading of *The Brothers Karamazov* involves the use of these two components of the

reading system – two reading sub-skills: application of letter-sound rules and rapid automatic recognition of familiar words as wholes. Of course, skilled reading of the novel depends on far more than these two simple reading abilities; but the abilities upon which skilled reading depends include these two. This much reading researchers have already shown, as they travel the path towards having a complete analysis of what we do when we read.

If letter-sound rule application and rapid whole-word recognition are reading subskills which are components of the skilled reading system, then they are subskills which a child will have to master if that child is to become a skilled reader. This is why many programs for reading instruction involve both phonics instruction (teaching children what the letter-sound rules are) and sight-word recognition (teaching children to recognise individual isolated words as wholes).

Knowing how to translate an unfamiliar word from print to speech by 'decoding' (sounding out the printed word's components) is sometimes useful even for the skilled reader, as in our Russian novel example above. But it is vastly more useful for children as they are learning to read – for a simple reason. A normally-developing seven-year-old child will have an auditory vocabulary of perhaps 10,000 words, but may be able to recognise in print fewer than 100 words, since seven-year-old children have usually only just begun learning to read. So it will constantly be the case, as a child looks at a page, that there will be words on the page which the child has never seen before and so cannot recognise in print, and yet could easily recognise if the words were heard. Given this, consider how useful it would be if the child had available some mechanism for converting print to speech ('sounding-out'): this would allow visually unfamiliar words to be recognised by ear. Application of letter-sound rules is just such a mechanism. In English this will fail for a proportion of words (the irregular words) but it will succeed for the majority (the regular words). This provides the child with a self-teaching mechanism. If the child is looking at the word tree, for example, and has never seen it before, applying some simple letter-sound rules to this letter-string will yield the pronunciation 'tree', and this the child can recognise: that allows the child to learn that the visual form tree is the word 'tree' and eventually to be able to recognise tree rapidly and automatically as a familiar visual form, without the need to translate it to speech via letter-sound rules.

Teaching the child what the letter-sound rules are equips the child with what's needed to carry out this self-teaching procedure. Teaching the child the rapid visual recognition of isolated whole words helps the child deal with words which disobey the rules. This also helps the

child to make the gradual transition from the crucially important but cumbersome sounding-out stage to an ability to recognise a large number of words rapidly and automatically – that is, the transition to skilled word recognition.

When one studies children who are having difficulties in learning to read, one finds some children whose difficulties lie in the first phase—they are having difficulties in mastering the use of letter-sound rules to sound out what's on the printed page. There are various scientifically validated and commercially available training programs to help children who are having difficulties at this phase. But there are also other children whose difficulties are at the second phase: even if they have mastered the use of letter-sound rules to sound out what's on the printed page, they struggle to move beyond this to build up a sight vocabulary of words which they can recognise instantly and automatically without needing to sound them out. Reading scientists have begun to discover what methods are effective in remediation of children who are having this particular kind of difficulty in learning to read (see Broom & Doctor, 1995; Brunson, Hannan, Coltheart and Nickels, 2002).

This conception of the teaching of reading is firmly grounded in what we know about the structure of the skilled reading system, is widely accepted amongst reading researchers, and is supported by a great deal of research on learning to read. Thus there is a solid body of scientific knowledge about how children learn to read, what they should be taught in the course of early reading instruction, different ways in which children find learning to read difficult, and effective methods for helping such children.

The points we have made above about learning to read apply just as much to learning to spell. Reading and spelling are symbiotic and hence should be taught together. Indeed, teaching of writing/spelling is a particularly powerful way of imparting to children an understanding of the alphabetic principle. Treiman (1998) presents evidence that spelling instruction should be part of beginning reading instruction rather than bringing it in later, or treating it as a separate subject. Spelling instruction facilitates the learning of rules and patterns to add to phonemic awareness (e.g. use of 'x' versus 'cks' in fix), and knowledge of morphology – appreciation of the significance of smaller meaningful parts or roots of words (e.g. 'ed' or 'ful').

Treiman's evidence also suggests that children who learn to spell words from their reading program make faster progress in learning to read than children who are taught to spell words that are not in the texts they are reading. Practice in spelling is more helpful to reading than vice versa, so using spelling as a remedial method

can be very profitable for both skills (Bradley, 1981). These insights concerning how learning to read can be helped by instruction in spelling and writing are the basis for one effective program for teaching literacy, the Spalding program, as is evident from the very name of the program's textbook: *The Writing Road to Reading* (Spalding and North, 2003).

### **The three national surveys of children's reading levels and of classroom practices in the teaching of reading**

Given that much is already known about learning to read and spell, about the difficulties some children have in this domain, and about how these difficulties can be treated, it is rather surprising that in the past decade the governments of three major developed countries – the USA, the UK and Australia – have been sufficiently concerned about how poorly their country's children were learning to read that each commissioned a national survey of reading standards and the classroom teaching of reading.

In the USA, Congress established the National Reading Panel in 1997, its task being to assess the effectiveness of different approaches used to teach children to read. It reported on 13 April 2000<sup>1</sup>.

In the UK, Parliament established in 2004 a House of Commons Select Committee on the Teaching of Reading, which conducted several hearings in 2004–2005. It reported on 7 April 2005<sup>2</sup>. The outcome was an announcement on 3 June 2005 that Jim Rose, a former Deputy Chief Inspector of Schools, had been asked to lead an independent review to examine best practice in teaching reading, emphasising the crucial role of synthetic phonics instruction in the reading curriculum.

In Australia, on 30 November 2004 Dr Brendan Nelson, then Federal Minister for Education, Science and Technology, launched the Australian Government National inquiry into the Teaching of Literacy. The Inquiry was intended as a broad, independent examination of reading research, teacher preparation and practices for the teaching of literacy, particularly reading. On 8 December 2005, this Inquiry issued its report and its recommendations in a document entitled 'Teaching Reading'.<sup>3</sup>

On the basis of its literature review, the Australian Inquiry reached the conclusion that the evidence indicates that the Whole Language approach to the teaching of reading, currently the most widely used approach to the teaching of reading in Australian schools<sup>4</sup> (we say more below about what the Whole Language approach is), is not in the best interests of students, especially those students who are having difficulty learning to read.

Rather, in order to be able to progress with reading instruction, children need to acquire the basic building blocks for reading, including letter knowledge (the names and sounds of the alphabet), phonological awareness (explicit appreciation of the sounds of language and how words are composed of these sounds) and a grasp of the alphabetic principle (the principle that the individual sounds of language can be represented by individual marks on the page – letters).

The inquiry concluded that the evidence is very clear as to what is essential for an effective program for the teaching of reading: much research has shown that, for any reading program to be effective, it must include throughout its first two or three years extensive systematic explicit instruction in synthetic phonics. Let us explain exactly what these terms mean.

First, what is ‘synthetic’ phonics? A child being taught that ‘cat’ can be analysed into three sounds – ‘kuh’ ‘a’ and ‘tuh’ – that correspond to the three letters of the word is being taught analytic phonics; a child being taught that the letters c a and t correspond to the sounds ‘kuh’ ‘a’ and ‘tuh’ and that these can be put together (synthesised) to make the syllable ‘cat’ is being taught synthetic phonics. Either type of phonics instruction helps children learn to read but research shows that the synthetic approach helps children more (Watson & Johnson, 1998).

Second, what’s meant by explicit instruction? This contrasts with implicit instruction, sometimes referred to as ‘discovery learning’: here you present children with a number of examples and let them figure out the rules for themselves. Few children will be able to figure out the rules of phonics by discovering these rules for themselves: most will need to be told explicitly what these rules are, and then trained in their use (Kirschner, Sweller and Clark, 2006).

The conclusions of this Australian literature review are completely consistent with those reached in the other recent national surveys of the teaching of reading mentioned above. For example, the USA National Reading Panel concluded that:

... the Panel’s findings demonstrate that learning phonics skills is critical for positive reading development. However, the best results will be achieved when direct instruction is combined with the development of other skills, and when teachers are able to use a combination of direct instructional strategies to achieve those skills.

And the UK Select Committee observed:

In accordance with the available evidence, the DfES [Department for Education and Skills] now seems to have accepted that phonics is an essential methodology in teaching children to read. The present debate revolves around the status of phonics within

early teaching of reading and the type of phonics programme that should be used.

All three inquiries have thus reached the same conclusion: systematic instruction in phonics is an essential component of any effective method of teaching reading<sup>5</sup>.

### **The Whole Language approach to the teaching of reading**

The emphasis above on reading and spelling as depending upon a set of skills which need to be explicitly taught contrasts markedly with a different approach to teaching reading and spelling which is currently widely adopted in Australian primary classrooms: the ‘implicit holistic’ Whole Language approach, where children are seen as active self-governed learners who construct knowledge of reading by themselves with minimal instruction in decoding. One exposition of this approach has the following to say:

Whole language represents a major shift in thinking about the reading process. Rather than viewing reading as ‘getting the words’, whole language educators view reading as essentially a process of creating meanings. Meaning is created through a transaction with whole, meaningful texts. It is a transaction, not an extraction of the meaning from the print, in the sense that the reader-created meanings are a fusion of what the reader brings and what the text offers. ... In a transactional model, words do not have static meanings. Rather, they have meaning potentials and the capacity to communicate multiple meanings. (Altwerger, Flores, & Edelsky, 1991, p. 32)

Although this quotation suggests that the whole language approach is new, this is not so. The approach goes back as far as the 19th century philosopher of education John Dewey and his advocacy of what was called ‘progressive education’. As far as the teaching of reading is concerned, according to Dewey:

It is one of the great mistakes of education to make reading and writing constitute the bulk of the school work the first two years. The true way is to teach them incidentally as the outgrowth of the social activities at this time. (Dewey, 1896)

This idea that reading and writing should be taught incidentally rather than explicitly is a key feature of the Whole Language approach to reading instruction.

A second key feature of this approach is that children are encouraged to guess freely at words which they fail to recognise:

It is not indeed necessary that the child should be able to pronounce correctly or pronounce at all, at first,

the new words that appear in his reading, any more than that he should spell or write all the new words that he hears spoken. If he grasps, approximately, the total meaning of the sentence in which the new word stands, he has read the sentence. ... And even if the child substitutes words of his own for some that are on the page, provided that these express the meaning, it is an encouraging sign that the reading has been real, and recognition of details will come as it is needed. The shock that such a statement will give to many a practical teacher of reading is but an accurate measure of the hold that a false ideal has taken of us, viz., that to read is to say just what is upon the page, instead of to think, each in his own way, the meaning that the page suggests. (Huey, 1908, p. 348-349)

As the major modern advocate of Whole Language put it, reading is “a psycholinguistic guessing game” (Goodman, 1967, p. 126).

In general, the Whole Language approach claims that learning to read develops naturally in the same way that acquisition of spoken language occurs naturally, and is biologically pre-programmed, so that learning to read is a natural process which children can do for themselves. “Written language is language, and what is true for language is true for written language... babies acquire a language through actually using it and this model of acquisition explains the learning of reading and writing” (Altwerger, Edelsky, and Flores, 1987, p. 145). But this can't be right, because literacy is a cultural invention, not a universal human characteristic. The belief that reading is a ‘natural process’ whose development should not be interfered with by explicit instruction has become entrenched amongst primary school teachers and popular pundits such as children's author Mem Fox<sup>19</sup>, and has been endorsed by Australian Departments of Education. This belief has, however, been universally rejected by reading scientists.

### **What are Australian trainee teachers taught about the teaching of reading?**

In addition to its literature review, the Australian Inquiry into the Teaching of Reading surveyed all the four-year Bachelor of Education courses around Australia. This survey's findings included the following:

- (a) In almost all such courses, less than 10 per cent of course time was devoted to preparing student teachers to teach reading; in about half of these courses this percentage was less than 5 per cent.
- (b) Many students undertaking BEd courses have poor literacy skills themselves and lack knowledge of such concepts as phonemic awareness, phonics and the alphabetic principle; yet these are just the kinds

of concepts that they will need to teach children if their teaching of reading is to be effective.

- (c) On the whole, beginning primary teachers are not confident about teaching some specific aspects of literacy, namely spelling and grammar, as well as phonics.
- (d) Barely a third of senior staff in schools think that beginning teachers are adequately prepared to teach children to read.
- (e) New teachers are graduating without sufficient specific strategies to improve literacy standards.

So the results of this survey suggest that, as far as the teaching of reading is concerned, the situation in teacher training courses in Australia is grave, which means that the classroom situation in Australia will also be grave.

The Committee made 20 recommendations<sup>7</sup> which they hope will improve the situation. These recommendations include:

- Teachers should be equipped with teaching strategies based on findings from rigorous, evidence-based research that are shown to be effective in enhancing learning to read in all children (i.e., including children who are having difficulty in learning to read).
- Teachers should provide systematic, direct and explicit phonics instruction so that children master the essential alphabetic code-breaking skills required for foundational reading proficiency.
- The teaching of reading throughout schooling should be informed by comprehensive, diagnostic and developmentally appropriate assessments of every child.
- The conditions for teacher registration of graduates from all primary and secondary teacher education programs should include a demonstrated command of personal literacy skills necessary for effective teaching of reading.
- All schools should have a highly trained specialist literacy coordinator to support school staff in developing and monitoring children's progress in individual literacy plans, especially for those children with reading difficulties.
- Literacy teaching should continue throughout schooling (Kindergarten to Year 12), and specialist literacy teachers should be available in each school.
- Teacher education and training should include more specific and evidence-based training in the teaching of reading and include ongoing professional learning throughout the teaching career.
- A national program of literacy action should be set up to design, produce, and evaluate guidelines concerned with the effectiveness of teaching literacy, and to promote research into the best teaching practice.

## **Children with specific difficulties in learning to read**

The situation for the thousands of children in Australian schools who are struggling with literacy requirements every day, and whose future will be seriously compromised if they do not receive expert help, is especially serious. While up to 20 per cent of children and adolescents are said to emerge from their education experience in Australia with ‘very poor levels of literacy’ according to numerous surveys<sup>8</sup>, around 10 per cent have intransigent reading difficulties which seriously limit their capacities for healthy adjustment in our society.

The Australian Inquiry review gave rather minimal attention to this problem, and education departments across the country have never given much more than tokenistic attention to children failing to achieve functional literacy. The program *Reading Recovery*, which is provided in many Australian schools for children identified as having slow development of reading skills in the early years, has not been successful in making a difference to the outcome of children with genuine reading problems (Chapman & Tunmer, 2000), despite beliefs to the contrary in the education system. Improved teaching of reading in the early years will help to reduce the numbers of children with difficulties over the longer term. But we have enough expertise now, from the science of remedial intervention, to make a difference to the existing problems (Hatcher, Hume and Ellis, 1994), and to save many children from the undesirable consequences of poor literacy. These undesirable consequences include low confidence and self-esteem, social, emotional and behavioural problems, vulnerability to delinquency and crime, early drop-out from education, and under- or unemployment. We know that training in, and adoption of, evidence-based interventions such as synthetic phonics, along with strategy-based instruction as noted above, applied intensively and consistently for sustained periods of time over the school years, does make a difference for children who would otherwise struggle to learn to read.

Therefore training of teachers in evidence-based remedial approaches for children who will struggle to read and spell should be a priority for training agencies. This needs to encompass not only students in teacher training, but teachers currently in the system who find themselves lacking in knowledge and skills to help the children in their classrooms with reading difficulties.

## **What actions are required following the review and recommendations?**

Critical, well-researched reviews of the teaching of reading

are important; but if they are not followed by action to produce change for the better, they will of course have no impact on what happens in the classroom. There is now opportunity following the Australian national review of the teaching of reading to take steps to significantly improve outcomes for Australian children in learning to read and write.

Firstly, a thorough overhaul of teacher training systems and courses in the universities and colleges is needed to properly equip teachers to teach reading well and with confidence, in ways which are based on scientific evidence, not on trends in educational philosophies. This is the responsibility of the teacher training and certifying agencies including university departments of education. It will involve an injection of the latest research and scholarship into the teacher training courses, based on the evidence about how the complex skill of reading develops and can be effectively fostered in young children. This is likely to require university staff to undertake professional development and update themselves in the science of reading.

Secondly, intensive professional development and training is needed for teachers who are working in the system already, so that they understand how to provide a valid evidence-based approach to their teaching of literacy skills. In addition, they need support in assessing the efficacy of their instruction by closely monitoring children’s progress and taking steps to provide extra help for those who are struggling – before the problems become entrenched.

Thirdly, there is need for a raising of awareness in parents and families in the community of the importance of preparing their children for success in reading, through pre-reading activities at home and in play, including introducing their children to letters and sounds in the pre-school stage.

## **What has been done so far?**

The Nelson Review was published in December 2005 (twelve months prior to the time of writing). We have identified a number of responses which have been subsequently made to this review at Federal Government level:

- The Federal Minister for Education, Science and Training, the Hon. Julie Bishop, in a media release in May 2006 noted that although Australian children do relatively well in comparison with other countries, too many were failing to reach national benchmarks in reading. She emphasised highlights from the ‘Teaching Reading’ report relating to teacher education, teaching quality, the use of proven techniques and early assessment of reading skills. Bishop also noted that

she would be working collaboratively with states and territories on the literacy agenda.

- The Council of Australian Governments (COAG) has discussed a range of reforms to improve literacy and numeracy standards as necessary underpinnings to Australia's economic prosperity. Bishop wrote in May that:

Senior officials from all governments have agreed that by December 2006, proposals will have been prepared for consideration by COAG that will focus on increasing the proportion of young people meeting basic literacy and numeracy standards and improving overall levels of achievement.

Thus far, no specific recommendations have been announced.

- From the 20th Ministerial Council for Education, Employment, Training and Youth Affairs Meeting in Brisbane (held 6-7 July 2006), a joint Ministers' Communique was released on literacy and numeracy reform. It stated that:

... agreement was reached on three priority areas for national collaborative action that have the greatest potential to lift literacy and numeracy outcomes across Australia. The three priority areas are teacher preparation, capacity building and assessment. The Federal Government, States and Territories will work with the Deans of Education, Teacher Accreditation Authorities and Teaching Australia to ensure that beginning teachers are being adequately prepared with the skills and knowledge to lift literacy and numeracy outcomes. The Ministers will also request a report on the strategies that build capacity in teachers, including professional development, to improve student outcomes.

- Recommendation six of the review actually calls for "highly trained specialist literacy teachers with specialised skills in teaching reading to be responsible for linking the whole-school literacy planning process... and supporting school staff". Consistent with this recommendation is the recent call by the Victorian Education Department for applications for 45 literacy coordinator positions in schools as recommended in the review. This is a welcome step forward: but if we have so few educators with the requisite knowledge and skills to teach reading, to evaluate standards and to identify and treat children who are failing, where are these experts to come from?

As far as we know, though, none of the Australian tertiary institutions which provide teacher training, nor any of the state Departments of Education except in Victoria, have yet acted in any way in response to the review and its recommendations. We know of no plans for the universities to improve the training of teachers in the

science of reading, and in evidence-based methods for teaching reading and assisting children with difficulties in learning to read. This is despite the fact, noted in the Nelson Report, that it is currently possible for Australia's future teachers to complete a Bachelor of Education course in Australia with less than two per cent of total credit points devoted to instruction in the teaching of reading.

## Acknowledgement

This paper was originally commissioned and published by the Academy of the Social Sciences in Australia, as the sixth in a series of Policy Papers (Occasional Paper 1/2007). It is reproduced with the permission of the publisher.

## Endnotes

1. See [www.nationalreadingpanel.org](http://www.nationalreadingpanel.org).
2. See [www.publications.parliament.uk/pa/cm200405/cmselect/cmmeduski/121/12104.htm](http://www.publications.parliament.uk/pa/cm200405/cmselect/cmmeduski/121/12104.htm).
3. See [www.dest.gov.au/nitl](http://www.dest.gov.au/nitl).
4. For example, De Lemos (2002) reports a survey of 272 Victorian teachers, 77 per cent of whom reported that they relied on Whole Language methods for the teaching of reading. See De Lemos, M. (2002). *Closing the Gap between Research and Practice: Foundations for the acquisition of literacy*. Camberwell, Vic: Australian Council for Educational Research.
5. Anti-phonics advocates interested in fanning the flames of the 'Reading Wars' sometimes claim – or imply – that those who consider phonics instruction to be important advocate reading programs that consist solely of phonics instruction; but there is no one who takes such a position.
6. 'Never ever teach reading': Fox, M., at [www.memfox.com/ten-read-aloud-commandments.html](http://www.memfox.com/ten-read-aloud-commandments.html) (accessed August, 16 2006).
7. See [www.dest.gov.au/nitl](http://www.dest.gov.au/nitl).
8. See for example, ABS (1997): 7.

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# School-related social adjustment of Chinese primary school students with specific learning difficulties: a perspective from Hong Kong

Man Tak Yuen, Peter Westwood, and Gunter Wong  
*University of Hong Kong*

## Abstract

Studies in several countries have indicated that students with specific learning difficulties (SpLD) tend to exhibit problems in social adjustment in addition to their difficulties in academic learning. It is often recommended that students with SpLD undergo social skills training as well as receive intensive remedial teaching. This study investigated the extent to which school-related social adjustment problems were evident in a sample of Chinese students of primary school age who had been identified by an educational psychologist as having a specific learning difficulty. Data were collected by questionnaire from 34 students with SpLD (individually interviewed; oral administration), 167 students without learning problems (group administration; written form), and the 34 teachers of the students with SpLD. Results indicated that although the SpLD students rated themselves lower than the students without learning difficulties on several aspects of social adjustment there was no evidence to suggest that they had major problems in this area. The teachers rated the SpLD students lower than the students rated themselves on most aspects of social adjustment, but the ratings given by the teachers suggested that they too did not perceive the students as having major inadequacies in social adjustment. The findings are discussed, with particular reference to the methodological problems associated with the use of self-reporting as a technique to obtain data in research involving primary school-age students.

## Introduction

Students with specific learning difficulties (SpLD) are, by definition, of at least average intelligence, and are free from any significant cognitive, physical or sensory impairment. They exhibit no primary emotional disorders and they have not suffered any marked degree of cultural or linguistic disadvantage. Like all other students, students with SpLD have had normal opportunities to learn through exposure to conventional teaching methods – yet they exhibit extreme difficulty in acquiring adequate proficiency in reading, writing, spelling, and basic mathematical skills (Lyon, 2002; Silver & Hagin, 2002). The most common form of specific learning difficulty – dyslexia – impairs the normal acquisition of basic literacy skills, and this in turn can cause problems in learning and assessment across most subjects in the school curriculum (Vukovic & Siegel, 2006).

Much of the international research in the SpLD field tended at first to focus almost entirely on the academic, cognitive, linguistic, and perceptual factors associated with the learning problem, rather than attending to any personal, affective and social dimensions. In recent years interest in exploring the social, emotional and motivational correlates of SpLD has greatly increased, and the literature in this domain has expanded considerably (e.g. Bryan, 1998; Firth, 2003; Hampton & Mason, 2003; Klassen, 2002; Pavri, 2006; Vaughn & Sinagub, 1998; Wong & Donahue, 2002). In addition to

learning difficulties within the curriculum, students with SpLD are frequently reported to have other problems in the domains of language, self-regulation, and social adjustment (Fletcher et al., 2002; Lyon, Fletcher & Barnes, 2003; Tur-Kaspa, 2002).

## Social adjustment of students with SpLD

Major interest in the social adjustment of students with SpLD was kindled by the work of Tanis Bryan (1974a; 1974b). Bryan's studies, and those of others such as Hutchinson, Freeman and Bell (2002) have revealed that many SpLD students in English-speaking countries exhibit major difficulties in establishing and maintaining satisfactory peer relationships. As a result of this, their self-esteem and quality of life can suffer. It is not unusual to find such students displaying signs of anxiety, depression, and loneliness. Hutchinson, Freeman and Bell (2002) report that classmates often do not interact socially with SpLD students, virtually isolating them within the classroom community. Bryan (1998) suggests that almost 60 per cent of SpLD students experience the problem of being ignored, isolated, or rejected by classmates. In addition, some SpLD students may become victims of teasing and bullying.

Hazel and Schumaker (1988) completed a review of research on social skills of students with SpLD, and in general the findings supported a view that social adjustment problems are common in this group. These

writers conclude that students with learning difficulties may develop behaviour problems of one kind or another that further impede positive interactions with peers. Many other studies, reviewed in a comprehensive meta-analysis by Kavale and Forness (1996), confirm that as many as three out of four students with SpLD also display social skills deficits and significant social adjustment difficulties. So common are social adjustment problems said to be in this population of students that in the United States, steps have been taken to ensure that deficits in social adjustment are clearly mentioned within the official description of a specific learning difficulty (Mather & Goldstein, 2001). However, Kavale and Forness (1995) point out that not all SpLD students display deficits in social adjustment, and it is not absolutely certain that such problems are an integral part of the core syndrome of specific learning difficulty.

According to Kavale and Forness (1995), there may be several possible explanations to account for these difficulties in social adjustment, including the hypothesis that the academic learning difficulties in fact cause the social problems by undermining the child's confidence and by causing peer group rejection or isolation. Another hypothesis suggests that students with SpLD are not adept at picking up interpersonal skills vicariously by observing other people. There is evidence also to suggest that some SpLD students are weak in reading social situations such as interpreting the emotions of others from non-verbal cues. These social cognition deficits have been reviewed comprehensively by Tur-Kaspa (2002), who concludes that some students with SpLD select immature or incompetent solutions to social problems or situations. In addition, Hallahan and Mercer (2002) suggest that some students have a language processing difficulty that manifests itself as a problem in acquiring normal pragmatic use of everyday language – sometimes referred to as a lack of 'communicative competence'. This weakness interferes with their ability to interact easily and effectively in normal social contexts and may irritate other students, resulting in avoidance or rejection. Finally, a view is expressed that the social adjustment problems may be associated more with secondary disorders that accompany the learning difficulty, such as hyperactivity, distractibility, or aggression, rather than with the learning problem or poor attainment per se.

In the literature it is frequently recommended that students with SpLD should undergo counselling and social skills training as well as receive intensive remedial teaching (e.g. Gresham, Sugai & Horner, 2001; Hazel & Schumaker, 1988); and many curriculum guides and training programs have been developed to teach pro-social skills to these students (e.g. Cornish & Ross, 2004; Merrell & Gimpel, 1998; Siperstein & Rickards, 2004).

It must be noted, however, that some authorities express doubts about the efficacy of such interventions. Elksnin and Elksnin (2001, p. 1) have remarked that, "Several comprehensive analyses of the treatment effects of social skills training indicate that it has minimal effect on the behaviours of children with learning disabilities and behaviour disorders". Bullis, Walker and Sprague (2001, p. 89) have commented that, "Unfortunately we do not know the necessary intensity or duration for the social skills intervention to be effective, and we are uncertain of the precise combination of components that should be added to the treatment to achieve maximum effect". There is much still to be discovered on how best to implement social skills training for students with SpLD.

### **The Hong Kong context**

It was originally thought that dyslexia occurred only in cultures using a graphophonic system for written language, but it is now evident that similar difficulties occur in other language systems using logographic or semi-logographic systems (such as Chinese) (Hanley & Huang, 1997; Ho, Chan, Tsang & Lee, 2002; Salili, 1999). It is even suggested that there may be a similar incidence of reading problems in Chinese language as in English, although the nature of the specific difficulties displayed by Chinese dyslexic children may be qualitatively different (Woo & Hoosain, 1984). In the past five years increased interest has been shown in identifying, and providing services for, students with SpLD in the Hong Kong education system.

Commenting on the current situation in Hong Kong, Chan (2002) reports rapidly growing awareness among parents and educators that some students experience major difficulties in learning to read and write in Chinese, their first language. Until recently, there had been no standard procedure available for identifying students with SpLD, although an observation checklist for teachers had been developed as the first stage for referral. Now, once a student is suspected of having a specific learning difficulty, an educational psychologist, a guidance teacher, the parents and classroom teachers become involved in the assessment process. The child's homework samples, teachers' and parents' observations, tests of word (character) recognition, and formal assessments of intelligence are used to provide a detailed profile of the student's existing skills and learning characteristics. Often the social adjustment of the student is also assessed through classroom observation and oral interviews.

An extensive review of the research literature on SpLD among Chinese students (e.g. Chan, 2002; Chan, Ho, Tsang, Lee, & Chung, 2004; Lee & Tsang, 2004; Ho,

Chan, Tsang, & Lee, 2002) revealed that no previous study had specifically examined the affective aspects of SpLD – and in particular the social adjustment of SpLD students in Hong Kong.

The study reported here set out to examine from three perspectives the social adjustment of a sample of Chinese students of primary school age who had been identified by an educational psychologist as having SpLD. The three perspectives adopted represented firstly the views of the children themselves concerning their own social adjustment. Secondly, the views of the students with SpLD were compared with the responses on the same questionnaire from a peer group of students with no learning difficulties (NLD). Finally, the responses from the students with SpLD were compared with the views of their teachers concerning the students' social adjustment.

It was hypothesised that compared with students of the same age who are making normal academic progress, these students would display an awareness of their social adjustment problems. It was further hypothesised that the teachers of the SpLD students would also perceive these students to have social adjustment problems.

## Method

### Participants

*Students:* The two groups of students used in this study comprised: (i) a sample of 34 students identified by educational psychologists as having SpLD; and (ii) a random sample of 167 students of similar age (Primary 3 to Primary 6 levels) with no learning difficulties (NLD). The students in both samples were distributed across classes in 16 primary schools in Hong Kong. The schools had been invited to participate in the study if they had any students on roll that had been assessed by an educational psychologist and found to have SpLD. Table 1 summarises the demographic details relating to both samples.

*Teachers:* The 34 teachers of the students with SpLD also participated in the study by providing data on the students' social adjustment.

### Instruments

A 20-item questionnaire, *Social Adjustment Scale: Student Form* (SAS [S]), was developed by the writers specifically for this study. The instrument was prepared first in English and then translated into Chinese. The topics addressed in the questionnaire covered key aspects of social adjustment and social skills appropriate for students of primary school age. To ensure the instrument had adequate construct and content validity, its design was influenced by items in *Matson Evaluation of Social*

*Skills with Youngsters* (Matson, Rotatori & Helsel, 1983), the *Walker-McConnell Scale of Social Competence and School Adjustment* (Walker & McConnell, 1995), and the *School Social Behavior Scales* (Merrell, 1993). These instruments are generally accepted as psychometrically sound. The questionnaire embodied a six-point Likert-type rating scale for each item, with 1 indicating strong disagreement with a given statement and 6 indicating strong agreement. Table 2 contains the actual items in the questionnaire. For the purpose of analysis the items were clustered into sub-scales representing the domains of 'making friends', 'being assertive', 'meeting social expectations', 'collaborating with others', and 'feeling emotionally comfortable in school' (see Table 2).

A parallel version of the questionnaire, *Social Adjustment Scale: Teacher Report Form* (SAS [T]), was also devised, focusing on exactly the same topics as contained in the students' questionnaire. For example, the students' version of an item might be worded as: "I get on well with other children in the class", while the teachers' version stated: "The student gets on well with other children in the class". The teachers were required to report their perceptions of each student's social skills and social competence against the same 20 items.

Prior to the study, feedback on the content and suitability of the two questionnaires was solicited from relevant professionals (educational psychologist, counsellor, and teachers). As a result, some modification was made to the wording of several items in the Chinese version. The reliabilities of the sub-scales and of the whole scale were found to be adequate (subscale alphas ranged from .72 to .93; whole scale alpha, .87).

### Procedure

In the participating schools, the students with SpLD and the students without learning difficulties (NLD) all completed the SAS[S]. The NLD students completed a written form of the questionnaire. For the SpLD students the questionnaire was administered orally and individually to avoid any possibility that a student might not be able to read and understand the items. The oral administration with the SpLD students was carried out by either the child's own teacher, a student counsellor in the school, or the research assistant engaged for this project.

The teachers of the 34 SpLD students completed a written form of the SAS [T], focusing on exactly the same items as appeared in the students' version.

## Results

### Demographics

Table 1 provides information on the sample of students

with no learning difficulties (NLD) and the selected group of students with specific learning difficulty (SpLD) used in this study. In the NLD group the 167 students were fairly evenly distributed across the four school-year levels (Primary 3 to Primary 6 inclusive). The sample contained slightly more boys than girls, but the imbalance was not significant. In the SpLD sample the 34 students were not so evenly spread across the year levels with rather more students in Primary 3 than in any of the upper primary classes. Gender imbalance is very noticeable in the SpLD sample, with over seven boys to every girl student. This imbalance mirrors the reportedly much higher prevalence of males in the SpLD population as a whole (Prior, 1996).

#### *Social adjustment*

Table 2 provides a summary of the means and standard deviations for the students' responses to the items in the *Social Adjustment Scale*. Data for the two samples (NLD and SpLD) have been presented in parallel to permit direct comparisons. A high rating reflects a high degree of agreement with a *positively worded* statement describing a desirable aspect of social adjustment. Ratings of 4.5 and above on the six-point rating scale can be regarded as an indication of reasonably strong agreement with a given statement. Ratings below 3 suggest increasing lack of agreement.

Looking first at the data from the SpLD students, it can be seen from the mean scores that in general they did not perceive themselves to have major problems in school-related social competence domains. In only one item (Q.15. 'I am a good leader in school') did they rate themselves below 3.0 in terms of group mean

(although in nine other items a few individual students rated themselves below 3.0, as reflected in the standard deviations recorded in Table 2). In 16 out of 20 items they rated themselves at 4.0 or above. The implications from these results are discussed later.

Turning to the comparison between the SpLD students and the NLD group, it can be seen from Table 2 that the NLD students tended overall to respond even more positively than the SpLD students to the items in the social adjustment questionnaire. Mean ratings above 4.5 were evident in 14 items (70%) for the NLD students, compared with seven items (35%) for the SpLD students. This suggests that in general, although the SpLD students were reasonably positive about most aspects of their social adjustment, the NLD students held even more positive beliefs about their own social adjustment.

Table 2 reveals that a statistically significant difference existed between NLD and SpLD students on eight out of the 20 items in the scale. Specifically, the SpLD students appear significantly less likely than NLD students to volunteer for classroom duties ( $F = 13.64, p < .001$ ); were significantly less likely than the NLD students to help others with their class work ( $F = 25.67, p < .001$ ); were a little less likely to seek help from others ( $F = 7.33, p < .01$ ); believed themselves slightly less likely than NLD students to obey classroom rules ( $F = 9.06, p < .01$ ); and were significantly less likely to see themselves as being good leaders in school ( $F = 11.11, p < .01$ ). In general, students in both samples tended to feel that they did not argue or fight with other students, but the SpLD students were a little less positive than the NLD students about this ( $F = 4.73, p < .05$ ). Surprisingly, in

Table 1: Demographics of the students without learning difficulties (NLD) and students with specific learning difficulties (SpLD)

Demographic	Students with no learning difficulties (NLD) (n = 167)		Students with specific learning difficulties (SpLD) (n = 34)	
	n	%	n	%
Gender				
Male	86	51.5	30	88.2
Female	77	46.1	4	11.8
Gender not recorded	4	2.4	-	-
Grade				
P.3	37	22.2	14	41.2
P.4	41	24.6	9	26.5
P.5	43	25.7	6	17.6
P.6	45	26.9	5	14.7

Table 2: Social adjustment – Comparing students with no learning difficulties (NLD) with the sample of students with specific learning difficulties (SpLD)

Items & Sub-scales	Students with no learning difficulty (NLD) (n = 167)		Students with specific learning difficulties (SpLD) (n = 34)		F-value
	Mean	SD	Mean	SD	
1. I am friends with many other children in the class.	4.71	1.32	4.75	1.34	0.02
2. I am not shy when called upon in class.	4.34	1.56	4.62	1.41	0.90
3. I do not often argue or fight with other children.	4.98	1.39	4.41	1.33	4.73 *
4. Other students never tease me.	3.46	1.61	4.15	1.60	5.10 *
5. I am very happy at school.	4.92	1.32	4.79	1.43	0.23
6. I have two or more good friends in the class.	5.10	1.65	5.12	1.30	0.00
7. I am confident to answer when the teacher asks questions.	4.52	1.23	4.32	1.49	0.65
8. I am not the cause of trouble in the classroom.	4.63	1.26	4.03	1.45	6.04 *
9. I always ask for help from the teacher or friends when needed.	4.74	1.23	4.06	1.76	7.33 **
10. I am never worried or anxious in school.	4.04	1.59	4.29	1.64	0.70
11. I often talk and play with my friends at recess/lunch.	5.13	1.20	4.74	1.62	2.62
12. I often volunteer for duties in class.	4.65	1.26	3.71	1.75	13.64 ***
13. I obey the classroom rules.	4.92	1.02	4.29	1.47	9.06 **
14. I often help other students with their class work.	4.63	1.09	3.50	1.60	25.67 ***
15. I am a good leader in school.	3.34	1.53	2.37	1.58	11.11 **
16. I think I am popular with other children in class.	3.69	1.51	3.49	1.40	0.50
17. I can usually get my own way when I need to.	4.61	1.24	4.31	1.37	1.55
18. I do not often get angry.	4.47	1.39	4.24	1.60	0.76
19. I always join in class activities without being told to.	4.95	1.15	4.68	1.41	1.48
20. I feel very good about myself in school.	4.66	1.28	4.54	1.36	0.21
<b>Sub-scales</b>					
1. Making friends	18.65	3.75	18.09	3.60	0.64
2. Being assertive	18.09	3.56	16.96	3.77	2.77
3. Meeting social expectations	18.99	3.93	16.97	4.07	7.34 **
4. Collaborating with others	17.77	3.43	16.38	4.21	4.24 *
5. Feeling emotionally comfortable in school	16.97	4.24	16.00	3.77	1.52
Total score of SAS	89.61	15.52	84.40	13.59	3.32

\*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

Table 3: Social adjustment – Comparing perceptions of teachers and their students with specific learning difficulties (SpLD)

Items & Sub-scales	Teachers (n = 34)		Students with specific learning difficulties (SpLD) (n = 34)		F-value
	Mean	SD	Mean	SD	
This student ...					
1. Is friends with many other children in the class.	3.94	1.13	4.75	1.34	7.27 **
2. Is not shy when called upon in class.	4.15	1.46	4.62	1.41	1.82
3. Does not often argue or fight with other children.	4.12	1.57	4.41	1.33	0.69
4. Other students never tease this student.	4.27	1.08	4.15	1.60	0.13
5. Is very happy at school.	4.32	0.84	4.79	1.43	2.73
6. Has two or more good friends in the class.	4.00	1.35	5.12	1.30	11.98 **
7. Is confident to answer when the teacher asks questions.	3.36	1.85	4.32	1.49	5.48 *
8. Is not the cause of trouble in the classroom.	3.62	1.76	4.03	1.45	1.11
9. Always asks for help from the teacher or friends when needed.	4.21	1.23	4.06	1.76	0.16
10. Is never worried or anxious in school.	4.00	1.10	4.29	1.64	0.75
11. Often talks and plays with friends at recess/lunch.	4.27	1.19	4.74	1.62	1.87
12. Often volunteers for duties in class.	3.44	1.19	3.71	1.75	0.53
13. Obeys the classroom rules.	3.88	1.51	4.29	1.47	1.30
14. Often helps other students with their class work.	2.41	1.33	3.50	1.60	9.31 **
15. Is a good leader in school.	2.41	1.10	2.37	1.58	0.02
16. Is popular with other children in class.	3.44	0.99	3.49	1.40	0.02
17. Usually gets his/her own way when necessary.	2.82	1.29	4.31	1.37	21.17 ***
18. Does not often get angry.	4.24	1.46	4.24	1.60	0.00
19. Always joins in class activities without being told to do so.	3.35	1.50	4.68	1.41	14.12 ***
20. Feels very good about him/herself in school.	3.53	1.24	4.54	1.36	10.35 **
<b>Sub-scales</b>					
1. Making friends	15.79	3.34	18.09	3.60	7.33 **
2. Being assertive	13.70	4.99	16.96	3.77	9.12 **
3. Meeting social expectations	15.85	5.76	16.97	4.07	0.85
4. Collaborating with others	14.24	3.65	16.38	4.21	5.04 *
5. Feeling emotionally comfortable in school	14.26	3.30	16.00	3.77	4.08 *
Total score of SAS	73.56	13.51	84.40	13.59	10.88 **

\*p &lt; 0.05, \*\*p &lt; 0.01, \*\*\*p &lt; 0.001

this study the NLD students seemed to believe a little more strongly than the SpLD students that they risk being teased by other students ( $F = 5.10, p < .05$ ). The reason for this particular result is not clear, but might be explained by the possibility that SpLD students were trying to present the interviewer with a good impression and did not wish to admit to teasing. This important issue of 'saving face' is discussed later. Finally, the SpLD students, compared with the NLD students, were a little less sure that they were not the cause of classroom trouble ( $F = 6.04, p < .05$ ).

Table 2 also shows that when differences between group means for the separate sub-scales of the questionnaire were analysed, two of the five sub-scales ('Meeting social expectations' and 'Collaborating with others') yielded statistically significant differences between the two samples, favouring the NLD students. 'Meeting social expectations' covered such behaviours as obeying classroom rules, behaving age-appropriately, and controlling temper and aggression. In this important aspect of social adjustment the SpLD students felt relatively less confident than the NLD students. 'Collaborating with others' included behaviours such as asking for (or giving) help and joining willingly in classroom activities. Again, the SpLD students saw themselves as rather less likely than the NLD students to engage in these pro-social behaviours.

Finally, the ratings given by students with SpLD to their own social adjustment were compared with the ratings given to them by their teachers using the SAS: Teachers' Report Form.

It can be seen from the data in Table 3 that the teachers tended to rate the social adjustment of students with SpLD somewhat lower than the students rated themselves in 16 out of the 20 items (80%). Indeed, there was a significant difference in the overall mean score for whole 20-item scale between the SpLD students' own rating of their social adjustment and the rating given to them by their teachers ( $F = 10.88, p < .01$ ). Some of the differences on individual items were small, but in seven items the difference between teachers and SpLD students reached statistical significance.

The subscale differences indicate that in particular, teachers perceived the SpLD students to be less assertive than the children rated themselves, less able to make friends, less successful in cooperating with other students, less willing to join in classroom activities, less confident in answering questions, and less happy or satisfied with life in school. However, it is essential to note that in only three items in the questionnaire were the teachers' mean ratings below 3.0 on the six-point scale. This suggests that the teachers did not perceive any severe degrees of social maladjustment in these students. The SpLD students' areas of greatest deficit, as reported by the teachers,

were a lack of leadership qualities, unwillingness or an inability to help other students with their work, and a lack of success in getting their own way.

### Discussion

The first picture emerging from the data collected in this study suggests that the SpLD students rated their own social adjustment rather more positively than might have been expected, based on evidence in the extant overseas research literature on this topic (e.g. Bryan, 1998; Hazel & Schumaker, 1988; Hutchinson, Freeman & Bell, 2002; Kavale & Forness, 1996). In only one item out of 20 did the SpLD students obtain a mean rating below 3.0 on a six-point scale, suggesting the majority held a generally positive view of their own social adjustment.

Is this a true finding? Are Chinese students with SpLD better socially adjusted than counterpart students in other cultures? Or have the students in this study simply responded to the questions in a way that would present their social adjustment in the most positive light in the interview situation? The answer to that question is impossible to determine from the data here; but it is certainly true that in Chinese society 'saving face' and not being thought of by others as in any way inadequate is a strong motivating force (Smith and Bond, 1993). For example, a child when faced with items such as 'I have two or more good friends in the class' or 'I am confident to answer when the teacher asks questions' may agree with the statements, even though the reverse situation may actually apply in the classroom. Self-worth theory suggests that most individuals will act in ways to protect their own self-image (Covington, 1992) and this may have influenced the children's responses in this study. A second possibility is that students with SpLD at this age are not fully aware of their degree of social adjustment, and their mainly positive self-evaluation may actually represent a distorted perception of self. Further research is needed to determine if this is the case (see below).

It was possible to check the accuracy of the children's perception by comparing it with ratings given by others, in this case the children's own teachers. This produces a second picture, revealing that teachers rated the SpLD students' adjustment and competence less positively than the children's own ratings. Data in Table 3 show that the teachers rated the SpLD students' lower on 80% of the items in the questionnaire, with seven of the differences (and the overall score for the whole questionnaire) reaching statistical significance. However, it must be noted that in only three items (15%) did the teachers rate the students below 3.0 on a six-point scale, providing very little support for the notion that these students have severe deficits in social adjustment, as typically implied

in the overseas research literature. While the SpLD students here did not rate themselves quite as highly as the comparison group of students without learning difficulties, the differences were not very marked in most cases, and it cannot be inferred from students' or teachers' responses here that social adjustment is a major problem with this Chinese group.

As stated above, teachers perceived the SpLD students to be somewhat less assertive, less willing or able to adopt leadership roles, less able to make friends, less successful in cooperating with and assisting other students, less likely to volunteer for duties, and less happy or satisfied with life in school. Although the degree of deficit in these domains is certainly not severe in this sample of students, it is important for teachers to be aware that some SpLD students may need help in developing more positive behaviours or skills in these areas. The judicious use of pair activities, group work, peer tutoring, and collaborative projects can provide opportunities for such social development to occur; and teachers can make sure that students with learning difficulties are given appropriate leadership roles in class from time to time. Such socialising approaches are fully supported for all children in the current educational reforms being implemented in Hong Kong's schools (Education Commission, 2000).

The final picture emerging from the data suggests that, as a group, these primary school-age Chinese children with SpLD are not exhibiting social adjustment deficits to the extent reported for similar students in several studies overseas. While a few individual students in the sample were slightly less confident than others concerning some aspects of their own social adjustment, the majority did not feel inadequate, and their teachers did not perceive them as socially inadequate. There is no evidence at all in this study to suggest that special intervention programs for social skill training would be needed with these students.

### Limitations of the study

There are limitations in this study. Firstly, the sample of SpLD students is relatively small ( $n = 34$ ), although large enough to justify statistical analyses. Secondly, the predictive and concurrent validities of the questionnaire are not established, although the items were adapted from existing scales of accepted validity and reliability. The items do appear to have adequate content validity and internal reliability. Thirdly, a different adult (teacher, counsellor, or research assistant) administered the questionnaire individually with each SpLD student, possibly resulting in some variation in administration procedures. To minimise the effect,

detailed printed instructions were given to all personnel before implementation in an attempt to standardise the procedure as much as possible. Finally, it could also be argued that the survey was undermined by having the NLD students complete the questionnaire in writing (as a group) while the SpLD students were interviewed individually face to face. While the items were identical, the procedure used was not. The dilemma for the researcher seeking to obtain information from young students with SpLD is how to present the questions if there is doubt that the students can read and comprehend the items in written form.

Future studies are needed to determine whether indeed Chinese students with SpLD are less prone to deficits in social adjustment. Such studies could adopt a different approach involving direct classroom observation and monitoring of a sample of SpLD students across a range of social activities inside and outside of the classroom. It would be relevant also to investigate whether social deficits become more prevalent as SpLD students move into adolescence – a period during which social adequacy and positive interpersonal relationships become even more important.

The authors invite researchers in Australia to conduct a similar study to explore the social adjustment of students with SpLD (and their perceptions of their own learning problems) and compare the findings with those from these students in Hong Kong. Permission is freely granted for use of the *Social Adjustment Scale: Student Form* (SAS [S]) and *Teacher Report Form* (SAS [T]) for this purpose.

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## **A history of Learning Difficulties Australia: part four – managing change**

Josephine C. Jenkinson

### **Abstract**

As the Australian Remedial Educational Association (AREA) approached its silver jubilee in 1990, significant changes were occurring in education. The principle, if not the practice, of integration into mainstream schools for students with disabilities had been widely adopted by education authorities, one outcome being an expectation that class teachers would provide for much greater diversity within the mainstream. Broader changes in education, including in end-of-school assessment, posed further challenges. During the decade from the mid-1980s to the mid-1990s, AREA was occupied in much internal discussion as Council searched for a framework that would encompass new ideas about special education while maintaining its service for remedial consultants as a priority. The association overcame financial and other difficulties, surviving with a new name, the Australian Resource Educators Association, to reflect an expansion of membership beyond the traditional concept of remedial teacher.

### **Changes in special education**

By the early 1980s changes were looming in special education. The Victorian integration policy was considered at the time to be far in advance of policies both in other parts of Australia and overseas, with implications for the whole educational community (Jenkinson, 1987). With the introduction of integration teachers qualified in special education into schools, class teachers would be expected to cope with the whole spectrum of learning difficulties and disabilities.

But teachers remained concerned about inadequate support services and class teachers' lack of training in the instruction of students with disabilities. Teachers qualified in special education were reluctant to move out of special schools and abandon specialist programs. Integration teachers were appointed without qualifications in special education, a further cause for concern within AREA<sup>1</sup>. Many parents, too, failed to embrace integration. The Victorian Government back-tracked on its initial proposal to phase out special schools, eventually adopting a policy of parent choice which promised equivalent funding for students with disabilities on the basis of educational need, regardless of the setting in which students with disabilities received their education (Jenkinson, 2001).

AREA shared many practical concerns about the Victorian integration policy and its implementation, especially when a Ministry of Education publication, *Advising Disabled Students: A Guide for Teachers*, made no reference to the needs of students who were underachieving or who had learning difficulties<sup>2</sup>. The association endorsed the principles underlying integration, however: the 1985 Mona Tobias Award was presented to Kevin Stone for his

pioneering work in establishing an integration unit in the rural town of Cobram, which had significantly influenced the development of policy in Victoria<sup>3</sup>.

Despite the large number of students in mainstream schools now being supported under the integration program, students with specific learning disabilities still did not receive assistance within the school system. A review of the program, commissioned by the Victorian Department of School Education (DSE), was quick to point out this fact:

The Commonwealth criteria specifically exclude students with learning disabilities [who]... are a very small percentage of the school community [and] who have specific information processing problems that can be described as a disability. This group of students is not to be confused with the larger group of students (up to 13 per cent) who are often described as having learning difficulties such as socio-economically disadvantaged students.

While there is an acknowledgement of the initiatives provided by DSE to assist students with learning difficulties (e.g. Reading Recovery), there is still a small number of students with severe learning disabilities who need some additional support. These learning disabled students could have their educational needs more adequately met from within the regular school program if:

- (i) the school is supported in gaining the expertise to identify these students as having specific/severe learning disabilities as distinct from learning difficulties, and
- (ii) the school has access to teacher training programs, professional development activities and other support. (Cullen & Brown, 1992, pp. 14-15)

The report only added to confusion over definitions of learning disability. Deakin University academic, Des Pickering, who chaired the Cullen-Brown Implementation Advisory Committee, was invited to attend a Council meeting to report on its implications. Pickering suggested that AREA, as a professional association, could devise an operational definition of learning disability based on research findings to argue their case for support. AREA organised a committee of representatives of various organisations to “formulate a viable definition of learning disability that would be accepted by government”<sup>4</sup>.

The result was a set of recommendations by AREA to the Ministry of Education, relating specifically to the distinction between learning disabilities and the more general concept of learning difficulties:

It is proposed that the term learning difficulties be used to refer to a learning condition displayed by students who have difficulty learning academic skills potentially due to one or more of a number of different causes. The term learning disabilities is proposed to be used to refer to those students who have severe difficulty learning academic skills, due to specific ‘narrow-band’ cognitive influences that in turn may be linked with neuropsychological factors.

The need for making this distinction has implications for issues associated with both diagnosis and teaching. In terms of teaching, learning disabled students are proposed to need instruction in the cognitive abilities necessary for learning in a particular area of academic performance, as well as in the academic area itself.

... Diagnosis of learning disabilities needs to target both the existence and extent of difficulty in the associated cognitive areas<sup>5</sup>.

AREA also referred to the extent to which the needs of children with both learning difficulties and learning disabilities were unmet, questioning whether such programs as Reading Recovery were designed to meet the needs of students with learning disabilities. The association recommended cooperative actions to address these issues, including facilitating provision of information to schools, preparing a professional development package, developing a registration or certification system for teachers and others offering their services as ‘remedial educators’, and offering forums of ‘experts’ in learning disabilities<sup>6</sup>. These proposals remained firmly within AREA’s traditional mould.

### **Seeking a new identity**

Early in 1983 AREA Council met to consider future developments in the context of changing societal, economic, and technological expectations. A discussion

paper considered these changes in terms of the needs of students, of the school and the teacher, and of AREA<sup>7</sup>.

In relation to students, the paper identified a need to update teaching and evaluation practices in the light of increased understanding of the learning process, predicting that the meaning of such terms as ‘learning difficulty’, ‘learning disabled’ and ‘low achiever’ would need to be modified in relation to medico-biological and psycho-educational models of human learning. The ability of remedial students to cope in a more technologically complex world was also considered in relation to new skills that were likely to emerge.

Changing models of special needs provision implied future changes in the roles and responsibilities of classroom and remedial resource support teachers. Both would require additional training to accommodate changes in teaching methods, delivery of instruction, and evaluation. Legal requirements and economic accountability implied a need for a code of ethics for remedial teachers and possible changes in AREA’s criteria for accrediting remedial education consultants. Finally, increasing use of technology meant changes in the way in which information was disseminated.

When it came to considering the needs of AREA, the association did not yet appear ready for radical change. Much of the debate centred on immediate solutions rather than on the longer term role envisaged in the discussion paper. Apart from considering changes in the association’s aims and objectives, discussion focused on improvements in office administration; introduction of special interest groups; improving communication; whether new services were needed or some existing services should be curtailed; improving policy-making and decision-making; and greater member involvement<sup>8</sup>.

Council also considered the association’s name. The term ‘remedial’ had become less acceptable to the educational community: it did not reflect the role of the resource teacher and was out of favour in government schools, reinforcing a perception that AREA was biased towards independent schools<sup>9</sup>. Council wanted to keep the ‘AREA’ acronym, and agreed to put a proposal to a general meeting to change the name to ‘AREA/Australian Remedial Education Association/A Resource for all Educators’. This somewhat clumsy proposal had a less than enthusiastic response, and further action was deferred until 1987 when Council agreed to canvas all members for suggestions for a new name for both the association and the journal<sup>10</sup>.

The role of the association continued to be a focus into the mid-1990s. Early in 1989 the president, Dr Pat Long, called a dinner meeting of Council to discuss new directions, with “members to think seriously about issues which they believe should be discussed or reviewed”<sup>11</sup>.

Nominated issues included the difficulty in maintaining membership, and identifying the clientele, which in the past had been seen as the ‘intelligent underachiever’. Students with other disabilities, including sensory impairments, emotional disturbance, and English as a second language, were also presenting for individual help, so that ‘students with special needs’ might be more appropriate. Council questioned whether there should be more focus on parents, and the fields and activities AREA should concentrate on. Crucial to the discussion was whether AREA was primarily a professional association concerned with a code of ethics and professional standards, or whether it should have a wider role. Practical concerns included the Australian Special Book Service (ASBS), the need to advertise and to attract sponsors, affiliations, and publications – especially the *Bulletin* and journal<sup>12</sup>. A follow-up meeting raised more general questions about AREA’s aims and objectives, whether the association was meeting the needs of members, and what short- and long-term changes were needed<sup>13</sup>. There were no immediate answers, but the discussion foreshadowed changes that would follow in the 1990s.

### Consultant referral service

Although there was much questioning of the direction AREA should take, support for consultant members remained the dominant role. The referral service was growing: in 1982–83 the number of requests for referral had reached 150, and by 1986 this number had more than doubled to 340. The high volume of enquiries was, according to the president, Dianne Betts, an indication “that the need for adequate services to students with special needs will continue to be an Association priority”<sup>14</sup>.

Nevertheless, more publicity was needed. The General Practitioners Association agreed to place a notice in their journal about the referral service<sup>15</sup>. An article in the *Waverley Gazette* produced a large number of enquiries from the Waverley area<sup>16</sup>. Council also considered ways of expanding into country areas. A proposal to apply for funding for a van to provide counselling and remedial services for teachers and schools in rural areas did not get off the ground; more feasible suggestions involved working with SPELD to develop a register of people available to work as consultants outside the metropolitan area, and a statement in the *Bulletin* that AREA was interested in fostering member groups in country areas.

Criteria for consultant membership were amended in 1986 to include a minimum of three years documented teaching experience in a recognised institution or its equivalent, as determined by Council<sup>17</sup>. As the association grew, it became necessary to vet qualifications of members more strictly. Under Dr Pat Long’s presidency,

a Consultants’ Register was set up and applicants were required to provide documentary evidence of their qualifications in addition to their experience in remedial or special education<sup>18</sup>. Consultant members continued to be mainly primary-trained teachers, reflecting the fact that the majority of referrals were children of primary age<sup>19</sup>.

New consultants received a certificate and *Guidelines for AREA Consultants in Private Practice*. The latter was a practical document developed by the Consultants’ Sub-committee under Anne Pringle, aimed at ensuring that consultants maintained professional standards in their work with clients. Consultants were advised to discuss their role and area of specialisation with parents and to provide printed information on their fees for specific services. A suggested schedule of hourly fees, based on Department of Education rates for four-year trained teachers, was recommended. Procedures for referral to other professionals, contact with schools when appropriate, the need to preserve confidentiality of medical and other records when reporting to other agencies, and guidelines for recording data and report writing were also included. Consultants were advised to take out professional indemnity insurance<sup>20</sup>.

Commercial learning schemes and tutors were multiplying: many “disillusioned and redundant” teachers were setting up in private practice, often attracting students who required more than just coaching. This situation posed a threat, not just to the livelihood of qualified remedial teachers in private practice, but to standards of remedial education, as many of the teachers lacked postgraduate qualifications in special education. The president, Anne Pringle, challenged Council members to declare a stronger stand for students with learning difficulties, urging them to think beyond the image of the remedial teacher “in the broom cupboard”, as the classroom helper, the “easy solution for difficult cases”, or the unacknowledged source of valuable teaching ideas:

... there is a great deal of prejudice to overcome and a lack of confidence in [the] special educator’s own right to work as s/he feels is appropriate. Much of this is imposed by the community and particularly [by] the regular school teacher’s defensive attitude towards his or her skills in the classroom.

The genuine full-time private practitioner ... is particularly vulnerable, having little, if any, support from the teaching profession. The practitioner has no convenient resources supplied by the government or institution and no securities. Fees are based on face to face work only. Clientele is derived from ‘success’ cases or advertising. Should a pupil not succeed in the eyes of the parent or regular school teacher, the private practitioner is placed in an unfavourable

position which can label the practitioner's abilities unfairly<sup>21</sup>.

The work involved in matching students to consultants was substantial, and to relieve the administrative load Rosemary Carter was appointed Referral Service Officer in 1991<sup>22</sup>, a position she continued to fill in a voluntary capacity until April 2002. The task became more complex when financial difficulties prompted introduction of a fee, equivalent to the fee for one teaching session, for consultant members receiving a referral from the service<sup>23</sup>.

Whether or not as a result of the referral fee, there was a small decline in consultant membership between 1990 and 1992. Nevertheless, AREA maintained its expectations of consultants' professionalism. Council approved the addition of a paragraph to the *Guidelines* stating its expectation that consultants would observe professional ethical standards in all aspects of their work, and reserved the right to withdraw consultant registration if these standards were not met<sup>24</sup>. The criteria for consultant membership were amended to include "additional postgraduate training equivalent to at least one year of a recognised course of study in the area of special education including a supervised practicum"<sup>25</sup>. Examples of such courses included the Graduate Diploma in Special Education, Bachelor of Special Education, and Bachelor of Education (Special).

Private practice was becoming more complex as business regulations changed, and in 1993 AREA initiated support group meetings for consultants. These meetings provided a forum for discussion of a range of issues, including the role and responsibilities of private consultants, student and parent perspectives, and individual cases that concerned group members<sup>26</sup>.

In a strong defence of remedial teaching, Nola Firth, a Council member, reiterated the advantages of private consultancy (Firth, 1993). Consultants could assess a child's abilities independently of the school situation and had a better understanding of the nature of learning difficulties than was usually possessed by class teachers. Assessment could include information about the child's achievements and difficulties from several sources, including school reports, medical history, parents, students themselves, and current assessments which school personnel may not have the time to do or which may not fit an ideology that was against singling out individual students. Specialist help could be offered by the consultant or through referral to other professionals. The one-to-one situation was accepting and supportive and could help raise the child's self-esteem. Further, the consultant could be an "independent and authoritative advocate" for the child, facilitating communication between parents, teachers and other professionals.

Where did referrals come from? A breakdown of

enquiries in 1989 showed that most (37.5 per cent) came from schools, followed by SPELD (16.7 per cent) and parents (16.2 per cent). Fellow members accounted for about 10 per cent and Yellow Pages advertising about 6 per cent, the remainder coming from psychologists (4.3 per cent) and paraprofessionals (4.1 per cent), student services, the Krongold Centre (Monash University), and the Australian Council for Educational Research. Just over half the students referred were at upper primary level (50.8 per cent), with, apart from a handful of adults, the remainder distributed fairly evenly among lower primary, and upper and lower secondary<sup>27</sup>. Data collected in mid-1990 indicates that just under one fifth of referrals were from independent schools. The majority (54 per cent) required assistance with reading and general areas, followed by 43 per cent requiring assistance with maths<sup>28</sup>. Students needing help with upper secondary maths remained the most difficult to place.

## Membership

Although there had been pleasing increases in membership over the first few years of the association, AREA was constantly seeking ways to expand. Fluctuations in financial membership occurred over the years, but at fewer than 1000 members AREA remained small compared to other professional associations. The most important change in membership over the association's first 25 years was in its composition, from predominantly remedial teachers in independent schools and private practice to a much wider representation in which independent school teachers were now a minority. A survey of AREA subscribers in 1990 indicated that the Ministry of Education accounted for 40 per cent of members, independent schools 25 per cent, and Catholic schools 20 per cent. Full time primary and secondary special education teachers made up 53 per cent of the membership, class teachers 11 per cent, and the remainder were specialists in special education and related areas, including academics. This balance would continue over the next few years<sup>29</sup>. The great majority – 89 per cent – described themselves as working in the language area. Although the proportion of members from tertiary institutions was relatively small, the active participation of academic staff in teacher training colleges, soon to merge into universities across the state, would have significant long-term implications for AREA.

The association received a boost when the fledgling Australian Language Disorders Association (ALDA) decided to join with AREA<sup>30</sup>. ALDA membership was evenly balanced between speech therapists and special education teachers, but with only 68 members it could not remain viable on its own. Following discussion between

the two organisations, AREA Council formed a sub-committee to examine the amalgamation, which it finally agreed to accept in December 1990<sup>31</sup>. Maureen Pollard, ALDA Secretary, was co-opted on to Council, and ALDA was given a segment in the *Bulletin*. Other benefits for ALDA members were increased professional and public awareness of specific language disorders, AREA publications, professional development opportunities, and, for qualified ALDA members, inclusion on the AREA Consultants' Register<sup>32</sup>.

Services for members were mainly in the form of publications and professional development. The *Bulletin* continued as a forum for regular communication. In 1986 each issue adopted a different theme: for example, reading comprehension, spelling, process writing, and the needs of secondary students, and in 1987 a regular case study was added, based on consultants' experiences. Other regular contributions included Council news, notices of outings, reviews, books available from ASBS, articles, information and research, and a thematic component to include ideas and strategies<sup>33</sup>. By 1990 the *Bulletin* was benefiting from greater sophistication with the use of computers and word processing, and had changed to A4 size. The format changed yet again in 1991 with an experimental version of an A3 sheet folded into A4 and printed in two columns.

The other major AREA publication, the *Australian Journal of Remedial Education* also continued to flourish (see Part Five in this series).

A long-term commitment of Council was to expand both the number and range of activities offered in AREA's professional development program. The program for 1984 included process writing, teaching strategies for older failing readers, parent communication, resources and strategies for spelling, and visits to the Department of Education Reading Research and Treatment Centre, Altona Special Education Unit, and Glendonald School for the Deaf<sup>34</sup>. For the first half of 1985 activities included Applications for Computer Resources, a solicitor speaking on Children's Rights and Teachers' Liability within the School Setting, a visit to the Alfred Hospital to observe a case conference, and an all-day seminar on Whole Language Teaching and Reading Assessment by Professor Dorothy Watson of the University of Missouri<sup>35</sup>. Catering for an increasing demand for remedial education in maths, John Munro continued to run the Mathematics Learning Centre at Melbourne State College<sup>36</sup>.

In 1988 a successful seminar was organised in conjunction with the Australian Association of Special Education and the Australian Reading Association, with presenters from the USA, Professors Ken and Yetta Goodman. The Goodmans were promoted as "internationally acclaimed proponents of the whole

language approach to developing literacy in children", which had become a significant trend in the teaching of reading. A donation of \$1500 from Mrs Brenda Sleigh was used to make a videotape of another workshop by the Goodmans on their return to Australia to lecture on 'Language and thinking in school: A whole language curriculum'<sup>37</sup>.

Attendance at workshops offered by people without appropriate professional qualifications, one being a proposed workshop on educational kinesiology, was not encouraged. Members were advised that AREA Council did not endorse this workshop or other "non-educational" activities run by persons without recognised qualifications. While such presentations provided an opportunity to be informed about methods which claimed to assist persons with learning difficulty, they had, as yet, no basis in recognised research. Members should question the validity of any method and its claim to alleviate learning problems within a short time. As teachers responsible for the welfare of children in their care, members were also in a position to advise parents about appropriate professional services, and if in doubt could seek advice from members of the teaching profession who had undertaken a higher level of study involving research and expertise in a particular field<sup>38</sup>.

Despite fluctuating attendances, the professional development program would continue to be a crucial component of AREA's services to members, offering a wide variety of topics which regularly included classroom use of computers.

## Submissions and lobbying

With changes in end-of-school assessment, equity for students with learning difficulties was the subject of a submission by AREA to the examining authority, the Victorian Institute for Secondary Education (VISE). The submission emphasised the importance of providing wide publicity about procedures for applying for special assistance. At the invitation of VISE, two AREA representatives met with VISE Chairman, Dr Lindsay MacKay, to discuss these issues, followed by a letter to VISE regarding problems of student communication and an offer to assist with an appropriate format for an information brochure<sup>39</sup>.

On 19 March 1986, AREA sent VISE a draft article prepared for the *Bulletin* on a 'consideration of disadvantage' program proposed by VISE for students presenting for the HSC. The Registrar of VISE was critical of the proposed article, and provided a copy of the VISE Advice to Students, which it suggested should be published as an alternative. The Registrar noted in his reply:

Having studied your article I think I should make it quite clear that the provision of scribes for candidates with learning disabilities is essentially a last resort situation and then only with the strongest medical support and the principal's recommendation ... Generally speaking, special examination arrangements for students with learning disabilities will take the form of extra time concessions<sup>40</sup>.

Memos accompanying the response set out strict limits on the extra time allowed, depending on the nature of the disability, and the procedures for applying for special consideration.

The president, Dianne Betts, responded with a modified document which was specific to learning disability and HSC, identifying AREA's concerns as written expression, reading skill and reading comprehension<sup>41</sup>. The response also noted that

AREA supports the strict controls on granting ... special provisions ... : only those with a definite identifiable handicap should apply, and each application must be backed by reports from professionals who have assessed the case ... such a report could include reports from a medical practitioner, from a psychologist, from a specialist in reading and from appropriate staff at the school (p. 3).

Discussions on assessment equity continued to occupy Council meetings as VISE became VCAB (Victorian Curriculum and Assessment Board). At the end of 1989 AREA proposed to develop a policy statement regarding the assessment of students with learning disabilities in country schools, and sent a list of questions to VCAB in advance for discussion at another planned meeting. In due course a document was received from a VCAB Working Party on Integration entitled 'VCAB Advice on Special Provision for Students with Physical Disabilities or other Impairments', which AREA planned to publish in the *Bulletin*. A sub-committee formed to consider issues relating to equity now added problem-solving in mathematics, in which there was a large verbal component, to the main areas of concern for students with learning difficulties<sup>42</sup>.

## Administration

Other issues took a back seat as AREA became more entwined in administrative concerns. After more than 20 years it was time to fine-tune AREA's legal and administrative basis. In 1987 AREA was incorporated under the *Associations Incorporation Act*, and an amendment was made to the Constitution limiting to three the number of annual terms a president could hold office. The amendment also clarified the terms of Council members:

The Association shall be governed by a council

consisting of the honorary officers of the Association and eight members. Each member of the Council shall be elected to serve for one year. The honorary officers shall be members of the Association and shall consist of a President, Vice-President, Honorary Secretary, Honorary Assistant Secretary, and Honorary Treasurer<sup>43</sup>.

In 1994 AREA adopted the concept of 'presidential succession', with the president-elect to be a member of Council each year<sup>44</sup>. As national membership broadened, postal voting for office bearers replaced the annual election at the AGM. Council began to discuss ways of including more interstate members in decision-making, resolving to appoint an interstate Council member to attend one meeting each year and to participate in the remaining meetings via teleconference<sup>45</sup>.

Financial concerns would continue to plague AREA well into the 1990s, but came to a head when the National Conference, held in Melbourne in 1990, made a loss of over \$12,000, placing the association in a precarious financial position. As a celebration of the first 25 years of AREA, the conference had an ambitious program but had attracted fewer than 200 registrants. At a meeting of Council, attended by accountant Humphrey Clegg and solicitor Alwyn Samuel, a sub-committee was formed to examine ways of cutting publication costs, particularly for printing, mailing and handling of advertising, which were a major drain on the association's resources<sup>46</sup>. There was no question that AREA should continue to publish the journal, but several cost-cutting measures were recommended for the *Bulletin*. Each issue was to be restricted to no more than eight leaves and to be A4 size so that it could be mailed with the journal. Collating would be done by Council members. The journal print run would be closely monitored to avoid printing a surplus, with care taken in distribution to ensure that it was not sent to non-member subscribers<sup>47</sup>.

Cost-cutting was also sought in other areas. A further meeting discussed a phasing-down of ASBS activities with a view to terminating salaried staff from December 1990. Council debated whether the role of the ASBS was to provide a service to teachers rather than to make money, but agreed that the service should not be an encumbrance. However ASBS could not compete with educational publishers whose representatives sold books and materials direct to schools. Cuts in funding to special education departments meant that orders were frequently not large enough to justify a discount, in some cases necessitating a surcharge on small orders for ASBS to break even<sup>48</sup>.

Another issue that occupied AREA during 1990 was the so-called 'sticker campaign', to be run in conjunction with SPELD under the general title of 'Literacy for Everyone'<sup>49</sup>. The campaign involved printing of 120,000

stickers. Failure to obtain sponsors, unauthorised printing of a letter containing both grammatical and factual errors, and costs incurred in paying a marketing company led to disagreements between Council and the campaign sub-committee and the resignation of two Council members<sup>50</sup>. Finally, a joint meeting of AREA and SPELD agreed to abandon the campaign.

A resolution was passed that no member of Council should authorise any work involving a financial commitment without Council's authorisation. Further, no person was to be employed without a written contract approved by Council which specified the purpose of the contract, the time involved, estimated costs, including possible inflation effects, procedures for payment, set times for review of the contract, and a clause that would allow the contract to cease if it was in AREA's interest. Anyone associated with AREA was to be fully informed of AREA's objectives and functions as a professional body dedicated to assisting children with learning difficulties<sup>51</sup>.

It was a difficult time for AREA, not least because divisions had been created between long-standing Council members who had, over the existence of the association, made substantial contributions. Options for the future were put forward, including closing AREA altogether, putting it into recession until more interest and finance were available, continuing with reduced services to cut costs, or continuing at the present level and attempting to borrow or raise funds. Another option was to appoint an Executive Officer with a computer to work part-time in low-rent premises<sup>52</sup>.

AREA did not fold, however. The incoming President, Anne Pringle, proposed a new framework for the operation of sub-committees to be discussed by Council, clearly intended to tighten up actions taken on the association's behalf. Ten sub-committees were proposed: conference; workshops and visits; language; maths; computers; study skills; equity; publicity; publications, and policies. Each member of Council would convene a sub-committee which would consist of at least four members, and the convenor would provide a report on activities at each Council meeting. Correspondence was to be typed on official letterhead and copies retained at the AREA office. When a more formal structure for sub-committees came into force, a chart was drawn up to indicate lines of responsibility<sup>53</sup>.

As the difficulties continued, Pringle continued to push for greater involvement by Council members in the future of AREA, writing again on 11 October 1990 to outline current problems. "The outcome of the meeting tonight will determine the directions AREA will take," she wrote. "The financial situation will be discussed in detail and the result ... will depend on you as a Council member."

At this point Pringle enlisted the assistance of Peter

Jeffery, who had worked in educational organisations both professionally and in an honorary capacity, to review the future viability of AREA. Jeffery recommended that AREA continue as "a worthwhile body representative of the special educator"<sup>54</sup>, but made several recommendations that involved restructuring of AREA's administration to achieve substantial cost savings. These included discontinuing the rented office, disposing of ASBS, establishing a link with a school or tertiary institution, outsourcing much of the administrative work, and putting the various activities of AREA, including conferences, on a more business-like footing<sup>55</sup>. Over the next few years most of these recommendations were implemented.

By mid-1991 the financial position had improved, and the auditor, Humphrey Clegg, reported a surplus of \$4,958, helped by an increase of \$10,000 in subscriptions over the previous year – attributed, with hindsight, to the previous year's conference<sup>56</sup>.

It was a much-needed boost of confidence, and in October 1991 Anne Pringle wrote to the Institute of Education at the University of Melbourne, seeking closer ties with that organisation<sup>57</sup>. Tenancy of the Kew office was not renewed – indeed it was questioned whether AREA actually needed office space since by now the ASBS had moved to Methodist Ladies College (MLC), and most business was conducted by mail or phone. On 11 June 1992, Pringle met with Dr Graeme Clunies-Ross, Head of the Department of Educational Psychology and Special Education at the University of Melbourne, and two of his colleagues to discuss the possibility of AREA using office space at the university. AREA, which would remain independent, would require a room with a telephone "for one or two persons to attend to office duties". In return AREA could assist the Department by providing opportunities for students to undertake practicum with remedial consultants. One week later, conditions and expectations were agreed and the office was moved. Darryl Greaves was delegated to liaise with AREA on behalf of the university. It was his first contact with the association; later he would be elected to Council and become President<sup>58</sup>.

The termination of ASBS combined with reduced rent and publicity costs gave AREA a much sounder financial base. In 1992 the auditor reported another surplus. This position would be maintained over a number of years as revenue from referrals and workshops started to pick up<sup>59</sup>. Relocation to the University of Melbourne also provided a central meeting place for the association, professional stimulus, and an opportunity to reorganise AREA's services<sup>60</sup>.

The Mona Tobias Award continued as an annual event. In 1993 AREA inaugurated the Bruce Wicking

Award, which had been set up by Bruce Wicking's family and friends to be administered by AREA. Wicking had been deputy principal of Glamorgan, the Geelong Grammar preparatory school, during the 1960s and early 1970s. His philosophy of education, to "let them run a little", was expounded in his books. In the mid-1970s Wicking founded Currajong, in East Malvern, a school for "intelligent underachievers". The award was made to an individual or organisation who, in the opinion of the judging panel, had made an innovative and continuing contribution to the education of children with special needs. The first recipient was Patricia McCulloch, the founding principal of Andale, a school in Hawthorn which catered for children who failed to thrive in the regular school<sup>61</sup>.

### **Moving ahead: a name change and a proposal for restructuring**

A new name for the association had still not been decided, and in 1993 a committee was convened, with Darryl Greaves as chair, to resolve this issue. Greaves suggested that 'Australian Resource Educators Association' would provide a broader focus, and a majority of council members agreed to present this proposal to AREA members at the next AGM<sup>62</sup>.

Greaves (1993) stated his case in the *Bulletin*. He referred to the fact that AREA had been considering a change of name for several years, based on negative connotations of the word 'remedial', which implied that the problem lay with the child. While it could be argued that 'remedial' was a "well-known and respected" word, the sub-committee believed that AREA should reflect the professional interests of its members. The association was seeking to expand its membership, and wanted to include all teachers who had an interest in students with special needs, not just those who saw themselves as 'remedial'. The name change and the broadening of focus which it reflected were, according to Greaves, significant events in the life of AREA, and he gave credit to the sub-committee's open-mindedness in reaching a decision. The choice kept the AREA acronym but was more inclusive of membership.

At the 1994 Annual General Meeting members present agreed to an amendment to Clause 1 of the constitution, finally approving the change of name to Australian Resource Educators Association.

In 1994 a sub-committee, convened by Nola Firth, was set up to examine the concept of chapters within AREA<sup>63</sup>. Its aim was "to clarify the currently very broad title of 'Australian Resource Educators Association' and to clarify the sub-groups within it and their roles". Chapters could be based initially on the current functions

of AREA with addition of a new area for 'resources', allowing the present areas of interest to be consolidated before adding new areas. New areas would come from the interests of the membership rather than being imposed from above.

The proposed areas were community education, to include public forums, workshops and media exposure, public lectures, and improving community awareness through media releases; teacher education, including a proposed course for upgrading AREA consultants and an advisory service to teachers; special education, supporting the consultants' referral service, but expanded to include advocacy for students in the context of equal opportunity legislation; an advisory committee to provide specialist advice on the current educational needs of children with learning difficulties as a basis for community awareness and lobbying; publications; and finally resources, to include a catalogue of materials, a directory of community resources, and possibly a library.

It was a wide-ranging and comprehensive overview of activities in which AREA might become involved – either as new areas or extending existing activities. However, the concept of chapters was received cautiously, with members urging a need to consider their rationale<sup>64</sup>. Council felt that the headings at this stage were too broad, and that some of the proposed chapters or groups had a large range of tasks that would require representatives from several groups. Lobbying, for example, would require representation from consultants, parents and educators, although this would depend on the nature of the information required.

Darryl Greaves suggested a possible alternative structure with a student group, a tertiary educators' group, and a parents' group to increase lobbying power in the community<sup>65</sup>. The reception was mixed – the sub-committee wanted more information on the role of the proposed student group in relation to AREA's aims; they felt parents would need to be articulate and informed and that parents could be called on to comment on specific issues without forming a membership group. Some members of the Consultants' sub-committee were concerned that a tertiary group might become an 'elite' within AREA, and suggested that it was more productive to consider the purpose of a particular group rather than who would be among its members.

These proposals lapsed over the following year, and it would be 1996 before further planning for AREA, with adoption of a five-year plan, would occur.

### **Conclusion**

The decade from the mid-1980s to the mid-1990s had been a difficult one for AREA as the educational

community struggled to cope with integration of students with disabilities, self-management of schools, changes in assessment at the end of secondary schooling, and mergers of the former teacher training colleges into universities with implications for the training of special education teachers.

Despite these changes, funding and structures to support students with specific learning difficulties remained elusive, while, as Pringle noted, government policies had little to offer:

It is difficult to obtain a clear picture of special education policies in Australia, particularly in relation to learning difficulties or disabilities ... The policies presented to date appear to be fragmented without adequate framework ... and information appears limited despite excellent research evidence in Australia and overseas<sup>66</sup>.

In Victoria, the Schools of the Future program, which offered schools greater autonomy in managing their affairs, had begun to divert attention away from centralised provision of services for students with disabilities. John Munro claimed that the “first and major” casualty of this program was servicing the needs of students with learning difficulties<sup>67</sup>. According to Munro, the Australian community was not well enough informed about how people learn, basing judgments on their own experiences rather than on recent findings in literacy and mathematics learning. Most teachers also lacked, and therefore did not incorporate into their teaching, understanding of such concepts as short- and long-term memory, acquisition of orthographic rules, self-attribution learning, and the acquisition of cognitive and metacognitive strategies. “Classroom practice is approximately half a century behind research in learning,” Munro wrote, contrasting this lag with the rapid uptake of research in technology. As a result, teaching methods did not match the needs of the child, and learning disability was still seen primarily as a deficit within the child.

For students with learning disabilities it was not a promising outlook. But AREA had survived a difficult time in its history and could look back with some pride on its achievements as the new millennium approached.

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3. AREA Council Minutes, 15 April 1985.
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7. AREA Council Minutes of Extraordinary Meeting, 27 February 1983.
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10. AREA Council Minutes, 12 October 1987.
11. AREA Council Minutes, 13 February 1989.
12. AREA Council Minutes, 10 April 1989.
13. AREA Council Minutes, 23 July 1989.
14. Minutes of Annual General Meetings, 4 July 1983; 19 June 1986.
15. AREA Council Minutes, 11 February 1985; 30 September 1985.
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  45. *AREA Bulletin*, Vol 27 No 3-4, November 1995.
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  47. AREA Council Minutes, 11 October 1990; Publications Sub-committee minutes, 14 October 1990.
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  50. AREA Council Minutes, 5 March 1990; Minutes of Extraordinary Meeting of 'Sticker Campaign' Sub-committee, 19 March 1990.
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## A history of Learning Difficulties Australia: part five – the journal (continued)

Josephine C. Jenkinson

### Abstract

Part Five in this series on the history of Learning Difficulties Australia continues the history, begun in Part Three, of the association's journal. During this time the quality of articles in the journal came under scrutiny, and refereeing, at first only of research reports, later of all contributions, came into practice. Editorial policy continued to embrace reports of new teaching methods and therapies as a means of informing readers, but contributions also reflected changes taking place in special education and in teacher training. Articles about reading continued to dominate as the debate between whole language and phonics approaches heated up. In 1996 the name of the journal was changed to reflect the broader interests of the association in learning difficulties.

The decade spanning the five years before and after the turn of the millennium was a difficult one for AREA. The *Australian Journal of Remedial Education (AJRE)*, however, remained a stable force during a period of significant change in the association and in special education generally. During the latter half of the 1980s the journal would continue to be the major means of communication with members on remedial education issues. Over this period, it also served as a major forum for debate about methods for teaching reading, discussion of new programs and old 'fads', and incorporation of computer technology into the teaching of students with learning disabilities. The editors could rightly claim international recognition as selected *AJRE* articles were extracted and recorded on microfiche through overseas agencies, while contributions came from countries in the Pacific, Asia, Africa, Europe and North America.

Yet the role of the journal as a professional publication was still not clearly defined. In addition to academic articles, contributions frequently covered more practical or transitory topics such as the role of remedial teachers or consultants in schools and private practice, case studies, reviews, news items, and in one case, an obituary.

### Refereeing of articles

An ongoing issue was the independent refereeing of contributions before accepting them for publication. Chris Davidson, as editor, believed that refereeing was not appropriate, that it did not necessarily guarantee the quality of an article, that it would involve increased costs for extra postage, and that the time involved could delay publication<sup>1</sup>. Davidson's point about quality was later vindicated when a Council member commented that "reviewers need to go through articles more thoroughly"<sup>2</sup>.

Moreover, refereeing of all contributions was inconsistent with editorial policy, reiterated by Davidson at a meeting of the Publications Sub-committee, which stated that the journal would continue to include articles dealing with new and untried approaches to remedial education as a means of stimulating debate<sup>3</sup>.

Davidson's arguments were not accepted, however. Early in 1991 John Munro announced that from March 1993 the *AJRE* would be refereed and the editor would convene a committee to select referees<sup>4</sup>. John Elkins from the University of Queensland offered assistance with a structure for the referee process, and the new editorial board consisted of Chris Davidson as Editor, Richard Weigall as Associate Editor, six consultant editors including one to advise on computers, two review editors, and a referee panel of twelve, mostly drawn from academic institutions and including international representatives<sup>5</sup>.

A compromise was reached following Peter Westwood's suggestion that research articles should be refereed but not reviews or articles describing classroom practice. Council reacted favourably to the idea of a separate refereed research section<sup>6</sup>, and the journal became part-refereed from the beginning of 1993, when contributors were advised that "Authors wishing their article to be refereed must request it"<sup>7</sup>. By 1997, contributions were divided into 'refereed papers' and 'articles'. The last two issues of 1997 carried only refereed papers and the journal is now fully refereed.

### Breaking down barriers

Policies for integration of students with disabilities into mainstream schools were in full swing by the mid-1980s, and the third issue of the *AJRE* for 1985 was devoted to this topic. Professor Marie Neale, as guest editor, noted

the unique conditions in Australia that had led to several innovations in providing support in a widely dispersed population. Dr Michael Steer, Director of the newly formed Integration Unit in the Victorian Department of Education, discussed the philosophy and principles underlying integration, and predicted that a wide range of social, educational, and vocational opportunities would be opened up for children with disabilities integrated into regular schools. Other articles presented case studies of integration<sup>8</sup>.

Training in remedial and special education was a continuing concern. Most courses in special education were offered at graduate diploma or fourth year bachelor level, but with considerable diversity in course structure, required contact time and supervised practicum. Victoria was the only state which specifically registered qualified special education teachers for appointment to permanent positions in specialist facilities (Pickering, 1987). Of particular relevance for remedial education was the fact that, while ten courses identified by Pickering in a national survey dealt specifically with learning difficulties, resource teaching, learning disability or special assistance, there was little conscious planning in the development of courses to meet current needs.

Teacher training could influence those about to enter the profession, but the success of integration required the removal of entrenched barriers among practising teachers. A review of research on teacher attitudes to integration by Konza, Gow, Hall and Balla (1987) revealed significant stress and anxiety among classroom teachers, and a need to introduce a comprehensive range of supports. These included adequate funding, modifications to the physical environment and material resources, but also emphasised resource personnel, classroom teacher commitment, and training at both pre-service and in-service levels. The role of the integration coordinator received special attention.

The theme of breaking down barriers posed by teacher attitudes resurfaced in a celebration of the 100<sup>th</sup> issue of the journal<sup>9</sup>. Fields (1995) suggested strategies for overcoming teacher resistance to integration of children with disabilities, especially in relation to working with support teachers in a consultative framework. Westwood (1995) examined teachers' locus of control in the context of dealing with learning problems, and Hay (1995) examined teacher actions in relation to student effort, self-perception and achievement.

Legal issues were also emerging. The federal *Disability Discrimination Act* and corresponding state Acts were scheduled to come into force in March 1993, with a significant impact on schools in meeting their obligations to students with disabilities. The second issue of the journal in 1996 included a lift-out supplement, originally published by Villamanta Publishing Services, *A User*

*Guide to the Disability Discrimination Act*. Printed on blue paper, the guide could be easily removed from the journal for a handy reference. Williams (1996) cited a case from the English legal system in which a student had been granted financial compensation on the basis of negligence when an educational authority had failed to make provision for a learning disability. The author warned that this case "at the very least puts Australian education professionals on notice, that what they do in classrooms every day when dealing with students' learning needs may well be seen as attracting a legal duty of care" (p. 13).

By the mid-1990s integration had been redefined as 'inclusion', and Westwood (1997) urged a gradual approach, especially for children with behaviour problems for whom the class teacher felt poorly equipped. Successful inclusion of these children would require a commitment to provision of appropriate funding and resources, and both pre-service and ongoing training for class teachers. Westwood also advocated the retention of special schools and classes where necessary.

Teacher training continued to be an issue, but as claims were made of falling standards of literacy and numeracy, the focus of contributions turned to preparation for reading and mathematics teaching across the whole range of students. Maglen (1997a) examined teachers' attitudes and morale in the context of literacy standards, and "their unreasonable perceptions of why students fail" (p. 2). According to Maglen, teachers attributed the failure of some children to learn, despite the use of currently "fashionable" teaching methods, to the students themselves or to their family background. It was time, Maglen concluded, that literacy teaching had highest priority and that teachers changed their approach with students who had clearly not benefited from an existing method.

Teacher attitudes were also addressed by Roll and Greaves (2005), who used several data collection techniques to examine the views of beginning and experienced teachers on pre-service preparation for teaching literacy and numeracy to students with a range of needs, including learning difficulties. Roll and Greaves concluded that most primary (but not secondary) teachers felt well-prepared to teach literacy and numeracy, although fewer teachers felt as well prepared to work with the diverse needs of students from a non-English speaking background, indigenous students, those from families with low SES, and students with disabilities.

## **The reading debate**

Criticism of the teaching of reading in the *AJRE* frequently targeted the Whole Language, or 'language experience', approach emphasised at the time by the Victorian

Ministry for Education (Sykes, 1991). Underlying this approach was the belief that children could learn to read simply by being exposed to print, just as they learned to talk ‘naturally’ by hearing spoken language. The method had appeal, but, as Sykes pointed out, there was little empirical research available to support its superiority over more traditional, skills-oriented methods.

Jackson’s (1986) criticism went further, claiming that reading instruction in many schools had degenerated into a “kidwatching” experience in which children were taught to read by visual rote memorisation of printed material, while teachers deplored the use of synthetic, analytic, linguistic or phonic instruction or attention to the nature of the reading process itself. Children were learning to repeat whole sentences from memory based on their own “natural language”, but were unable to read the same words in a different sentence. Jackson identified a number of unjustified assumptions underlying the natural language approach, concluding:

It is time this kind of educational dogma was relegated to its rightful place. At the moment it is demoralising and confusing the teaching profession, but above all, and much more seriously, it is denying children the right to access reading and spelling via more than one route. (Jackson, 1986, p. 10)

While Whole Language methods were still in favour, arguments for including phonics instruction gathered strength, most critics favouring a balanced approach to reading. Jorm (1986), for example, identified problems in storage and retrieval of phonological information from long-term memory as an important cognitive factor in reading difficulty, but also recognised the importance of social factors, such as encouragement to read in the home, which interacted with cognitive factors. Reviewing arguments for and against the inclusion of phonics, Westwood (1986) concluded that there was a stage in reading acquisition, as children became increasingly familiar with print, in which instruction was needed in letter-sound correspondences, especially for children having difficulty in decoding unfamiliar words which could not be predicted from context. In a guest editorial, Westwood (1994) blamed a decline in South Australian spelling standards on the Whole Language approach, in which students were taught only to spell specific words as the need arose.

An English educationalist agreed:

... we do get rather weary of all the fads that come along. The latest one in the UK – I am sure it has reached Australia as well – is that of ‘real reading’. Just give a child a book that is interesting to them, and lo and behold! – they will read. Brightly coloured books with good pictures are all that are needed according to this approach. I am a firm believer that one cannot

get away from the basics, no matter how difficult, grinding and tedious it can be at times. (Thomson, 1991, pp. 2-3)

Weigall (1992, p. 2) attributed at least some of the blame to publishing houses “which advocate a non-phonetic approach at junior primary level and who assume that children will learn to read through memorising the configurations of hundreds of words without the benefit of proficient decoding skills”. Some of these publishers, Weigall claimed, had formed an “unholy alliance” with teaching organisations to promote the whole language approach. Council expressed concern that a proposed issue of the journal devoted to ‘Whole Language’ could be too general<sup>10</sup>.

Phonemic awareness, an aspect of phonics teaching that had been neglected in the journal, although it was not new to academic research in reading, was introduced by Munro and Munro (1993). Phonemic awareness refers to the ability to analyse the sounds in words, and works reciprocally – phonemic awareness is essential in eliciting meaning from print, and in turn develops as children learn to associate sounds with letters or letter combinations. Munro and Munro (1994) also reviewed research which stressed the importance of efficient word recognition in freeing the reader’s attention to focus on comprehension of text, and suggested that dyslexia could be related to an inability to use phonological knowledge to decode unfamiliar words.

In 1998 a special issue of the journal was produced which included five substantial refereed papers on the role of phonemic awareness in language acquisition. A team from Massey University, New Zealand, Tunmer, Chapman, Ryan, and Prochnow (1998) reported key findings from a six-year investigation into the role of language and motivational factors in early literacy development, concluding that knowledge of spelling-sound patterns was more effective than ability to use sentence context. Children who reported using word-level information in Year 1 also performed better on tests of reading, including comprehension, one and two years later, compared to children who reported a preference for using non-word level cues, including context. Tunmer et al. also found that use of materials and procedures to teach phonological skills significantly improved reading achievement in beginning readers.

Munro (1998) confirmed the importance of phonological knowledge in early reading, while Thomson (1998) provided a model of early reading that teachers could use to incorporate phonological skills into their teaching practice. Love and Reilly (1998) offered practical suggestions for the classroom.

Criticism of the Whole Language approach was not confined to educators. Zollner, Harrison and Magill

(1996) investigated aspects of early reading, including whole-word processing skills, letter reversals, phonic skills (letter sounds, sound blending, and blending syllables into words), and proofreading skills in 615 students who had been referred to an optometry practice with a special interest in literacy. They concluded that many males and some females were significantly disadvantaged by an early emphasis on whole-word guessing and predictive cueing, contributing to a decline in literacy levels.

Hempenstall (1996) was even stronger in his criticism of the Whole Language approach, taking education authorities to task for endorsing a method that was clearly not supported by research evidence. He called upon researchers to adopt the unaccustomed task of attempting to influence decision-makers. "For the sake of those not well served by the current system", he concluded, "... it is surely time to stop fiddling around the problem. It is time to address the core issue: the manner in which we approach beginning reading instruction" (p. 30).

A boxed quote headed 'California bans whole language' reported legislation to ban the use of (U.S.) government funds for Whole Language teaching of reading and writing, insisting that "unfamiliar words must be decoded ..."<sup>11</sup>. The extract referred to this move as the "phonics revolution", as though the teaching of phonics was an innovation never before tried. It is telling of the 'fad' mentality that this article did not advocate a mixed approach with a balance of strategies, which would have allowed context to confirm, if not aid, the child's efforts at decoding.

Contributors were also concerned with more general literacy issues. Results of a survey by the Australian Council for Educational Research (ACER), which indicated that as many as one third of secondary students lacked sufficient literacy skills to cope with their curriculum, were rejected by teachers and teacher educators (Maglen, 1997b). Maglen argued that, rather than debating teaching methods, educators should be asking what society wants from schools, identifying as a major objective the acquisition of skills in literacy, numeracy and socialisation that would enable students to participate successfully in community activities and in further education:

Those who argue that this is an impossible objective for some children need to seriously address the question about whether these children should have to attend school at all: for many of them the whole schooling experience is a relentless litany of failure and unhappiness. (Maglen, 1997b, p. 25)

Maglen criticised academics who used conferences to further their own biases in teaching methods, or simply preached to the converted. She also criticised those who blamed parents' ignorance and misunderstanding for

their children's poor literacy, or who assumed that parents were competent to take on the role of reading instructor. She praised the majority of teachers who were dedicated and hard-working and had their students' interests at heart, but called for strong leadership that would get rid of the few who were "lazy, incompetent and uncaring". She abhorred the "evangelical righteousness" of opposing factions in literacy education that precluded reasoned discussion about good teaching methods, but especially those who promoted the Whole Language approach as the only way to guarantee success. Good teachers, Maglen concluded, "have always been open to new ideas and able to incorporate what is useful – many use an amalgam of methods and approaches that is constantly modified to meet individual learning styles". It was a well-reasoned article, but contained some provocative material to be heeded by both academics and practitioners.

Gender differences and debate about reasons for the preponderance of males among students with reading difficulties emerged from time to time as a topic for discussion. In a survey of child and adult referrals for literacy problems, Robinson (1997) found that the gender discrepancy was much larger among children (male-female ratio of 2.2:1) compared to adults (male-female ratio of 1.2:1). Robinson suggested that the difference may be explained by a male tendency to react to learning difficulties with lowered self-esteem leading to disruptive behaviour, whereas females tend to withdraw and their problems are overlooked because they do not draw attention to themselves.

Much of this debate was concerned with general trends in literacy, rather than with the nature and causes of reading difficulties. The fourth issue of the journal in 1997, however, returned to the basics of specific learning difficulties. Bradshaw (1995) deplored the increased number of children in Australia identified as having a learning disability, a trend that followed the United States, where it was predicted that by 2000 one third of the school population would be so labelled. Bradshaw named this trend "mislabelling", and proposed four alternative explanations for failure to learn: neglect of individual differences in learning styles; differences in left-right brain dominance in a system which tended to favour left-brain functioning; lack of self-esteem; and behaviour disorders often arising from a regimented school atmosphere.

In the same issue Brock (1995) provided a clear discussion of dyslexia and its common features, also pointing out the importance of self-esteem in children who have difficulty in learning, while Young (1995) discussed a wide range of research perspectives that had influenced the teaching of students with learning disabilities, from Piaget to Vygotsky and coloured lenses.

## **Fads and cures**

Supporters of fads and supposed cures for reading disability continued to find an outlet in the journal. The use of coloured lenses to facilitate reading was promoted in the 1980s by Helen Irlen. Lenses obtainable only from practitioners licensed by Irlen were prescribed to suit the individual according to a specific combination of tint and density determined by testing procedures. The lenses were consequently quite expensive. Stanley (1987) agreed that some aspects of reading performance, such as reading speed and reduction of glare, could be improved by the use of coloured lenses, but coloured overlays were just as effective and much less expensive. He pointed out that Irlen's claims were as yet unsupported by methodologically sound research and her methods could only be regarded as experimental. Articles which followed showed similar caution; although authors acknowledged that coloured lenses could facilitate reading by enhancing the clarity of words on the page, there was little evidence to support claims that these lenses could be a 'cure' for reading disability.

Stanley was taken to task by O'Connor and Sofo (1988) who claimed that Stanley failed to acknowledge the contribution made by clinical research in such fields as medicine and psychology. O'Connor and Sofo reviewed recent research that supported the relatively high prevalence among children with reading disabilities of Irlen's concept of 'scotopic sensitivity', or sensitivity to certain frequencies and wavelengths of the white light spectrum, on which the use of coloured lenses was based. Whiting (1988) also reported positive results from the use of coloured lenses, but acknowledged that those who participated in his study were likely to be highly motivated to show improvements.

Arguments about Irlen lenses ceased until Whiting, Robinson and Parrott (1994) followed up 267 subjects who had been using Irlen filters for at least six years. Of the 43 per cent who responded to their follow-up survey, most continued to report improvements, especially in visual perception of print and ease of reading, evident, for example, in fewer skipped lines and fewer substitution errors consisting of words of similar shape. These effects, however, were not universal, being most beneficial for students who already had some basic reading skills. Irlen and Robinson (1996) reported significant improvements in workplace productivity and satisfaction for Californian workers who used coloured lenses on the job. A team from the University of Newcastle, Robinson, Roberts, McGregor, Dunstan, and Butt (1999), described a preliminary investigation of a biochemical basis for 'Irlen syndrome' in people with chronic fatigue syndrome.

Another popular therapy in the late 1980s was conductive education, developed in Hungary. Conductive education emphasised the teaching of important life skills through intensive individual methods by a 'conductor', a dedicated specialist who was trained to teach these skills to children with motor disorders such as those associated with cerebral palsy. While significant improvements in independent movement had been claimed for children in Hungary, Silver (1987) questioned whether the system could ever be as successful in the somewhat less rigid atmosphere of Australian society.

An American contributor, Carla Hannaford (1994), introduced the concept of 'brain gym', also referred to as 'educational kinesiology'. Brain gym, developed by American educator Paul Dennison, was described as "a series of specific brain integrative movements designed to bring attention and fully activate the neo-cortex of the brain ... and activate visual, auditory and kinaesthetic functioning for ease of learning" (p. 25). Hannaford used case studies to demonstrate the effectiveness of her methods in improving behaviour and learning.

Hannah (1994) described a brain gym program in a Queensland school, but her claims about the program were not supported by objective evidence. A problem common to most of these articles on specific methods and strategies was their authorship by people who were actually engaged in using the method, and so had a vested interest in demonstrating its effectiveness. There was a notable absence of independent research in supporting specific programs or instructional methods in special and remedial education.

Greaves (1994) defended the journal for raising awareness of new programs, arguing that remedial education has no single set of commonly agreed principles:

A rationale for the existence of this journal is to inform its readers of methods and strategies which are appropriate for children with learning difficulties, on the basis that this group appears to have needs in addition to the classroom approaches which are generally available. This premise creates the scene for a debate on the choice of the most appropriate method or strategy. Recent articles in this journal (1994, nos. 1-3) inform readers of this debate. Should the teacher spend his/her limited time with the child on phonics, Distar, meta-cognitive strategies, brain gym, Irlen coloured filters and/or use a sloped desk top? (p. 2)

But Greaves also urged caution in the adoption of new methods:

... Faith in a theory is insufficient justification for its implementation. Innovations for their own sake ... may lack substance, and usually do lack unbiased evidence to substantiate their use. Even published

research may be no better than suggestive of support for a new theory because of measurement and other methodological problems. (Greaves, 1994, p. 2)

Dykes (1997) called for educators to get rid of “fads” based on false assumptions about the teaching of literacy, and for State education authorities to stop indiscriminately importing overseas ideas and materials. “For years Australia has blindly followed the lead of other western countries and of the U.S. in particular,” she wrote. “The time lag ensures that we introduce new systems just as other countries are realising their flaws.” (p. 30)

### **Learner characteristics**

A more promising direction came from contributions that focused attention on the learner. In an inspiring editorial entitled ‘Wonderful Willy’ (a reference to a current concern for preserving whales), Weigall (1995) urged educators to become involved in the interests of children to engage them in learning, rather than attempting to impose adult interests.

Several contributors added a new dimension to learning disability by exploring individual differences in learning style. Knight (1993) discussed research which showed that internal locus of control (the belief that one has control over the outcomes of one’s actions) promotes active involvement and independence in learning, and its relevance for teachers in promoting children’s learning. Recent research on learning styles and motivational aspects suggested that children with learning disabilities tended to be passive learners who lacked a motivational orientation to learning and thus failed to employ effective learning strategies (Chan, 1993). According to Chan, a more active, self-directed pattern of learning could be fostered with a supportive atmosphere and classroom practices such as self-instruction, goal-setting, self-monitoring and self-reinforcement, which would help to prevent expectation of failure among many learning disabled students.

### **The ‘whole school’ approach to literacy**

Such strategies could be incorporated into a ‘whole school’ approach to literacy, which was the focus of a special issue edited by Greaves (1999) in response to questions about the priority given to literacy within the school program. The thrust of contributions to this issue was that a structured literacy program, with adequate, regular time commitment and continual monitoring of students’ progress, was crucial for the successful teaching of reading.

Hill and Crevola (1999) described one example. A daily literacy block of two hours, incorporating both

whole-class ‘shared reading’ and small group teaching, was timetabled for every class in a school. Instead of expecting that some children would fail to acquire adequate literacy skills, the school adopted an attitude that all children were capable of achieving. Rigorous performance standards were set. Ongoing assessment of students and professional development were other key features of this approach that produced more effective teaching outcomes.

In an epilogue to the issue, Munro (1999) identified several trends in the programs described. Consistent with concepts of school effectiveness, each of the schools took responsibility for acquisition of literacy within the school. Support programs were an integral part of the curriculum and involved the whole school, not just the early years. Systematic and structured learning was emphasised, with monitoring of individual and school literacy outcomes a crucial component. Students were encouraged to be active participants in the learning process. Finally, professional development of teachers was integrated into the program.

This approach represented a marked change from earlier programs for students with learning difficulties:

The earlier paradigm was characterised by an approach that saw these students as ‘defective’ ... Their approach to learning was diagnosed by ‘experts’ and they were frequently involved in learning support programs away from their regular classroom ... The present paradigm, with its focus on inclusion, sees all learners moving along a developmental continuum in literacy development. (Munro, 1999, p. 39)

The role of remedial consultants was being challenged, with consultants in private practice feeling less than welcome in schools, tolerated only to meet parents’ wishes:

The school perspective is that the private practitioner’s work is ... a direct criticism of their literacy provision for the student with learning difficulties. This perception is further reinforced when the private practitioner recommends or uses assessments not available in the school and implements approaches which contrast sharply with school literacy practices and policies. (Greaves, 1999, p. 2)

The private practitioner, on the other hand, perceived that the school’s methods had not succeeded in teaching students with learning difficulties, and instead implemented methods which he or she had found successful with other students.

The inclusive approach, however, made certain assumptions about the nature of reading difficulties, to which educational consultants had not yet adapted:

Without the opportunity to negotiate a role for themselves within the changed context [educational

consultants] ... continue to operate largely in ways that they did earlier and assess the educational provision in terms of the earlier paradigm ... In order to work within the recast model, consultants need to align their professional knowledge with the changed directions. They need to identify the contributions their areas of expertise can make to overall understanding of a child's learning needs. They need to recognize their roles in an essential partnership that is based on mutual respect and valuing. (Munro, 1999, p. 39)

It was a far cry from perceptual-motor programs, Irlen lenses, kinesiology and the many other 'cures' for learning difficulties that had been debated for three decades in the pages of the journal.

### **Computer education**

Computers made strong inroads in remedial education in the 1980s, and in 1984 a computer section was introduced into the *AjRE*, edited by Gerry Kennedy. Negotiations with the Computer Education Group of Victoria resulted in joint production of an issue on 'Computing and Special Education' in 1986<sup>12</sup>. Contributors discussed the uses of computer technology in the classroom, for analysing teaching material, for educational diagnosis, in interactive programs for children with language problems, and in facilitating remedial reading, maths and writing instruction. Colbourn and McLeod (1986) outlined a model of computer-guided educational diagnosis that could be used by the classroom teacher.

Another special publication on computers and education, combining two issues, celebrated AREA's Silver Jubilee in 1990. Contributors provided further examples of computer use in remedial and special education, using a word processor to help language disordered children and adults to write, computer-assisted learning for students with moderate to severe intellectual disabilities and as a resource in integration, the computer as a focus for group interaction, fostering computer literacy, and integrating computer technology into the classroom.

As technology became more widespread, creative and varied, a further issue published articles on the use of reactive toys and switches to teach a range of skills, including cause and effect relationships, guidelines for software to teach spelling, hardware and software for computer-assisted communication, and keyboard strategies for children with poor handwriting skills<sup>13</sup>. With increasing numbers of computers in schools, many more typefaces became available for presentation of printed texts and work sheets, and another special issue, sub-titled 'Words, graphics and symbols: A new literacy ... using computers', dealt with typography<sup>14</sup>, including

the suitability of typography for children learning to read (Sassoon, 1993).

Kennedy (1992) cautioned against use of technology for its own sake without relating it to the needs of the child, but also claimed that, compared to society generally, schools lagged far behind in cutting-edge technology, largely because of lack of funding (Kennedy, 1993). This lack was exacerbated by teachers not having the technical expertise to prepare submissions for available funds. Even if they did succeed in obtaining funds from philanthropic or other sources, teachers often did not have the time to learn to use new equipment at a level at which they could feel comfortable working with a child. In the context of integration funding, new equipment was not in itself sufficient to ensure that it could be used to the benefit of the child.

### **The Australian Journal of Learning Disabilities**

The *AjRE* celebrated its 100<sup>th</sup> issue in 1995 and the following year was renamed the *Australian Journal of Learning Disabilities (AJLD)*, with numbering starting from Volume 1 Number 1. There was little change, however, in the style or content of the journal and authors could still choose whether or not to have their contributions refereed. The issue began with a guest editorial written by Fay Maglen, literacy coordinator at Holmesglen Institute of TAFE, on declining literacy skills, questioning why the amount of time spent in training teachers in literacy education should be decreasing when pre-service teacher training courses had increased to four years. Two articles dealt with left-right confusion, others with classroom conflict, the teaching of spelling, and teaching strategies for children with short-term memory problems. There were the usual notices and information about forthcoming events.

During the last years of the millennium much thought was given to the future of AREA. The president, Darryl Greaves, was clearly looking ahead on a range of issues as he drew on keynote addresses from a recent AREA conference held in Melbourne to consider the future role of the consultant:

... AREA members will need to be identified as specialist practitioners with a specific set of teaching and assessment skills. One of the identifying characteristics of a specialist is their ability to accurately assess a problematic situation in order to provide appropriate interventions. (Greaves, 1996, p. 2)

This focus on individual differences would require a significant shift from the emphasis over the previous decade on curriculum "as the panacea for a child's lack of educational progress".

The journal was reaching another crossroad. Greaves (1997) predicted that the entire contents of the *AJLD* would soon be available on AREA's newly created website, with subscribers choosing to receive a printed copy or having a pin number to download articles as they wished. Harking back to changes since the first issue had been produced on a Gestetner machine using stencils cut with a typewriter, Greaves urged the association to keep up with new methods of communication to ensure its viability. "At this point in the history of the AREA organisation," he wrote, "the potential of its world presence and the ease of international communication for this journal is quite amazing."

Editorial policy, though, showed little change, unless it was towards even greater eclecticism:

The Journal aims to provide relevant, current information to a wide audience including special educators, teachers in training, school administrators, parents, and other professionals ... The Editors promote effective teaching approaches in the basic subjects including systematic multisensory instruction in reading, writing, and spelling which recognises the importance of phonemic awareness and the structure of language and related clinical educational intervention strategies for individuals with learning disabilities.

The Editors are committed to the wide distribution of interdisciplinary, research-based knowledge and effective practice approaches regarding learning disabilities, including Specific Learning Difficulties (Dyslexia). Other subject areas include mathematics, dysgraphia, metacognition, self-esteem, [and] social issues such as 'tolerance' ...

The Journal is truly international, welcoming well-written articles in English from writers around the world. The Editors strive for a balance between practical articles and research-based papers for each issue. Special issues dealing with a specific topic such as *Computers in Special Education* are a feature of our publishing programme. From time to time the Editors include articles of a potentially controversial nature, for example papers dealing with [a] new form of instruction, treatment or therapy. The Editors publish these in order to keep our readers informed and stimulate productive debate ...<sup>15</sup>.

### **Learning difficulties: definitions and identification**

The Federal Government had commissioned an investigation into learning difficulties in Australia, which formed the theme for a special issue of the *AJLD*. In an overview of the history of learning difficulties in Australia, Elkins (2000) defined Australian use of the

term 'learning difficulties' as signifying students with academic and related school problems in the absence of an underlying impairment. He noted the implications of this situation for recognition and funding, and confusion about whether learning difficulties constituted a disability for the purpose of disability discrimination legislation at both school and tertiary levels of education.

Contributions by academic staff from Edith Cowan University, who were also involved in the federal project, dealt with research, definitions, school provisions and programs, and parental involvement. The issue concluded with a discussion by Greaves (2000) of the range of non-government services available for students with learning difficulties. These included SPELD, the Learning Difficulties Coalition of NSW, AREA, and various franchised services promoting specific methods or programs. In addition there were private practitioners in various professions, including teachers, speech pathologists, psychologists, optometrists, special educators in private practice and other specialists largely based on specific practices such as kinesiology and neuro-linguistic programming. It was a useful overview of the wide – perhaps for parents, bewildering – range of provisions and methods of practice for students with learning difficulties.

Chan and Dally (2001) summarised literature reviewed for the DETYA Report<sup>16</sup>. They contrasted definitions of learning difficulties common in the literature with the constructivist, or sociocultural, approach to defining learning difficulties which shifted the focus "from the individual nature of a learning disability to the embedded nature of an individual's actions within social contexts" (p. 13) – in this case the context of the classroom. The proponents of this approach argued for special educators to focus on the "sophisticated use and application" of basic skills, not just the acquisition of those skills. As the authors pointed out, confusion over the definition of learning difficulties added to problems in identifying students and estimating prevalence.

The impact of learning problems on parents gained attention with a report of an investigation into learning disabilities and parental stress. Bock and Shute (2001) found high levels of stress among parents of children with learning disabilities as a result of child and school factors, but excluding poor coping strategies. Nevertheless, a skill-based intervention program was effective in helping to reduce stress.

In 2001 a special issue was produced on assessment, now re-emerging as a controversial topic<sup>17</sup>. As Greaves (2001) pointed out, some educators believed that assessment gave a child a label, or argued that assessment rarely provided a basis for further instruction. Although authors in this issue generally favoured assessment, their contributions

contained a common thread that assessment should lead to an intervention that is beneficial to the student.

Between 2002 and 2004 articles continued to represent a variety of topics and viewpoints. In 2002 a special issue on giftedness focused on gifted students who had a learning disability. Munro (2002a) discussed the difficulties in identifying these children because they do not fit stereotyped notions of giftedness, and advocated teacher training in both giftedness and learning disabilities. In a study of gifted students with a reading disability, Munro (2002b) identified two groups: one showing superiority in both verbal comprehension and perceptual organisation, and one showing superiority only in perceptual organisation, but concluded that literacy disability in both groups could be attributed to a preference for the use of global rather than analytic information strategies.

Despite the exclusion of other disabilities from popular definitions of learning disability, there was considerable interest in disabilities that are often accompanied by learning difficulties, including attention deficit disorder and Asperger's syndrome. In a special issue on difficulties in mathematics, Munro (2003) defined and described dyscalculia. Phonemic awareness and other phonological processes, spelling, writing and written expression, support for children with special needs, self-concept and reading, computer literacy, and learning difficulties among university students were just some examples of the range of topics covered in the journal.

In around 150 issues of the journal, first the *Australian Journal of Remedial Education*, later the *Australian Journal of Learning Disabilities*, many thousands of words had been written about learning difficulties. How far had knowledge about the subject advanced? In a guest editorial, Weeks (2002) summarised what was known about dyslexia and reading difficulties, concluding that there was plenty of evidence to support the existence of dyslexia, and that it had a biological basis. Research could not provide a cure, but it did give some guidance on minimising the effects of dyslexia through phonological awareness programs and environmental enrichment, while also drawing attention to the inadequacy of teacher training in the area. Weeks believed that Australia was lagging behind both the UK and the USA in providing support for students with reading difficulties: although there were some good programs in individual schools, these were implemented on a 'piecemeal' basis. What was needed was a systematic approach to identification and support, which would include screening at preschool level and the routine development of phonological awareness as part of language programs: "In the primary school years we need mandated time spent on the explicit teaching of basic literacy skills which

includes the teaching of phonics and an understanding of the English language as part of a balanced literacy program," Weeks wrote (2002, p. 3). Essential to this requirement would be recognition of the existence of dyslexia so that its impact could be better understood by teachers and appropriately addressed in schools.

## Conclusion

Over almost four decades of editorship by Chris Davidson, assisted by Richard Weigall, the journal had evolved into an increasingly professional publication. Notices about current events and conferences were no longer included, although the emphasis was still on maintaining a balance between theoretical and practical content. Indeed, the editor was still wary of including too many "esoteric" papers, and categories were established to ensure that refereed papers would include not only articles discussing new practices, but "would meet the criteria of action research or more qualitative criteria, review articles and case studies"<sup>18</sup>. Articles that examined new strategies and methods or suggested new ways of looking at factors contributing to learning difficulties were acceptable, as were "creative articles that may provide new directions for research". Davidson's 37 years of editorship, during which he edited a total of 141 editions, has been suitably acknowledged following his retirement (Byers, 2005). Kevin Wheldall, of Macquarie University, NSW, replaced Chris Davidson as editor from the beginning of 2006, and will be joined by Alison Madelaine as co-editor in 2007.

The journal's flavour is perhaps less international than it was, but it can be argued that quality and relevance are more important than where contributions come from. However, the exclusion of news items and the publication of non-refereed papers in the *LDA Bulletin* have made it difficult at times to fill the journal. This difficulty may reflect an increasingly academic orientation that makes articles seem less relevant to classroom practice, an issue that needs to be resolved not just in relation to the journal, but within the association as a whole. It is also due to pressure on academics to publish in internationally recognised journals rather than in Australian journals, regardless of the quality of the publication.

The difficulty of filling the journal has prompted Council to reduce the number of issues per year, at least for the present, from four to two. In the meantime, Council is exploring the possibility of having the journal published by a well-respected international publishing house to make it more attractive as an avenue for publication, while essentially keeping its Australian character.

## Endnotes

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2. AREA Council Minutes, 4 December 1994.
3. Minutes of Publications Sub-committee, 21 August 1991.
4. *Australian Journal of Remedial Education*, Vol 23 No 4, 1991.
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6. AREA Council Minutes, 5 December 1991; 6 February 1992.
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8. *Australian Journal of Remedial Education*, Vol 17 No 3, 1985.
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# **An international perspective of early number sense: identifying components predictive of difficulties in early mathematics achievement**

Sally Howell and Coral Kemp  
*Macquarie University*

## **Abstract**

From preschool to high school, number sense is included as an important outcome in mathematics syllabi. It is a term associated with the development of concepts and skills in mathematics and as such appears frequently in the teaching literature. However number sense is a term yet to be operationally defined. The present study used a modified Delphi procedure to determine the level of agreement amongst six early mathematics experts from Britain, Europe and the United States, with respect to a variety of components of early number sense. The results of this study are discussed in relation to a similar Australasian study and the emerging literature on early number sense assessment. This study revealed some components of number sense worthy of further investigation in relation to early mathematical achievement but also confirmed a lack of consensus on what exactly constitutes early number sense.

Since the late 1980s the term number sense has gained recognition and is now being used to describe, among other things, the informal understanding of number needed by children if they are to succeed in mathematics. Current literature emphasises the importance of number sense both as a facet of individual students' achievement in mathematics and as a desirable outcome of mathematics instruction, and teachers are encouraged to provide children with experiences that will develop number sense in an effort to improve mathematics outcomes. Number sense features heavily in recent Australian mathematics documents (see e.g. the *National Statement for Australian Schools*, Australian Education Council, 1991, *Numeracy benchmark descriptions*, Department of Education, Science and Training, 2003, *NSW Board of Studies K-10 Mathematics Syllabus*, 2002; *Mathematics K-6 Sample Units of Work*, 2003). Unfortunately, while assessment tasks developed at both a state and federal level target 'number sense', exactly what constitutes number sense is not specified.

If the mathematical learning needs of all children are to be met, clearly there is a need to determine if there are essential components of number sense that children must acquire in order to succeed in early mathematics. Some interesting work in the area of number sense and early mathematics has already been undertaken and the notion of number sense as a prerequisite for mathematics success is an exciting one. If the prerequisites for early mathematics success could be identified, those children who are at risk of having difficulty in learning mathematics because they do not have these identified prerequisites, could presumably be taught them in the early years of

schooling, thereby maximising their potential to succeed in mathematics later. In order to do this, it is necessary to establish a consensus on which components of number sense are essential for early mathematics success.

The informal mathematics of young children has been studied extensively with general conclusions being drawn that children from different cultural and socio-economic backgrounds proceed through the same developmental pathway in their early intuitive understanding of mathematics (Gelman, 2000; Ginsburg, 1997; Klein & Starkey, 1988). Whether the measures included in studies of informal mathematics reflect the 'number sense' needed for future success in mathematics cannot be determined but it seems likely that those children starting school with less developed intuitive number skills will have greater difficulty learning the mathematics of the classroom. Results for children of low socio-economic background on verbal number tasks are consistently found to be lower than for middle income children and one would expect that the verbal demands of the classroom would favour children with better verbal skills. It remains to be determined whether children with weaker number sense are also disadvantaged.

Recognition of the benefits of early intervention in addressing the educational needs of "at risk" students (Brophy & Good, 1986) coupled with the notion that some children may begin school lacking basic number sense (Fuchs, Fuchs, & Karns, 2001; Ginsburg, 1997; Griffin, Case & Siegler, 1994) or basic numerical concepts (Butterworth, 2005; Clarke & Shinn, 2004; Landerl, Bevan, & Butterworth, 2004; Starkey, Klein, & Wakeley, 2004) has seen the beginnings of research into number

sense as a measurable and teachable phenomenon. In more recent years the notion that number sense may be to mathematics what phonemic awareness is to reading (Gersten & Chard, 1999) is one that has been embraced both in the research and teaching literature (Chiappe, 2005). Research into the predictive value of early number sense is now where research into the predictive value of phonological awareness was some 30 years ago. Just as the reading research community worked towards the development of assessments to identify children at risk in reading during the 1980s and 1990s, now the mathematics research community is working towards the development of 'number sense' assessments with a view to identifying children who may be at risk in mathematics (see Gersten, Clarke, & Jordan, 2006 for a review). Such assessments reflect important steps towards the development of screening measures with the potential to identify students who may have difficulty learning basic mathematics in the crucial early years of schooling.

It is too early to say which components of number sense, if any, included in these assessments will prove to be essential, teachable skills for mathematics success and we cannot yet be sure that all the essential components of number sense have been included for assessment (Fletcher, 2005; Gersten, Jordan, & Flojo, 2005; Mazzocco, 2005). When examining Gersten and Chard's phonological awareness analogy from the perspective of beginning research in the area of number sense, it can be seen that number sense research is in its infancy and to date exactly what components of number sense are crucial to the ongoing development of mathematical competence has not been established. Much of the current number sense literature highlights the lack of consensus on a definition of this domain (Berch, 2005; Gersten et al., 2005; Howell & Kemp, 2004) and some authors use the term "numerosity" rather than "number sense" (Butterworth, 2005; Landerl et al., 2004).

Recent articles published in the area of number sense and early mathematical assessment acknowledge difficulties in defining number sense but nonetheless propose that certain skills, concepts and understandings may be essential for early mathematics success. These include counting, "number knowledge", number transformation, estimation, number patterns (Jordan, Kaplan, Olah, & Locuniak, 2006), rote counting, 1:1 correspondence, sequencing numbers, determining which of two numbers is larger, determining which of two numbers is closer to a given number, counting on from a given number (Chard et al., 2005), oral counting, number identification, quantity discrimination, "missing number" (Clarke & Shinn, 2004), "understanding of magnitude", counting, differences in quantities (Chiappe, 2005), reading one digit numerals, constancy, adding one

digit numbers using manipulatives, magnitude judgments between different one digit numbers (Mazzocco & Thompson, 2005), measures of quantity discrimination (magnitude comparison), counting knowledge, number identification, working memory as measured by a digit span backward task (Gersten et al., 2005), and number-line estimation (Siegler & Booth, 2004). The Number Knowledge Test developed by Griffin, Case, and Siegler (1994) highlighted the following conceptual prerequisites for early addition and subtraction: knowledge of the number sequence 1-10 (including positional knowledge of each number); understanding of one-to-one mapping with objects; understanding of cardinal value; understanding of the generative rule that adjacent cardinal values are either an increase or decrease of one; and understanding that each successive number has a greater value along any dimension.

Examination of the literature on early mathematics assessments designed for children prior to school entry reveals that such assessments do exist and these reflect slightly different skills, concepts and understandings. Dowker (2005) proposed that an assessment of four-year-olds should include counting sets, cardinality principle, order irrelevance, repeated addition by one, repeated subtraction by one, number conservation, and establishing equivalent sets. Van Luit and his colleagues included concepts of comparison, classification, correspondence, seriation, using counting words, structured counting, resultative counting and general knowledge of numbers in their *Early Numeracy Test* designed for four- to seven-year-olds (Van de Rijt, Pennings, & Van Luit, 1999; Aunio, Hautamaki, & Van Luit, 2005). The preschool level of *The Number Knowledge Test* includes tasks to measure counting objects, addition and comparison (Griffin, Case, & Siegler, 1994). Malofeeva and her colleagues, included counting, "number after", "number before", backwards counting, number identification, number object correspondence, ordinality, comparison, addition and subtraction in their *Number Sense Test* for preschool children (Malofeeva, Day, Saco, Young, & Cianco, 2004). In the numerical domain Starkey et al. (2004), emphasised the importance of object counting, counting a subset, number after, number before, number comparison, ordinal number terms, number reproduction, addition and subtraction with and without objects and effect of addition to one of two hidden sets (Starkey et al., 2004). Evidence that some of these skills, concepts and understandings are predictive of early mathematics success is beginning to emerge.

The current study attempted to tap into expert knowledge in the area of early mathematics in an effort to establish a consensus on exactly which components of number sense are essential for early mathematics success.

A modified Delphi procedure was employed whereby international academics were asked to indicate their level of agreement with a variety of components of number sense in young children prior to formal schooling, through completion of two questionnaires. An earlier study (Howell & Kemp, 2005) used similar procedures to analyse the opinions of a range of Australasian academics. This paper describes the international study and discusses the findings in relation to the earlier Australasian study and the emerging literature on early number sense assessment. The questionnaires used in both the current study and the Australasian study included both potential components of 'number sense' and tasks designed to assess these components. As the purpose of the current study was to identify the components of 'number sense', respondent feedback on the tasks will not be presented or discussed in this paper.

## Method

### *Participants*

Following a literature search using the ERIC and PsycINFO data bases, 27 academics, other than Australasian academics, with published work in the area of early mathematics or 'number sense' were invited to participate in the present study. Nine of these academics provided an address for further communication and thus an initial panel of nine was established to evaluate the proposed number sense components and tasks. Of the remaining 18 academics approached for the study, six communicated an inability to participate and 12 did not reply. Of the nine academics receiving the first questionnaire, only six returned it. Of these six, three were from Britain, one was from the Netherlands and two were from the United States. Between them the six academics had a total of 71 entries related to mathematics listed in either the ERIC or PsycINFO database.

Each of the six participants remaining after Round 1 was included in the mailing of the second questionnaire. Of these six questionnaires five were returned, giving a total of five participants in Round 2. Two follow-up emails were sent to the sixth participant but despite assurances that the questionnaire would be returned this did not eventuate. In the Australasian study completed in 2003, 20 academics with published work in the area of early mathematics and/or number sense were invited to participate. 12 academics, 11 from Australia and one from New Zealand, returned the first questionnaire and 9 returned the second questionnaire (see Howell and Kemp, 2005 for details).

### *Procedure*

Delphi is a procedure that is used where some form of

human judgment is required. It allows opinion to be sought from a group of people who are not geographically close to one another (Clayton, 1997; Rowe & Wright, 1999; Schmidt, 1997). Rowe and Wright, (1999) described the key features of the Delphi procedure as "anonymity, iteration, controlled feedback, and the statistical aggregation of group response" (p. 354). In a classical Delphi procedure participants respond to a series of questionnaires in which items are repeatedly ranked according to some scale. The iteration of items over a number of rounds allows respondents to reconsider earlier opinions without experiencing any group pressure. Controlled feedback takes the form of a summary of opinions and judgments made by the group and statistical information such as a mean or median value for items included in the questionnaires (Rowe & Wright, 1999; Clayton, 1997; Schmidt, 1997). The number of rounds involved is determined by a measure of stability of the participants' responses. According to Rowe and Wright, this is typically within one or two iterations. At the end of the procedure results can be reported as the mean rank of each item included in the final round.

In the present study participants were asked to rate their agreement with each component of number sense in the questionnaire, on a five-point scale with 5 indicating 'Strongly Agree', 4 indicating 'Agree', 3 indicating 'Neutral', 2 indicating 'Disagree' and 1 indicating 'Strongly Disagree'. The 'Neutral' option was provided to save participants from a forced choice, which may reduce the accuracy of the survey. In both the present study and the Australasian study participants were provided with the opportunity to submit items to be included in the second round.

Two weeks after initial contact had been made with the 27 international academics the first questionnaire, along with the document *Guidelines for Questionnaire Completion*, was mailed to the nine academics who had published work in the area of early mathematics and/or number sense and who had indicated their willingness to participate in the Delphi process. The guidelines included descriptions of the assessment tasks as well as instructions for completing and returning the questionnaire. All participants received an electronic version of the *Guidelines for Questionnaire Completion* and a copy of the first questionnaire.

The panel of nine academics was asked to rate their agreement with each component in the questionnaire as an essential measure of 'number sense' and each task as an appropriate assessment of the component of number sense, using the five-point scale. As well as providing a measure of their agreement, participants were invited to include comments on each component of number sense and task and were given the opportunity to add clearly defined

components of number sense or tasks that they felt should be included in an assessment of early number sense.

In total only six questionnaires were returned leaving six names on the mailing list for Round 2. The mean rank (M), standard deviation (SD) and number of respondents giving a rank of 'Agree' or 'Strongly Agree' was calculated for each of the items listed in Round 1. The decision to provide (SD) was made on the basis that it would clearly show a wide range of opinion within such a small group. Each of the returned questionnaires from Round 1 was examined closely to identify components of number sense and tasks that had not been included. Modifications to existing component and task descriptions were also noted.

Respondents were emailed an electronic version of the second questionnaire and mailed a paper copy along with a prepaid return envelope. Instructions accompanying the questionnaire requested that it be returned within three weeks. Feedback on the first questionnaire was provided in the form of mean, standard deviation and percentage over 50 of 'Agree' or 'Strongly Agree' for each of the components of number sense included on that questionnaire. Instructions for the completion of the second questionnaire were included asking participants to rank the new and modified components and tasks and to add any further comments they wished.

In the present study a high degree of stability was established in the first round and rather than re-ranking items in the second round, participants were asked to rank the additional components of number sense that had been suggested by first round participants. For the purposes of both the present study and the Australasian study (Howell & Kemp, 2005), the process was used to identify items for future empirical validation rather than as the end point for item inclusion.

### **Instruments**

#### *Development of questionnaires*

Based on a review of international literature in the areas of 'number sense' and 'early mathematics', a number of skills concepts and understandings that may reflect early number sense were identified and a list of components of number sense and assessment tasks was developed for the Australasian study (Howell & Kemp, 2005) which was implemented in 2003 (see Appendix 1). Components of number sense included were: an understanding of comparative numerical relationships such as "the same number as", "more than" or "less than" and the comparative size of numbers (Baroody, 1995; Baroody & Wilkins, 1999; Griffin et al., 1994); part-whole relationships and an understanding that addition and subtraction can be reversed (Bryant, Christie, & Rendu, 1999; Carpenter, Fennema, Frank, Levi, & Empson,

1999); the order irrelevance principle (Geary, Hamson, & Hoard, 2000); the "min strategy" of adding on from the larger number (Geary et al., 2000; Gersten & Chard, 1999; Jordan & Montani, 1997; Siegler, 1988); and the ability to subitise (i.e. recognition of the number of items in a small group without having to count them) quantities of up to five (Funkhouser, 1995). The mental number line, which enables the student to make mental comparisons of numbers, is another recurring theme in the literature (Fuchs et al., 2001; Griffin et al., 1994; Malofeeva et al., 2004; Resnick, 1987).

Each of the components of number sense identified in the literature was included in the first questionnaire. Assessment tasks for each of the components of number sense were also included. Some components of number sense were assessed using tasks that were differentiated for children who were able to rote count to five and beyond and children who had no counting skills. Participants were asked to rank both components of number sense and tasks separately so that it was possible to agree with a component of number sense but not necessarily the task proposed to measure it. In the Australasian study none of the additional components of number sense suggested by Australasian academics reached the criterion of a mean of 3.75 so none was included in the first questionnaire used in the present study (see Appendix 1: Components of number sense ranked in Round 1, for a list of the components of number sense included in the first questionnaire).

#### *Revised questionnaire*

Each of the returned questionnaires from Round 1 was examined for comments that suggested additional components of number sense and/or modifications to existing components. Additional components and modifications were included for ranking in the second questionnaire. This meant that eight additional and three modified components were listed for ranking in Round 2 (see Appendix 2: Additional components of number sense ranked in Round 2). Included in the questionnaire were the mean (M) and standard deviation (SD) for each component that reached the criterion of a mean of 3.75 in the first questionnaire. Components that did not reach criterion were listed with a note to this effect.

### **Results**

While data were collected for both components of number sense and assessment tasks, only the data relating to the proposed number sense components are reported in the present paper. The six responses to the first questionnaire revealed that eight of the proposed components of number sense were ranked as 'Agree' or

‘Strongly Agree’ by all respondents (see Table 1) and all 25 were ranked as ‘Strongly Agree’ by at least one respondent. No component was ranked ‘Strongly Agree’ by all six respondents. Of the 25 components listed, 24 were ranked as ‘Agree’ or ‘Strongly Agree’ by at least three of the six respondents. The only component that did not reach this criterion was ‘subitising to 5’ (i.e. recognition of the number of items in a small group without having

to count them) which nonetheless was ranked ‘Agree’ by one respondent and ‘Strongly Agree’ by one respondent.

Components of number sense with a mean of 3.75 or above, listed in order from highest to lowest mean, are shown in Table 2. Of the 25 components included in the first questionnaire, 19 reached this criterion. A mean ranking of 3.75 was selected to avoid being too exclusive and because it was clearly closer to ‘Agree’ (score = 4)

Table 1: Components of number sense ranked Agree or Strongly Agree by all Round 1 participants

Order	Components of Number Sense	Mean	SD
1	Cardinal value within counting range	4.83	0.41
3	Matching numerosity to 5	4.66	0.52
4	1:1 correspondence within counting range to 10	4.5	0.55
4	‘One number after’ within counting range	4.5	0.55
4	Subtraction of 1 or 2 – effect	4.5	0.55
4	Commutativity – addition	4.5	0.55
11	‘One number before’ within counting range	4.33	0.52
13	Inversion principle	4.16	0.41

Table 2: Components identified as indicative of number sense at school entry in Round 1

Order	Components of Number Sense	Mean	SD	Number of Agree/ Strongly Agree
1	Cardinal value within counting range	4.83	0.41	6
2	Comparison of quantity to 10 (most/least)	4.75	0.61	5
3	Matching numerosity to 5	4.66	0.52	6
4	1:1 correspondence within counting range to 10	4.5	0.55	6
4	‘One number after’ within counting range	4.5	0.55	6
4	Subtraction of 1 or 2 – effect	4.5	0.55	6
4	Commutativity – addition	4.5	0.55	6
4	Rote counting to 5	4.5	0.84	5
4	Rote counting to 10	4.5	0.84	5
4	Subitising to 3	4.5	0.84	5
11	‘One number before’ within counting range	4.33	0.52	6
11	Magnitude (low/high position on number line)	4.33	0.82	5
13	Inversion principle	4.16	0.41	6
13	Order irrelevance principle	4.16	0.75	5
13	Ordering of quantity (lowest to highest)	4.16	0.75	5
13	Addition of 1 or 2 – effect	4.16	0.75	5
17	Addition of 2 sequential sets screened from view	4.0	0.89	4
18	Additive composition	3.83	0.75	4
18	Combining sets – 2 visible collections	3.83	1.17	4

than to 'Disagree' (score = 2) or the neutral score (score = 3). All 19 of these components were ranked as 'Agree' or 'Strongly Agree' by at least four of the six respondents.

A comparison of components of number sense reaching the criterion of 3.75 in the Australasian study and the present international study reveals marked differences. In the Australasian study, 11 components reached the 3.75 criterion after Round 1 while in the

present study 19 components reached this criterion after this round. Table 3 presents the comparative order of components in the two studies. There were 12 participants in the Australasian study and only six participants in the international study, thus the mean of 3.75 in the two studies is not directly comparable. The purpose of the comparison is to highlight that different groups of academics perceive different skills, concepts

Table 3: Order of school entry components by international and Australasian Round 1 respondents

Components of Number Sense	Order International	Order Australasian
Cardinal value within counting range	1	4
Comparison of quantity to 10 (most/least)	2	*
Matching numerosity to 5	3	1
1:1 correspondence within counting range to 10	4	1
'One number after' within counting range	5	5
Subtraction of 1 or 2 – effect	5	*
Commutativity – addition	5	*
Rote counting to 5	5	3
Rote counting to 10	5	6
Subitising to 3	5	8
'One number before' within counting range	5	*
Magnitude (low/high position on number line)	12	*
Inversion principle	12	*
Order irrelevance principle	14	11
Ordering of quantity (lowest to highest)	15	*
Addition of 1 or 2 – effect	15	6
Addition of 2 sequential sets screened from view	15	*
Additive composition	18	8
Combining sets – 2 visible collections	18	8

\* These components did not reach criterion in the Australasian study

Table 4: New and modified components ranked as indicative of number sense in Round 2

Order	Components of Number Sense	Mean	SD	Number of Agree/Strongly Agree
1	Simple word problems (New Component)	4.6	0.55	5
2	Inversion principle – adding then subtracting up to 5 (Modified Component)	4.2	0.84	4
3	Counting backwards from 10 (New Component)	4.0	1.22	4
3	A sense of size (New Component)	4.0	1.73	4
5	A sense of numerosity (New Component)*	3.75	1.9	3

\*One participant did not rank this component.

and understandings to be “essential” components of number sense at school entry, with the international academics including a far broader range of components than did the Australasian academics. The components with a mean of 3.75 or above were ordered differently by the international and Australasian academics.

Data from the second questionnaire were analysed to calculate the mean rank (M), standard deviation (SD) and number of respondents giving a rank of ‘Agree’ or ‘Strongly Agree’ for each new or modified component of number sense. Of the eight new components included, four reached the criterion of a mean of 3.75, and of the three modified components included, one reached this criterion. Only one new component was ranked ‘Agree’ or ‘Strongly Agree’ by all respondents and one modified component was ranked from ‘Neutral’ to ‘Strongly Agree’. Five of the new or modified components were ranked from ‘Strongly Disagree’ to ‘Strongly Agree’, two were ranked from ‘Disagree’ to ‘Strongly Agree’ and two were ranked from ‘Strongly Disagree’ to ‘Agree’. Table 4 details the new and modified components that were ranked with a mean of 3.75 or above.

After two rounds of questionnaires, 23 components

of early number sense were ranked with a mean of 3.75 or greater. Of these 23 components, 4 were ranked as ‘Disagree’ or ‘Strongly Disagree’ by one participant. The 19 components of number sense with no ranks of ‘Disagree’ or ‘Strongly Disagree’ are presented in Table 5.

Round 2 results from the Australasian and International studies cannot be compared because of the different feedback provided in the two studies. In the Australasian study the view was expressed that the skills were indicative of number sense ‘after one year of schooling’ rather than ‘at school entry’. No such opinion was expressed in the international study, although one respondent did suggest the skills were appropriate to children of five years of age rather than four years of age. In the second questionnaire, Australasian participants were asked to rank Round 1 components of number sense reaching a mean of 3.75 both ‘at school entry’ and ‘after one year of schooling’. This had a marked impact on responses with many of the components reaching a mean of 3.75 for ‘children at school entry’ in Round 1 not reaching this criterion in Round 2 for ‘children at school entry’. Only seven components of number sense reached the 3.75 criterion in Round 2 of the Australasian

Table 5: Components from Rounds 1 & 2 with no ranks of Disagree or Strongly Disagree

Order	Components of Number Sense	Mean	SD	Number of Agree/ Strongly Agree
1	Cardinal value within counting range	4.83	0.41	6
2	Comparison of quantity to 10 (most/least)	4.75	0.61	5
3	Matching numerosity to 5	4.66	0.52	6
4	Simple word problems (New Skill)	4.6	0.55	5
5	1:1 correspondence within counting range to 10	4.5	0.55	6
5	‘One number after’ within counting range	4.5	0.55	6
5	Subtraction of 1 or 2 – effect	4.5	0.55	6
5	Commutativity – addition	4.5	0.55	6
5	Rote counting to 5	4.5	0.84	5
5	Rote counting to 10	4.5	0.84	5
5	Subitising to 3	4.5	0.84	5
12	‘One number before’ within counting range	4.33	0.52	6
12	Magnitude (low/high position on number line)	4.33	0.82	5
14	Inversion Principle Adding then subtracting up to 5 (Modified Skill)	4.2	0.84	4
15	Order irrelevance principle	4.16	0.75	5
15	Ordering of quantity (lowest to highest)	4.16	0.75	5
15	Addition of 1 or 2 – effect	4.16	0.75	5
18	Addition of 2 sequential sets screened from view	4.0	0.89	4
19	Additive composition	3.83	0.75	4
19	Combining sets – 2 visible collections	3.83	1.17	4

study. International participants were not asked to re-rank Round 1 components and thus no comparisons between Round 2 results can be made. All seven of the components that reached the criterion of 3.75 in Round 2 of the Australasian study, reached the criterion of 3.75 in Round 1 of the present study. The seventh of these components, 'Comparison of spoken numbers to 5', was included as one of the tasks to assess the component described as 'comparison of quantity' rather than as a component in its own right in the present study.

## Discussion

While it is acknowledged that few participants were involved in the present study, the results do reveal support for some of the components of number sense appearing in the literature pertaining to the assessment of early number sense. Rote-counting, cardinal value, comparison of quantity and 1:1 correspondence applied to quantities of up to 10 were identified as essential measures of number sense at school entry in the present study and in the Australasian study. Each of these components appears in recent assessment literature, and is described by some, as having predictive value.

Results of the Australasian study suggest the view that number sense prior to school entry *is* reflected by a child's competence with early counting (i.e. counting to 10). Counting is recognised as an essential prerequisite for mathematics success (Aunola, Leskinen, Lerkkanen, & Nurmi, 2004; Bryant, 2005; Fuson, 1988; Gelman & Gallistel, 1978; Groen & Resnick, 1977; Malofeeva et al., 2004; Siegler, 1988) but it alone is not sufficient for the development of mathematical competence (Baroody & Wilkins, 1999; Briars & Siegler, 1984; Cowan, Dowker, Christakis, & Bailey, 1996; Fuson, 1988). Counting skills appearing in recent assessment literature at the preschool and Kindergarten level but not identified in either the present study or the Australasian study include: counting to 50 and counting forward by a specific number (Aunola et al., 2004) and ordinality (Malofeeva et al., 2004).

Results of the present study suggest that some of the skills, concepts and understandings currently being assessed in children in their first and second year of schooling were seen by participating academics as essential components of number sense for children even before they commence school. In contrast to the limited number of components of number sense identified by the Australasian academics, the present study supports the view that a diverse range of components may impact on the mathematical development of young children. In the present study, components seen as essential measures of early number sense in addition to those identified by the Australasian academics included: counting backwards

from 10, the inversion principle, a sense of numerosity, a sense of size, simple addition and subtraction word problems, matching numerosity, 'one number after', effect of adding one or two, 'one number before', effect of subtracting one or two, number magnitude, the commutativity principle, addition of sets and additive composition. While it is acknowledged that a weakness of the present study is the small number of participants, these participants do have an impressive number of relevant publications among them and, as 'experts' in the field, their contributions to the Delphi process indicate measures worthy of future examination. Recent research into early number sense assessment provides emerging evidence that some of the components of number sense identified in the present study are predictive of difficulties in beginning mathematics but it is too early for firm conclusions to be drawn.

Reading numerals and tasks involving numerals feature heavily in many, though not all, of the assessment research cited in this paper. Chard and his colleagues reported that number writing, number recognition to 20, quantity discrimination of numerals 1 to 20, and missing number had predictive value when assessed in Kindergarten and First Grade (Chard et al., 2005).

The international academics participating in the present study did not support these skills as reflecting number sense prior to school entry, with numeral reading reaching a mean of only 2.75 in Round 2. This is not unexpected given that numeral recognition and production is a focus of teaching in the first year of school and the target population for the questionnaires was 'children prior to school entry'. Whether numeral recognition is an early number skill or a reading skill is open to question. Relying too heavily on tasks requiring numeral recognition for assessing number sense in young children, therefore, has the potential to lead to a misdiagnosis of young children's mathematical problems.

Across the present study and the Australasian study a total of 18 academics with published work in the area of early mathematics and/or number sense provided their opinions on a range of possible components of number sense. The results of the two studies reveal that no skill was ranked as 'Strongly Agree' by all 18 of these academics. This confirms the lack of consensus recognised within current number sense literature. A problem with the modified Delphi procedure adopted in the two studies was that it did not provide information on why particular responses were given. It is possible that respondents considered a listed component to be essential for mathematics success but did not consider it to be a facet of number sense. Perhaps, also, there is lack of consensus as to the value of using the term number sense. One of the experts approached to participate in the present

study offered the following comment on number sense: "I have a negative reaction to the word 'number sense'. It has never been adequately defined, and it implies there is some special 'sense' out there that is beyond particular mathematical competencies. I think you will meet your goals better if you focus on 'early numerical competency' rather than 'number sense'." The growing use of the term 'number sense' and, in particular, its inclusion as an important outcome in mathematics syllabi across the globe means the term cannot be ignored.

Other limitations relating to this research need also to be acknowledged. It is possible that ranking components of number sense was influenced by the assessment tasks proposed as a measure of each component. Certainly a skill is partially, if not wholly, defined by the tasks designed to measure it. While respondents did suggest some changes to tasks, there was no clear indication that the tasks were generally rejected as representative of the components they were set to measure. The questionnaires were also quite lengthy and required time and focus to complete them. In each of the studies at least one respondent commented that they found the questionnaire difficult to complete. A simpler questionnaire may have enhanced the reliability and ensured a higher level of participation.

By seeking expert opinion, the present study and the Australasian study aimed to identify the core components of number sense, not limited to counting skills, prior to school instruction in mathematics. In the Australasian study some participants were uncomfortable that a definition of number sense was not provided and it was noted that using the Delphi procedure might not have given participants their full voice in what is at present a highly theoretical domain. Balancing this criticism is the fact that the procedure allows participation from a group of experts who otherwise could not be involved. Using the modified Delphi procedure in the present study allowed participation from Britain, Europe and the United States and participation from Australia and New Zealand in the Australasian study.

Clearly there is a need for ongoing research in the area of number sense to determine which, if any, of the components of number sense identified in the present study have predictive value. Much exciting work is happening in the number sense domain with researchers being engaged in longitudinal studies aimed at identifying the best measures for predicting which children are at risk of learning difficulties in beginning mathematics, which measures are predictive of problems with particular components of mathematics and which interventions are effective. Within the research community continued debate about 'number sense' is likely. Not only is there a lack of consensus on the components of number sense but there is also a lack of consensus that the construct

of number sense can be defined in terms of teachable skills. These are issues that need to be addressed through extensive longitudinal research in the areas of early mathematics assessment and intervention.

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## Appendices

### **Appendix 1: Components of number sense ranked in Round 1**

1. Rote counting to 5
2. Rote counting to 10
3. Subitising to 3
4. Subitising to 5
5. 1:1 correspondence within counting range to 10
6. Order irrelevance principle
7. Matching numerosity to 5
8. Cardinal value within counting range
9. Comparison of quantity to 10 (most/least)
10. Magnitude (high or low on a mental number line)
11. Ordering of quantity (least to most/lowest to highest)
12. 'One number after' within counting range
13. 'Two numbers after' within counting range
14. Addition of one or two – 'effect'

15. Addition of one or two – 'result'
16. 'One number before' within counting range
17. 'Two numbers before' within counting range
18. Subtraction of one or two – 'effect'
19. Subtraction of one or two – 'result'
20. Inversion principle
21. Commutativity – addition
22. Combining two visible collections
23. Combining two sets – one screened
24. Addition of two sequentially presented sets that are then screened from view
25. Additive composition

### **Appendix 2: Additional components of number sense ranked in Round 2**

1. Rote counting beyond 10
2. Counting backwards from 10
3. Comparison of visually presented numerals
4. Comparison of numbers to 10 with a difference of only one
5. Inversion principle
  - adding then subtracting up to 5
  - subtracting then adding up to 5
6. Numeral reading to 5
7. Numeral reading to 10
8. A sense of numerosity
9. A sense of size
10. Simple word problems



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# Australian Journal of Learning Disabilities

*Vol 11, Issue 4, 2006*

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## Contents

Editorial <i>Kevin Wheldall</i>	155
Learning to read in Australia <i>Max Coltheart and Margot Prior</i>	157
School-related social adjustment of Chinese primary school students with specific learning difficulties: a perspective from Hong Kong <i>Man Tak Yuen, Peter Westwood, and Gunter Wong</i>	165
A history of Learning Difficulties Australia: part four – managing change <i>Josephine C. Jenkinson</i>	175
A history of Learning Difficulties Australia: part five – the journal (continued) <i>Josephine C. Jenkinson</i>	185
An international perspective of early number sense: identifying components predictive of difficulties in early mathematics achievement <i>Sally Howell and Coral Kemp</i>	197

Note: This issue of the journal was published in June 2007.

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ISSN 1324-8928

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LEARNING DIFFICULTIES AUSTRALIA