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# School-based reading assessment: Looking for vital signs

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Abstract

There is increased interest throughout the educational and broader community in discovering how our students fare in the important early task of mastering reading. Broad scale assessment at State and National level is potentially valuable, and school-based assessment, too, has the potential to influence the priorities assigned to reading instruction in schools. It can assist in the identification and management of students at-risk even before reading instruction commences. It can also help identify those making slow progress at any year level. If specific interventions are implemented, school-based reading assessment can provide information about the worthwhileness of the chosen approach. There is an important question implicit in this potentially valuable activity. What sorts of assessment are likely to be most useful for our school? In this paper the emphasis is directed towards those aspects of reading that have been identified by recent research as critical to reading development.

There is a significant problem with the attainment of universal literacy in Australian schools. The Australian Government House of Representatives Enquiry (1993) estimated that between 10-20% of students finish primary school with literacy problems. In Victoria, as many as 16% have been labelled reading disabled (Prior, Sanson, Smart, & Oberklaid, 1995; Richdale, Reece, & Lawson, 1996). Victorian Budget estimates (Public Accounts and Estimates Committee, 1999) anticipated that for the year 2000, 20% of Year 1 students required the Reading Recovery program. Further concern has been expressed that, after their Year Three at school, students with reading problems have little prospect of adequate progress (Australian Government House of Representatives Enquiry, 1993). Providing additional foundation for that fear was a Victorian study (Hill, 1995) that noted little discernible progress in literacy for the lowest 10 percent between Year Four and Year Ten. Even successful schools will have some students who do not do well in reading and writing. Nationally according to the Australian Council for Educational Research, more than 30% of Australian children entering high school (mainly in government and Catholic schools) cannot read or write properly ("Our desperate schools", 2000).

In recent years, perhaps because the introduction of state and national literacy testing has identified and publicised the widespread nature of the literacy problem, there has developed an interest in assessment of a more formal nature than that allowed solely by the collection and study of student folios. Literacy assessment itself has little intrinsic value - it is the consequence of the assessment process that has the potential to enhance the prospects of those students currently struggling to master reading. The value relates to the question of what should be done. What should be done is inevitably tied to the conception of the reading process and what can go wrong with its progress. How do educationists tend to view the genesis of reading problems?

In a fascinating study, Alessi (1988) contacted 50 school psychologists who, between them, produced about 5000 assessment reports in a year. The school psychologists agreed that a lack of academic or behavioural progress could be attributed to one or more of the following five factors. Alessi then examined the reports to see what factors had been assigned as the causes of their students' educational problems.

1. Curriculum factors? No reports.
2. Inappropriate teaching practices? No reports.
3. School administrative factors? No reports.
4. Parent and home factors? 10-20% of reports.
5. Factors associated with the child? 100%.

In another study this time surveying classroom teachers, Wade and Moore (1993) noted that when students failed to learn 65% of teachers considered that student characteristics were responsible while a further 32% emphasised home factors. Only the remaining 3% believed that the education system was the most important factor in student achievement.

This highlights one of the ways in which assessment can be unnecessarily limiting in its breadth, if the causes of students' difficulties are presumed to reside solely within the students rather than within the instructional system. Assessment of students is not a productive use of time unless it is carefully integrated into a plan involving instructional action. When the incidence of failure is high as in Australia for example, then a more appropriate direction for resource allocation is towards the assessment of instruction. It can only be flawed instruction that intensifies the reading problem from a realistic incidence of reading disability of around 5% (Marshall & Hynd, 1993) to that which we find in Australia of 20% - 30%. "Learning disabilities have become a sociological sponge to wipe up the spills of general education. … It's where children who weren't taught well go" (Lyon, 1999). Though it is not the focus of this paper, it is encumbent upon a school system to constantly assess the quality of instruction provided in its schools, and to take account of the findings of research in establishing its benchmarks and policies. Up to this time, education systems in Australia have been relatively impervious to such findings (Hempenstall, 1996), lagging behind significant changes in the USA and Great Britain.

Even allowing that the major problem for most students lies in the realm of instruction, assessment of students remains of value in a number of areas, such as the early identification of reading problems, determining the appropriate focus for instruction, the monitoring of progress in relevant skill areas, and the evaluation of reading interventions. It is the assumption in this paper that decisions about assessment should be driven by up-to-date conceptions of the important elements in reading development.

What are the issues in reading development that should guide assessment?

Even though it is comprehension that is the hallmark of skilled reading, it is not comprehension per se that presents the major hurdle for most struggling readers. There is increasing acknowledgement that the majority of reading problems observed in students occur primarily at the level of single word decoding (Rack, Snowling, & Olson, 1992; Stanovich, 1988a; Vellutino & Scanlon, 1987) and that in most cases this difficulty reflects an underlying struggle with some aspect of phonological processing (Bradley & Bryant, 1983; Bruck, 1992; Lyon, 1995; Perfetti, 1992; Rack et al., 1992; Share, 1995; Stanovich, 1988a, 1992; Vellutino & Scanlon, 1987; Wagner & Torgesen, 1987).

Recently, Shankweiler and colleagues (1999) found that the simple ability to read aloud a list of English words accounted for 79% of the variance in reading comprehension. Even the ability to do the same thing with non-words (e.g., skirm, bant) correlated very highly with reading comprehension, accounting for 62% of the variance in their study. Lovett, Steinbach, & Frijters (2000) summarise neatly the critical emphasis. "Work over the past 2 decades has yielded overwhelming evidence that a core linguistic deficit implicated in reading acquisition problems involves an area of metalinguistic competence called phonological awareness" (p.334).

Unless resolved, phonological problems continue to be evident throughout the school years and beyond. An interesting study by Shankweiler, Lundquist, Dreyer, and Dickinson (1996) provides some evidence for the location of the fundamental problem areas and supports a code-based intervention focus. Their study of Year 9

and Year 10 learning disabled and low to middle range students found significant deficiencies in decoding across each of the groups. They also noted that differences in comprehension were largely reflecting levels of decoding skill, even among such senior students.

A number of similar studies involving adults with reading difficulties have revealed marked deficits in decoding (Bear, Truax, & Barone, 1989; Bruck, 1990, 1992, 1993; Byrne & Letz, 1983; Perin, 1983; Pratt & Brady, 1988; Read & Ruyter, 1985; cited in Greenberg, Ehri, & Perin, 1997). In the Greenberg et al. (1997) study with such adults, their performance on phonologically-based tests resembled those of children below Year Three. Even the very bright well-compensated adult readers acknowledged that they had laboriously to remember word shapes (an ineffective strategy), had little or no idea how to spell, and were constantly struggling to decode new words, especially technical terms related to their occupations.

The emphasis on decoding is not to say that difficulties at the level of comprehension do not occur, but rather, that for many students they occur as a consequence of a failure to develop early fluent, context-free decoding ability. The capacity to actively transact with the text develops with reading experience, that is, it is partly developed by the very act of reading. Students who read little struggle to develop the knowledge of the world and a vocabulary necessary as a foundation for comprehension (Nagy & Anderson, 1984; Stanovich, 1986, 1993b).

Research has indicated that the problems begin early, are predictable and have broad and predictable consequences. " … the phonological processing problem reduces opportunities to learn from exposure to printed words and, hence, has a powerful effect on the acquisition of knowledge about printed words, including word-specific spellings and orthographic regularities" (Manis, Doi, & Bhadha, 2000, p.325).

In the largest, most comprehensive evidenced-based review ever conducted of research on how children learn to read the National Reading Panel (National Institute of Child Health and Human Development, 2000) recently presented its findings. For its review, the Panel selected methodologically sound research from the approximately 100,000 reading studies that have been published since 1966, and from another 15,000 earlier studies. It determined (Hall, 2000) that "effective reading instruction includes teaching children to break apart and manipulate the sounds in words (phonemic awareness), teaching them that these sounds are represented by letters of the alphabet which can then be blended together to form words (phonics), having them practise what they've learned by reading aloud with guidance and feedback (guided oral reading), and applying reading comprehension strategies to guide and improve reading comprehension."

This Panel report is also consonant with the findings of several recent major reports, such as those of the National Research Council (Snow, Burns, & Griffin, 1998) and the National Institute for Child Health and Human Development (Grossen, 1997), and the rationale supporting the British National Literacy Strategy (Department for Education and Employment, 1998).

Given the confluence of these findings of empirical research, it is appropriate for reading assessment to reflect this current understanding of reading development and its potential hurdles.

Current models of reading development

A number of researchers have developed models of reading development based on stages (Chall, 1979; Ehri, 1993, 1994). Although variations occur among writers, there is now general acceptance among empirical researchers that the sequence of development of the word identification system moves from logographic to alphabetic to orthographic. In the first stage, the beginning reader learns to recognise a visual pattern by its shape (a letter landscape). The shape is recognised wholistically, and significant alterations to the letter structure may be made without altering the child's response (e.g., Pepsi signs changed to Zepsi without beginning readers noticing any change).

At this stage, the child has not learned to analyse the written word structure, and would not need to if our written language was logographic. It is, however, alphabetic, and contains far too many words to be recognised by the visual pattern of peaks and troughs, whirls and intersections that comprise our written language.

The movement to the alphabetic stage is probably driven by the gradual awareness of speech segmentation which the child induces or is taught (Adams, 1990). This phoneme awareness may more readily be invoked in children whose earlier experiences have included a focus on the structure of the spoken word, albeit in larger units such as rhymes, syllables, onset and rimes. Some children do not develop this awareness unaided (Chall, 1989) and without assistance may remain at this early stage, reliant on memory of the letter landscapes or contextual guessing strategies (Spear-Swerling & Sternberg, 1994). Such readers are doomed as the demands of a rapidly increasing visual vocabulary become overwhelming in middle to upper primary school, that which Share and Stanovich (1995) term "an orthographic avalanche" (p. 17).

In the alphabetic stage, simple letter pattern-to-sound conversion provides a means of decoding (albeit, laboriously) unknown words. Initially this may involve use of only partial letter-sound cues (Spear-Swerling & Sternberg, 1994) until, with the arrival of alphabetic insight (Byrne, 1991), this strategy becomes reliable, at least with regular words, and continues to provide some clues for irregular words (Goulandris & Snowling, 1995). In irregular words, it is vowels that provide the quality of irregularity, but consonants remain regular for the most part, and it is the consonants that are most important in word recognition (Share & Stanovich, 1995). Of further assistance is the regularity inherent in a wide variety of letter clusters, for example, *igh, eat.* Of 286 phonograms that appear in primary grade texts, 95% are pronounced the same in every word (Adams, 1990). Hence this phonological recoding strategy enables cues for decoding a high proportion of words along the regular-irregular continuum.

Share (1995) sees this alphabetic period as crucial, and he developed a self-teaching hypothesis in which " ... each successful decoding encounter with an unfamiliar word provides an opportunity to acquire the word specific orthographic information that is the foundation of skilled word recognition and spelling" (Share & Stanovich, 1995, p. 18). This gradual "lexicalization" (p. 18) occurs through repeated opportunities to use letter-sound correspondences for decoding. The strategy is used with less frequency as the range of familiar word patterns increases, through a "self-teaching" (Share, 1995, p. 155) mechanism. The phonological recoding strategy remains useful for decoding unfamiliar words - and of course, our language has many low frequency words. Eighty percent of English words have a frequency of less than one in a million (Carroll, Davies, & Richman, 1971, cited in Share & Stanovich, 1995). Thus, the phonological recoding mechanism has a usefulness beyond its initial ability to provide the opportunities for the formation of orthographic representations.

Share and Stanovich (1995) assert that orthographic strategies are developed through multiple examples of success in decoding phonologically. If one accepts this view, then orthographic strategies should not be taught directly, and the instructional emphasis for older students must still be placed on ensuring letter-sound correspondences, blending and segmenting, and practice. It may also be that only through such laborious serial letter-by-letter decoding can precise letter-order become entrenched in the orthographic representation that forms the basis for accurate spelling (Adams, 1990; Jorm & Share, 1983; Williams, 1991). However, since many different words share similar spelling patterns, practice on any one word may simultaneously enhance the recognition of other similar words. It is this facility, known as decoding-by-analogy, that helps explain the capacity or readers to develop a large reading vocabulary so quickly.

Assessment of reading:

The assessment is based upon the deceptively simple view of reading first described by Hoover & Gough (1990), and acknowledged by researchers as a useful means of conceptualising reading problem foci. In this view, the comprehension of text requires general language comprehension ability and the capacity for accurate and fluent identification of the words in print. Thus, assessment based upon this model should address the development of both decoding and of comprehension. Given that the majority of reading problems arise in the area of decoding (Stuart, 1995), then that area is a very salient beginning focus.

If the student is a *beginner*:

Early reading delay is sometimes viewed as indicative of a slow starter who will catch up later; however, this is a dangerous assumption. Juel (1988) reports a probability of 0.88 that a student classified as a poor reader at the beginning of Year One would remain so when re-tested at Year Four. Hence, early identification and intervention should be paramount issues for the sake of those children who are at present needlessly exposed to crippling, extended failure.

If there are concerns regarding potential reading failure prior to school commencement (family history, disability etc.) there are a number of useful screening subtests in the *Comprehensive Inventory of Basic Skills-*

*Revised* (Brigance, 2000) under the heading of Readiness. If an intellectual disability is suspected, or if the child is very young, the *Inventory of Early Development-Revised* (Brigance, 1993) may provide the educational assessment information at a more appropriate level. In the USA, research from the National Institute for Health and Human Development has indicated that the strongest predictors of success in beginning reading are a knowledge of letter-sound correspondences (Chall, 1967) and phonemic awareness (Torgesen, 1998). This provides a theoretical rationale for focussing assessment on these areas initially.

Torgesen (1998) suggests a screening procedure involving: 1) a test of knowledge of letter names or sounds, because letter knowledge continue to be the best single predictor of reading difficulties; and 2) a test of phonemic awareness. Torgesen's research indicates that, individually, knowledge of letter names is the stronger predictor for Prep children, and knowledge of letter-sounds is stronger for first graders. McBride-Chang (1999) considers letter-sound knowledge to be more closely related to reading skills than is a grasp of letter names, because of the stronger phonological basis for letter-sound knowledge. Thus assessing letter names has predictive value because it is a marker for a range of useful literacy experiences, though letter-sound knowledge appears to have a causal rather than merely correlational relationship to reading progress.

One test is the Letter Identification subtest of the *Woodcock Reading Mastery Test-Revised* (Woodcock, 1987). It presents letters in several different fonts for which either the sound or the name is scored as correct. Its use of different fonts appears to be intended to enable the assessment of the concept of sound-symbol relationship, not simply the association between one letter-shape and its name/sound.

The *Comprehensive Inventory of Basic Skills -Revised (Brigance, 2000)* has several useful subtests. Visual discrimination of upper and lower case letters, Recitation of the alphabet, Reading upper and lower case letters, Printing upper and lower case letters in alphabetic sequence, and, Printing upper and lower case letters as dictated.

The *Neale Analysis of Reading Ability (Revised)* (Neale, 1988) has a supplementary test that assesses the names and sounds of the alphabet.

There is near-complete consensus among researchers that phonemic awareness is a very robust predictor of future reading progress, markedly better than is intelligence (Stanovich, 1991). As this awareness is also the major causal factor in early reading progress (Adams, 1990), assessment of current levels allows both a prediction of a child's likely progress in the absence of appropriate intervention, and a direction for any intervention to take.

Phonological(or phonemic) awareness is an auditory skill enabling the recognition that the spoken word consists of individual sounds. It appears to follow a developmental sequence: from simple (Do *cat* and *comb* begin with the same sound?) to complex (blending, and then segmenting). A study by Schatschneider, Francis, Foorman, Fletcher, and Mehta (1999) suggests that phonemic awareness is a unitary construct, but that its development is best charted as a sequence of tasks from easiest to hardest:

1. Initial sound comparison -identifying the names of pictures beginning with the same sound
2. Blending onset-rime units into real words
3. Blending phonemes into real words
4. Deletion of a phoneme, and pronouncing the word thus formed (say *hat* without the /h/ sound - *at*)
5. Segmenting words into their phonemes (/c/ /a/ /t/)
6. Blending phonemes into nonsense words

In a huge study (Hoien, Lundberg, Stanovich, & Bjaarlid, 1995), initial-phoneme and final-phoneme matching tasks (such as assessed by the *TOPA*: *Test of Phonological Awareness (Torgesen & Bryant, 1994*) were by far the most potent predictors of early reading acquisition. There are a number of screening tests available, but relatively few with norms, the *TOPA* being one that has an age range is 5.0 - 8.11yrs. Another advantage of this test is its facility for group-testing.

Another test is the *Phonological Awareness Screening Test* (Henty, 1993) developed in Tasmania for which the author has been attempting to obtain normative data. The *Sutherland Phonological Awareness Test* (Neilson, 1995) has norms (Australian) for Years P-3. The *Lindamood Auditory Conceptualization Test* (Lindamood & Lindamood, 1979) has norms for Years P-12. The Rosner *Test of Auditory Analysis Skills* (Rosner, 1975) is a 13 item test with norms for Years P-3. *The Yopp-Singer Test of Phoneme Segmentation* (Yopp, 1995) is a brief test for Prep/Year 1 students, designed for early screening purposes. Informal un-normed tests are available in *A Sound Way* (Love & Reilly, 1995), *Sound Linkage* (Hatcher, 1994), *Phonemic Awareness Checklist* (Lewkowicz, 1980), *Phonemic Awareness in Young Children* (Adams, Foorman, Lundberg, & Beeler, 1998), among others.

Phonemic awareness becomes important when beginners are faced with the challenge of making sense of the English alphabetic system of writing. The degree to which students are then able to use their developing phonemic awareness in the reading task can be assessed with the Word Attack subtest, *Woodcock Reading Mastery Tests-Revised, 1987*. The decoding of non-words is considered the most appropriate measure of phonological recoding (Hoover & Gough, 1990; Siegel, 1993; Wood & Felton, 1994). It provides an indication of the capacity to transfer the auditory skill of phonological awareness to the task of decoding print. It provides an indication of the facility with which students can use the sound values of letters and letter groupings to decode words not before seen. While it may appear to be a task only obliquely related to reading, it ensures that memory for words and contextual cues can be ruled out as explanations when the non-words are read accurately. Non-word decoding also correlates very highly with reading comprehension (Shankweiler, Lundquist, Dreyer, & Dickinson, 1996).

<u>Other phonological processes</u>

There are other phonological skills besides phonemic awareness, and they are beginning to assume importance in the research literature because of their capacity to add discrimination power to screening batteries (Badian, 1994; Cornwall, 1992; Felton, 1992; Hurford, Darrow, Edwards, Howerton, Mote, Schauf, & Coffey, 1993; Hurford, Schauf, Bunce, Blaich, & Moore, 1994; Spector, 1992).

Some of these studies have demonstrated excellent results through including phonological tests in a battery to predict problems in reading acquisition. Hurford et al. (1994) assessed 170 school beginners, and predicted with 100% accuracy which students would be diagnosed with a reading disability two years later. They used phoneme deletion, phonological discrimination, IQ, and pseudo-words. Badian (1994) assessed 118 pre-schoolers mid-year and successfully predicted 91% would be good or poor readers 2 years later. She used phonological awareness, naming speed, and an orthographic matching task.

On the other hand, Scarborough (1998) in his review of screening tools suggested that existing test batteries may under-identify about 20% of Preps who later experience reading difficulties; and they over-identify a larger percentage as requiring intervention when they do not. In his view, the extra work involved in administering and interpreting large test batteries is not reflected in a commensurate improvement in accuracy of screening at this time. This is not to discourage research into increasing accurate screening, but rather to point out that the most accurate mix is yet to be determined.

1. Phonological recoding in lexical access.
Humans store the internal representations of words in sound form known as phonological segments. These representations need to be clearly distinguishable from other stored sound segments, or else the wrong word may be selected when, for example, one is asked to name an object presented in a picture, or a written number, or letter.

Not only must the representations be distinct, but they must be quickly and accurately accessible. Students with reading difficulties often display significant difficulty with rapidly retrieving and accessing names for visual material, even though the relevant names are known to them. The impact on reading development is that a deficit in this area will also adversely impact upon the basic processing necessary for fluent word recognition processes and thereby reading comprehension (Wolf, Miller, & Donnelly, 2000).

These speed and accuracy problems may be evident even prior to experience with print. Naming speed for pictures or objects may be slow, as too, subsequently, naming of (known) numbers and letters. A number of researchers have noted the predictive power of naming-speed tasks, using pictures, numbers, and letters. Both naming speed and sight word reading depend on rapid, automatic symbol retrieval. Bowers (1995) argues that slow naming speed is specific to reading disability, and not common to children with either *garden-variety* reading problems, or *Attention-Deficit Hyperactivity Disorder*.

Wolf and Bowers (2000) discuss the possibility that naming speed is independent of phonemic awareness and represents a second core deficit among some disabled readers, a model becoming known as the Double Deficit Hypothesis (Bowers & Wolf, 1993; Wolf & Bowers, 1999). This issue is important because there may be a group whose phonemic awareness is developing normally and who would be unidentified by a phonemic awareness screen, but who will subsequently have reading difficulties. Additionally, there may be a group of students who have deficits in both phonemic awareness and rapid naming. Their dual difficulty may well lead them to be especially resistant to the standard procedures in reading instruction. Identifying them before the failure process

commences is obviously worthwhile because it enables the marshalling of resources to provide very intense (and appropriate) instruction to this targeted group.

A recent study by Lovett, Steinbach, and Frijters (2000) underlines the importance of recognising such treatment resisters. They noted that, when intensive phonologically-based instruction was implemented, even the Double Deficit students made progress commensurate with their less disabled single deficit peers. Without such carefully planned intervention, they tend to be the most severely disabled readers, and their difficulties are not relieved by maturation (Lovett, et al., 2000; Wiig, Zureich, & Chan, 2000).

Tests: *RAN: Rapid Automatized Naming* (Denckla & Rudel, 1974); *BNT: Boston Naming Test* (Kaplan, Goodglass & Weintraub, 1983); *SNS: Symbol Naming Speed* (Swanson, 1989); *Picture Naming Test* (Hempenstall, 1995). Some have suggested that, for children with well-established letter-sound recognition, a letter-naming test may be a better predictor (Manis, Doi, & Bhadha, 2000). However, Wiig, Zureich, and Chan (2000) argue for pictures and colours as more suitable because of the highly automatised nature of letter and number knowledge.

Even though rapid naming tasks assist in the prediction of early reading success, there is as yet little evidence that directly training those tasks improves reading (Spear-Swerling, 1998). That is not to say that such efforts can never be fruitful. Wolf, Miller, & Donnelly (2000) have developed a program (Rave-O) designed to directly address the processing deficits they consider produce impediments to reading fluency. The RAVE-O program is not a stand-alone approach but is integrated with a phonological analysis and blending strategy based upon Reading Mastery I/II Fast Cycle (Engelmann & Bruner, 1988). The additions emphasise orthographic pattern recognition, semantic development, and retrieval strategies. Evaluations are as yet incomplete.

2. Phonological recoding in working memory.
The beginning reader is required to decode a series of graphemes, and temporarily order them to allow the cognitively expensive task of blending to occur. This skill has been found to be an important determinant of early reading success. It is usually assessed by digit span (oral & visual) and sentence memory tasks.
Tests: *Wechsler Intelligence Scale for Children: Third Edition (WISC III)* (Wechsler, 1992): Digit Span subtest; *Wechsler Pre-school and Primary Scale of Intelligence- Revised (WPPSI-R)* (Wechsler, 1989): Sentences; *Stanford-Binet: Fourth Edition (SB-FE)* (Thorndike, Hagen, & Sattler (1986): Memory subtests; *Comprehensive Inventory Of Basic Skills-Revised* (Brigance, 2000): Sentence Memory.

*The Comprehensive Test of Phonological Processing (CTOPP)* (Wagner, Torgesen & Rashotte, 1999) assesses all three phonological processes: phonological awareness, rapid naming, and phonological memory. The CTOPP is designed to identify individuals from prep to tertiary level whose reading would benefit from development of their phonological skills. One version, developed for children aged 5 and 6 has seven core subtests and one supplementary test. The second version (ages 7 to 24 years) contains six core subtests and eight supplementary tests. Individual administration requires about 30 minutes to administer the core subtests. The CTOPP authors argue for three potential classroom uses: to provide a screening test for students who may

not be developing their phonological abilities, to indicate any student's areas of strength and weakness among those processes, and, to measure progress in phonological processes when intervention programs are in place. The subtests are Elision, Blending Words, Sound Matching, Memory for Digits, Nonword Repetition, Rapid Color Naming, Rapid Digit Naming, Rapid Letter Naming, Rapid Object Naming, Blending Nonwords, Phoneme Reversal, Segmenting Words, and Segmenting Nonwords.

There is less known about the role of these other phonological processes, including how amenable they are to direct or indirect intervention. Several studies have noted improvement in lexical access following phonemic awareness intervention (Beck, Perfetti, & McKeown, 1982; McGregor & Leonard, 1995, cited in Catts, 1996). Gillam and Van Kleeck (1996) reported a study in which pre-school aged children with speech and language disorders improved both in phonemic awareness and phonological working memory following a phonemic awareness training program. Further, they noted that children with poor initial phonological working memory were as responsive to the intervention as were those with better phonological working memory. No studies thus far have supported the value of directly teaching naming or short term memory skills.

What then is one to make of the results of such process assessment?

Teachers may anticipate that students with difficulties solely in phonological awareness tasks are likely to require additional care in the teaching of decoding skills, while those with problems solely with naming speed may be expected to require assistance in whole word recognition and careful attention to fluency development. Wolf and Bowers (2000) argue that students who have difficulty with *both* phonological awareness tasks and naming speed tasks are very likely to be more resistant to reading instruction than are those with a problem in one area only. Schools can then prepare for intensive assistance over a longer period of time (Torgesen et al., 1994) with these students - too often efforts are prematurely discontinued for those students in greatest need. Progress may be slow and hard earned, but attention to detail in instruction and vastly increased opportunities for practice can make a great difference to the prognosis. The lesson to be learned from assessment of student's phonological processing is not about identifying learner characteristics to account for lack of progress, but rather to assist the discerning of which students demand of us our cutting-edge best interventions.

Older students: Why are so many struggling students not noticed until about Year Four and beyond?

At about Year Four, there is a marked increase in the number of children referred for reading assistance (Chall, Jacobs, & Baldwin, 1990). This may represents the dawning of teachers' recognition that the maturational delay hypothesis can no longer be used to explain the lack of reading progress. More salient perhaps is the generally unacknowledged explosion of new words in textbooks at about that time (Carnine, 1982). Many students who have relied upon whole-word memory recognition as their mode for storage and retrieval find the strategy collapses in Year Four. Whereas a word recognition capacity of 400 words is adequate for coping with text up to this time (and many children's visual memory can manage such a load), the demand increases dramatically to about 4000 words around that year, and up to 7000 words by Year Six (Carnine, 1982), what Share (1995) describes as an "orthographic avalanche"(p.17).

For the student who relies primarily on word shape, the task is similar to that required in visually memorizing 7000 telephone numbers. Students who cannot access the phonological route to identify these words do obviously struggle and progress grinds to a halt. In truth, they had difficulties before this time, but perhaps managed to disguise them in classrooms where careful continuous assessment of word attack skills was unavailable. Unfortunately, this appears to be even more likely for girls, as their rate of referral for assistance (about 1 in every 4 referrals) does not match the prevalence (about equal with males) of reading problems among females in our society (Alexander, Gray, & Lyon, 1993).

A low *Woodcock:* Word Attack score suggests this scenario in students at (or beyond) Year Four. For younger students it is predictive of their reading future. Inability to decode pseudo-words is indicative of the need for an intensive, carefully designed program that provides at least a reasonable opportunity for the accelerated progress needed if a student is to make headway against his peers. If a student is two years behind his peers he must develop in reading at a rate twice as fast as they do, if he is to catch them by the end of primary school (as they will improve by at least two years over that period). While this conception of reading progress is rather crude it does give the flavour of just how immense a task it is. It also helps explain the chilling finding from a Melbourne University study (Hill, 1995), that for most students in this position there is no discernible improvement in reading between Year Four and Year Ten. Most students do not have access to intervention, and their prognosis is grim. For those students who do receive help it is incumbent upon us to provide the best and most efficient intervention available at the time. This implies that the most salient content must be delivered to students in the most effective manner possible.

How might assessment differ for an older student:
How delayed is this child's reading development? A general reading assessment will provide some information. It will provide an idea of the length of time it may take for the child to achieve a reasonable level of reading skill (i.e., to be able to adequately comprehend grade-level textbooks as a minimum outcome) given a good program, regularly and competently taught to a motivated student. Normed reading tests may be used for this purpose, bearing in mind the various problems they have in specifying absolute grade levels. In the RMIT Clinic, the most commonly used general tests are the *Woodcock Reading Mastery Tests* – Revised (Woodcock, 1987), the *Neale Analysis of Reading Ability*-Revised (Neale, 1988), the *Spadafore Diagnostic Reading Test* (Spadafore, 1983) and various subtests of the *Comprehensive Inventory Of Basic Skills-Revised* (Brigance, 2000).

These tests will usually provide an indication of the student's ability to read accurately from word lists or connected text (reading accuracy) and the capacity to make sense of that which they read (reading comprehension). Reading accuracy tests do not adequately discriminate between those students who have memorised whole words and those students who additionally have the capacity to decode words not recognised. The *Woodcock* has a significant advantage over the *Neale* because of the inclusion of a Word Attack subtest that indicates the degree to which the student can apply his phonemic awareness to the task of reading (sometimes called phonological recoding). Additionally, it is normed to an adult level. The *Neale* allows for testing of reading rate, an important element in a student's progress, reflecting the level of automaticity or fluency achieved. Rate also provides information about the attentional capacity a reader has available to commit to the task of reading comprehension.

Reading fluency

As reading accuracy becomes facile, the role of reading speed assumes greater importance. Automaticity with the code enables effortless decoding, thereby freeing up the cognitive resources necessary for making sense of that which is read. It also lessens the load on working memory such that the time between beginning and ending the sentence is reduced. This fluency may develop solely from practice at reading, but may be enhanced when students attend to the goal of increasing their reading speed. Most students require between four and 14 exposures to sounding-out in order to evoke the recognition of the practised word as a whole (Lyon, 1998). Thus, the greater the volume of appropriately constructed text read at a student's independent reading level (95% accuracy), the more rapidly fluency develops. (Lyon, 1998).

Standardized assessments in addition to informal assessments of oral reading accuracy, rate and comprehension are recommended and referenced in the National Reading Panel Report (National Institute of Child Health and Human Development, 2000). The Report recommends guided oral reading a valuable fluency enhancing activity, though provides no empirical support for independent silent reading as an effective means of addressing the fluency issue. It is likely that the private nature of silent reading provides little incentive to increase one's reading rate in addition to precluding teacher feedback on errors that may subsequently become entrenched.

The *Gray Oral Reading Test–3* (Wiederholt & Bryant, 1992) is a standardized measure of oral reading allowing assessment of reading accuracy, rate, and passage comprehension, as does the *Neale Analysis of Reading Ability –Revised* (Neale, 1989), though only for ages from 6-12 years.

What about the assessment of *dyslexia*?

In the traditional approach, *dyslexia* was assessed by the presence of a discrepancy between a child's intelligence and his reading attainment. Vellutino, Scanlon, and Lyon (2000) point out that such discrepancies have little utility since they cannot reliably discriminate between dyslexic and other struggling readers, and nor can they detect which readers will be reasonably easy to recover and which will be difficult.

It is now increasingly recognized that intelligence is far from perfectly correlated with reading. Stanovich (1992) calculated a median correlation of 0.34 across 14 studies involving 26 measures whose correlations ranged from 0.10 to 0.66. The range of correlations relate to the choice of intellectual and reading tests. The lower figures are more likely when the reading measure has a strong word-decoding emphasis, and the higher figures when comprehension is the major focus. Given this only moderate correlation, any discrepancy may be more reasonably considered a normal statistical variation than a specific neurological deficit. Siegel (1989) correctly pointed out that most intelligence tests currently in use evaluate acquired knowledge or cognitive abilities that can either be adversely affected by reading ability or adversely affect this ability. For example, most commonly employed intelligence tests include measures such as vocabulary and general knowledge, precisely the areas in which students with reading difficulties increasingly become deficient, probably due to their reduced volume of reading compared to normally developing readers (Stanovich, 1986; Vellutino & Scanlon, 1987; Vellutino, Scanlon, & Tanzman, 1994; Vellutino, Scanlon, & Spearing, 1995).

Another major problem with discrepancy-defined *dyslexia* is that a different group (between 2%-35% of the population) is described by different intelligence tests and through different subtest-analysis. For example, there has been debate over whether verbal or performance (or both) scales should be used - the use of one over the other certainly defines a different group as *dyslexic*. There is also disagreement over how large a discrepancy (e.g., 1, 1.66, or 2 SD) is needed for a diagnosis of *dyslexia*; over the minimum intelligence level needed for a *dyslexia* classification; and over the type of reading test chosen to define the reading deficit.

Further, it is noted that the development of literacy is closely intertwined with the development of intelligence (Stanovich, 1993b). That is, the continued normal development of measured intelligence may rely on an adequate volume of reading. This assertion may be difficult to accept at first glance, but vocabulary development and higher-order comprehension skills are best advanced through reading (Nagy & Anderson, 1984) once the beginning stages are passed. Thus, as children with reading difficulties grow older, their lack of reading could be expected to *reduce* the initial gap between measured intelligence and attainment. That is, over time, *dyslexic* students' measured intelligence may come to more closely resemble that of their *garden-variety* colleagues, as problems additional to the phonological core develop (Stanovich, 1988b). Sadly, the intelligent under-achiever may appear to become less intelligent because of our educational system's failure to adequately address his needs at the critical early stage. Given the slippery nature of such assessment choices, it is unsurprising that such a model is falling from favour, although it still has currency in some educational circles.

Does the child have solely a decoding problem, or is his decoding ability actually commensurate with his other language skills?

Stanovich (1988b) describes the *dyslexic* child as one with a severe phonological problem, but (initially at least) no other language difficulties. He contrasts this child with the *garden variety* reading-problem student, who shares the phonological problem (though perhaps to a lesser extent) with his *dyslexic* colleague, but who also has other language difficulties, such as language comprehension, vocabulary, short-term memory, or attentional problems. The rationale for making such a discrimination revolves around the instructional decisions that need to be made consequent upon the assessment. For the *dyslexic* child, there is considerable consensus in the research community that the deficit lies in the area of phonological processing (Elbro, Nielsen, & Petersen, 1994; Yap & Van Der Leij, 1993), and that the intervention focus needs to be at the level of word decoding.

Consistent with research findings (Adams, 1990), best results for intervention at the RMIT Clinic have come from reading programs that have a strong phonic emphasis and involve explicit instruction, such as the *Corrective Reading Program – Decoding* strand (Engelmann, Hanner, & Johnson, 1999). These outcome are consistent with that found in empirical research (Foorman, 1995; Perfetti, 1992), and that recommended by the National Reading Panel (National Institute of Child Health and Human Development, 2000). Additionally, a number of program comparisons have been released in the USA in the past couple of years supporting the value of these programs as a response to the problem of struggling readers.

The American Federation of Teachers (no date) series of documents *Building From The Best, Learning From What Works* names Direct Instruction programs among *Seven Promising Reading and English Language Arts Programs, Three Promising High School Remedial Reading Programs,* and *Five Promising Remedial Reading*

*Intervention Programs.* A report from the American Institutes for Research (1999), *An Educators' Guide to School-wide Reform*, found that only three programs, Direct Instruction among them, had adequate evidence of effectiveness in reading instruction. Another report, *Reading Programs that Work: A Review of Programs for Pre-Kindergarten to 4th Grade* (Schacter, 1999), similarly includes Direct Instruction among six school-wide effective reading models. A report from the Fordham Foundation (Traub, 1999) supports the Direct Instruction model as a viable approach to schoolwide reform.

The *garden variety* reading problem is also addressable by the same program, at least at the decoding level. This is a valuable intervention to introduce, as the increased facility for decoding reduces the attentional requirements needed at the level of print-decoding, thus freeing up valuable attentional capacity for the task of comprehension. However, this group of students may also need assistance with the comprehension of what they decoded, and additional intervention should be considered simultaneously with, or perhaps after, the decoding program. The *Corrective Reading Program - Comprehension* strand (Engelmann, Hanner, & Johnson, 1999) is a program that has been successfully used in primary and secondary settings and by teachers and parents (Clunies-Ross, 1990; Noon & Maggs, 1980) for this purpose.

The deceptively simple way to discriminate between these two (*dyslexic and garden variety)* groups of students is to compare their attainment on a reading comprehension task to that on a listening comprehension task. The *Comprehensive Inventory of Basic Skills-Revised* (Brigance, 2000) has the capacity to provide such a comparison, with its reading comprehension and listening comprehension subtests (up to Year 9). The *Spadafore Diagnostic Reading Te*st (Spadafore, 1983) has an advantage in that it is normed to Year 12, and the *Wechsler Individual Achievement Test* (Wechsler, 1992) is normed to age 20 years. This comparison is now considered by many researchers as the most appropriate method of discriminating these two groups since the discrepancy-defined *dyslexia* model has fallen from favour.

In the *Spadafore Diagnostic Reading Test* (Spadafore, 1983), it is also possible to compare a student's comprehension score on Oral Reading comprehension and Silent Reading comprehension subtests. When a student's comprehension is adequate in the Silent Reading subtests, but markedly lower in the Oral Reading comprehension, that is when reading-out-loud is required, it may be that the student has poor decoding skills and compensates by making exceptional use of contextual cues when reading silently. Ultimately this strategy will collapse as the reading material becomes more complex and less predictable in later years, yet unless oral reading is a regular element in the monitoring of student progress, detection may be delayed with serious consequences.

Comparing the results of listening comprehension to reading comprehension also makes intuitive sense, because listening comprehension tasks are much more closely related to reading than are the more global tasks involved in intellectual assessment. It offers the capacity to define those children who have a major problem only at the level of print. They will perform well on the listening comprehension tasks, using their impressive general language skills to answer questions about a story read to them. On the reading comprehension task however, they will do relatively poorly as their under-developed decoding skills prevent them bringing into play their well-developed general language skills. When required to decode a passage unassisted, they struggle, as did their

*garden-variety* peers. On the other hand, the *garden-variety* students would be expected to perform similarly on both tasks. Their reading problems are general rather than specific, and they may not have any particular reading subskill restricting their development. Their decoding skill is commensurate with their other language skills, such that if they know the meaning of a word (or phrase, or sentence), they can comprehend it whether it is presented orally or in print. The consequence for the high LC (listening comprehension)-low RC (reading comprehension) child should be intensive assistance at the decoding level. For the low LC-Low RC child, intensive assistance at both the decoding and comprehension levels is indicated.

Other possible outcomes are high LC-high RC, a result predictable from an all-round good reader; and low LC-high RC, a rare result, possibly from a student with acute attentional, hearing, or short-term memory problems. In this case, the permanence of text would allow the student to use his intact language comprehension skills, whereas the ephemeral nature of the spoken story precludes such access. *Hyperlexic* students (a less common sub-group with excellent word recognition but poor reading comprehension) would not be detected by this discrepancy analysis, because their listening comprehension parallels their reading comprehension (Sparks, 1995). Hyperlexic students should not be confused with the oft seen older struggling reader who may appear to decode adequately but have under-developed decoding skills. As pointed to earlier, these students have usually a long history of inadequate decoding skills and little fluency.

This LC-RC discrepancy represents an alternative definition of the group known as *dyslexic*; however, as with the IQ discrepancy-defined *dyslexic,* an issue is how great a discrepancy should be considered significant. Some (including the RMIT Clinic) have considered a two years discrepancy to be very significant (Anderson, 1991) given the extent of commonality of the tasks; although this is clearly an arbitrary figure, its significance being higher the younger the age of the child. This is its major value since the intervention techniques employed include systematic phonics instruction whether the difficulty is described as *dyslexic* or *garden-variety*. The *dyslexic* classification can, however, sensitise teachers to the possibility that *dyslexic* students may be more treatment-resistant (Berninger & Abbott, 1994) than *garden-variety* students, and may also require additional direct phonemic awareness instruction if their progress in a systematic synthetic phonics program is unsatisfactory despite its being appropriately taught.

Is there a role for intellectual assessment?

Intellectual assessment is not part of a teacher's responsibility, and in any case has very limited relevance to instructional decisions (Goyen, 1992; Stanovich, 1991, 1993a). It also has the potential for a destructive consequence if a school uses low measured intellectual ability as an excuse for its failure to teach the child effectively, and as a rationale for future inaction. Any report to a school that comments (however obliquely) about a child's intellectual ability, should also include some reference to the admirable assertion of Marilyn Jager Adams (1990): "The bottom line is that the role of mental age is not one of limiting what a child can learn, but of limiting the ways in which they can be effectively taught" (p. 59).

It is sometimes argued that intellectual assessment can uncover bright non-readers - those who should be reading well because they can do most other things well. As indicated earlier, reading and intelligence do not have a strong correlation, and above a threshold, one is as likely to find low IQ good readers as high IQ poor readers. Stanovich (1991, 1993a) concludes that measured intelligence is a poor predictor of reading potential. Further, it is not useful in predicting which children with reading problems are most likely to make good progress (Goyen,

1992). Additionally one may question the underlying implication on social justice grounds. What is it about students of higher intelligence that makes them more worthy of our resources to assist their reading development than for students of lower intelligence?

There are some psychologists who attempt to use the analysis of the various subtests comprising intelligence tests to make judgements about the existence and type of learning disability a student may have, and for instructional decisions consequent upon the diagnosis. This is a controversial area of continuing research and there have been significant psychometric problems with such analyses. There is not sufficient research support currently for the use of subtest profile interpretation (Kavale & Forness, 1984; Kramer, Henning-Stout, Ullman, & Schnellengberg, 1987; McDermott, Fantuzzo, & Glutting, 1990; McDermott, Fantuzzo, Glutting, Watkins, & Baggaley, 1992; Mueller, Dennis, & Short, 1986; Watkins & Kush, 1994, cited in Watkins & Worrell, 2000).

Intellectual assessment is occasionally of paramount importance when the referral involves consideration for assistance under an integration program, that is, a classification decision must be made about whether a student is eligible for a specific funded program for students with an intellectual disability.

Spelling

The assessment spelling too is of interest – in its own right and because of its links to reading. Lindamood (1994) noted that children who have difficulty in appreciating the sound structure of words tend to be poor spellers. Schultze-Korne, Deimel, and Remschmidt (1997) also pointed to the dominant influence of phonemic awareness on spelling in their study. Ball and Blachman (1991) found that, for young children, improved phonemic awareness led directly to improved spelling. Snowling and Hulme (1991) argued that in the normally developing reader the knowledge of word structure gathered during reading activities transfers to spelling. Treiman (1993) extended the argument in claiming that phonemic analysis training will positively impact spelling performance even without any instruction in conventional spellings, a position with which Uhry and Shepherd. (1997) supported.

The obvious explanation for this apparent causal relationship offered by Davidson and Jenkins (1994) and Treiman (1985) is that spelling, at least in part, is indicative of young children's ability to classify speech sounds. Burt and Butterworth (1996) have argued that phonological ability plays a greater role in spelling than it does in reading (even in adults). Stage and Wagner (1992) diverged from this view, asserting that older students make less use of phonological processes in spelling than do young students, instead relying more on orthographic representations. Burt and Butterworth maintain that it is the strength of phonological coding skills that promotes the orthographic skills evident in competent spellers. Thus, it may be that this latter assertion of Stage and Wagner refers only to older, *skilled* readers, and hence is really an assertion about stage rather than age.

Thus one element in an evaluation of a phonologically based reading intervention is to assess gains in spelling. However, the effect of phonological interventions on spelling may not be dramatic if gain is measured only by

an increase in the number of words spelled conventionally. The relationship between spelling and reading has been compared to that between recall and recognition, in that we are often able to recognise what we cannot recall. Reading may be achieved with only partial acknowledgement of all the letters in a word, whereas spelling requires a complete orthographic representation. Hence, there may be words we recognise on the basis of partial cues, but our cursory attention to the detail of the word does not enable correct reconstruction. Word attack skills alone can certainly aid in producing regularly spelled words, but there are numerous possible phonetically correct spellings for many words, blurring the ready transferability of reading to spelling. Markedly irregular words of course are not constructible from individual phoneme-grapheme conversions, even though irregular words often have letter patterns (e.g., *igh, eat*) that are quite regular. Irregularity is probably best considered as existing along a continuum rather than in a dichotomy with regularity.

There have been a number of approaches used to assess spelling. One obvious means is to assess spelling errors in the context of written expression; however, it is too complex a task to be practicable across a class in terms of time and scoring issues. Another approach is to require the student to recognise deliberate spelling errors in a list or story (a proof-reading task). A dictated word list approach to assessment is often employed because students are familiar with such a format and also because it eases the teacher's work load in a group setting. Moats (1994) argues that " ... the primary construct for investigation of spelling should be the ability to write dictated words in lists" (p. 351), a position with which Lindamood (1994) agrees.

The *Comprehensive Inventory of Basic Skills-Revised* (Brigance, 2000) spelling sub-test is primarily a criterion-referenced instrument of this type. It is based on words chosen from the various grade-level words in five or more of nine published spelling programs. It provides informal norms up to Year 10. Other spelling tests in common use include The *Wide Range Achievement Test - III* (Wilkinson, 1993) is a brief test that includes norms up to adult age; and the *South Australian Spelling Test* (Westwood, 1999). Ehri (1993) points to the value of assessing spelling growth in a more fine grained manner, as when a child improves his misspelling of "pickle" from *po* to *pikl.* Moats (1994) describes such a spelling assessment system in which quality points (1-5) are assigned for degrees of spelling errors based on a specified set of criteria. The effect of a simple correct/incorrect dichotomy is to attenuate measurable change by failing to note within-incorrect-category improvement, that is, underestimating real spelling growth.

A relatively cheap and research-based series of tests has recently been published under the auspices of the Texas Government and is called the *Texas Primary Reading Inventory* (Texas Education Agency, 2000). It is criterion referenced and offers a series of salient graded assessment tasks at Prep, Year One and Year Two. It also provides a 5-minute screening test to help determine who should take the full inventory. The Prep level contains four assessments: Listening comprehension, Book and print awareness, Phonemic awareness, and Grapho-phonemic knowledge. First Year level also contains four assessments: Book and print awareness, Phonemic awareness, Grapho-phonemic knowledge, and Reading comprehension. The Second Year level contains two assessments: Reading comprehension and Grapho-phonemic knowledge

Other assessment options

Of course formal testing, whether standardised or criterion referenced is not the only way to gather information about a student or about his progress. Qualitative data is especially valuable in assisting decisions about whether an intervention has effects evident to interested observers in the real world. This aspect is very important for two reasons. One is that many people are suspicious of formal assessment, and the other is that unless there are changes consequent upon an intervention that are clearly discernible to observers, it may be that the effects are real but not educationally significant, or at least not worth the effort that is required to maintain the intervention.

The *effect size* statistic is able to provide an indication of the effect of treatment on the mean and standard deviation of the reading scores of groups of students as a consequence of an intervention. One interpretation of effect size is as a coefficient of acceleration. Given that average students continue to progress at an average velocity, students who have fallen behind must accelerate their learning if they are to make up ground on their normally achieving peers. This is a considerable challenge for instruction - to increase the rate of slow learning students to one above the normal. It is unsurprising then, that in educational research relatively few interventions have large effect sizes. Slavin (1990) considers that effect sizes around 0.25 are educationally significant - the mean effect size of 60 studies he reviewed was 0.27. In contrast, the mean effect sizes of the Direct Instruction programs have in three meta-analyses reported much higher effect sizes.

Swanson and Hoskyn' (1998) analysis of interventions for learning disabled students found a large effect size for Direct Instruction (0.91). Adams & Englemann' (1996) analysis resulted in an effect size of 0.68 for the 44 acceptable comparisons involving one of the Direct Instruction program *Reading Mastery* (Engelmann. & Bruner, 1988). To further place this medium-to-large effect size in perspective, a meta-analysis of the effectiveness of the whole language approach to reading found an effect size of only 0.09 (Stahl & Miller, 1989; Stahl, McKenna, & Pagnucco, 1994). White's (1988) meta-analysis of studies involving learning disabled, intellectually disabled, and reading disabled students restricted its focus to those studies employing equivalent experimental and comparison groups. White reported a large effect size of 0.84 standard deviation units for the Direct Instruction over comparison treatments.

Thus one way of ascertaining whether change following an intervention is considered strong is the calculation of effect sizes for any intervention from analysis of the pretest and posttest data.

Social validity

Another literature providing a context within which to examine results of interventions is that of social validity. The concept involves the social desirability in addition to the usefulness of an intervention. Arising out of consumer satisfaction indices, the concept has expanded along several dimensions. The type of information collected may be subjective, that is based on the participants' or others' judgements about the initial need for, and subsequently the value of, the intervention. The concept is useful in explaining why in some settings highly effective programs are discontinued because they are not popular with those involved, and why ineffective

approaches sometimes continue for long periods of time despite a lack of effectiveness. It also provides an important focus for those attempting to introduce change into a school system to ensure that information about program success is well promulgated and that any concerns raised by participants are not left unattended.

Apart from the type of information gathered, social validity includes a consideration of the intervention process itself - how goals are selected, how satisfactory to consumers are the lesson procedures, and how satisfactory are the outcomes. Indications of each of these elements can be obtained at the beginning and end of the intervention to enable comparison. Kennedy (1992) observed that most of the social validity studies have emphasised the subjective assessment of the value of the intervention.

In terms of the value of an intervention, some schools use a questionnaire designed to elicit subjective post intervention data from home-teachers and parents, and program outcomes may not be formally assessed. There may or may not be information about student acceptance of the program. Gaining social validity information prior, during and after an intervention program from participants may have value in decisions about program continuation in the school.

Kennedy (1992) perceives a particular value in including goals and procedures in the social validity framework in those studies in which the primary goal is some form of school system change. By contrast, interest directed primarily at knowledge building need not be so concerned with acceptability issues. Given the potential value to the education system of well-established interventions, future program evaluations may do well to incorporate such social validity measures in their design.

Clinical Significance

A term from the psychotherapy evaluation research discussed by Jacobson and Truax (1991) is clinical significance. The authors make the important point that the efficacy of a treatment cannot be determined solely by statistical procedure because judgements about efficacy are predicated on external standards. Whereas, statistical analyses relate to the probability of a clear and reliable effect occurring from treatment, efficacy questions relate to the worthwhileness of the intervention. For example, an intervention may reliably reduce self destructive head-banging by 30% from 300 times per hour to 210 times per hour. Despite an significant finding and a large effect, it is unlikely that the techniques would be adopted because the intervention is not sufficiently worthwhile for the client.

The standards chosen to ascertain clinical significance may vary, of course. The authors provide several potential indicators. *What percentage of clients showed improvement?* If a reading program is offered to a group, is it only a few students who make good progress?

Another criterion involves *the recognition by significant others of discernible change*. A questionnaire for parents and teachers (See Appendix) was developed in the RMIT Clinic to address this question.

*The complete elimination of the problem* appears a worthy objective; although, in many educational interventions of a short term or those addressing entrenched problems in middle school and beyond - it is probably unrealistic. On the other hand, those interventions with a focus on earlier intervention may aspire to such a laudable objective. A more reasonable criterion in a remedial framework could involve reaching or approaching performance levels appropriate for the student's age/grade.

That *treatment should leave participants less vulnerable to various problems subsequently* is also a worthy criterion. It may be examined in longitudinal studies that measure, for example, high school graduation rates, various follow-up measures of reading, thinking and reasoning, and grade-point averages (Gersten, Keating, & Becker, 1988). It may also be argued from a theoretical perspective that significant reading improvement reduces the risk of general education failure through helping to avoid the insidious Matthew Effects (Stanovich, 1986). The Matthew Effects involve relatively minor early unaddressed deficits that broaden into ever more pervasive problems intensifying over the student's career. Reading is usually considered pivotal in all academic subjects; thus, improvement may have inoculative effects across the curriculum. From a somewhat different perspective, Share (1995) argued that students must achieve a certain level of facility with decoding before a self-teaching mechanism allows them to make continuous independent progress from that stage; although as yet there is no quantitative measure to pinpoint when that state is reached.

The use of a well-constructed, systematic early phonics program should be the first line of attack for most students if the confluence of research findings over the last decade is to be accepted. There is ample evidence to support this phonics emphasis (Felton, 1993; NICHD, 2000), although there is no reason why it could not be introduced alongside a *whole language* program (Adams & Bruck, 1993). The principles of effective teaching, such as task analysis, appropriate initial placement, mastery learning, demonstration-practice-feedback as a major teaching strategy, rapid pacing, well-defined correction procedures, attention to academic learning time, adequate massed and spaced practice, and high rate of success - are variables associated with rapid progress independent of learner characteristics (Rosenshine, 1986). Both the content and delivery principles outlined above have been strongly endorsed in great Britain and the USA as a major means of improving the literacy outcomes for vast numbers of currently struggling students. Ultimately, it is instruction that must be assessed if the sort of systemic change that is needed is to occur.

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**Program Evaluation: PARENTS**

Your child has been participating in a special reading assistance program at the school, and we would like to find out how useful it has been for your child. We are particularly interested to learn whether you have noticed any changes in your child's reading. We would appreciate your help in filling out this form, and returning it to us as soon as is convenient.

Please **underline** the words which best describe your child's current reading.

In terms of the *amount of reading* done at home, my child is now reading
much more than a little more than the same as less than
before the program's introduction.

If you have noticed an increase, what *type(s)* of reading materials does your child favour?

In terms of the *skills of the reading* done at home, my child is now reading
much better than better than the same as worse than
before the program's introduction.

If you have noticed a skill improvement, is it in
speed, accuracy, smoothness, preparedness to read out loud understanding of what is read?
(You may underline any number of these words.)

In terms of the *enjoyment* of reading done at home, my child now seems to find reading
much more enjoyable than more enjoyable than the same as less enjoyable than
before the program's introduction.

Do you have any other comments that you think might be helpful to future planning? Please write them below.

**Program Evaluation: TEACHERS**

One or more of your students has been participating in a special reading assistance program at the school, and we would like to find out how useful it has been for him/her. We are particularly interested to learn whether you have noticed any changes in your student's reading, and general performance.

Please **underline** the words which best describe your student's current reading.

In terms of the *amount of reading* done at school, my student is now reading
much more than a little more than the same as less than
before the program's introduction.

If you have noticed an increase, what type(s) of reading materials does your student favour?

In terms of the *skills of reading* done at school, my student is now reading
much better than better than the same as worse than
before the program's introduction.

If you have noticed a skill improvement, is it in
speed accuracy smoothness preparedness to read out loud understanding of what is read?
(You may underline any number of these words).

In terms of the *enjoyment* of reading done at school, my student now seems to find reading
much more enjoyable than more enjoyable than the same as less enjoyable than
before the program's introduction.

Is there evidence of change in reading skills in *other curriculum areas*, that is, have the skills transferred? The student is
much better than better than the same as worse than
before the program's introduction.

Has there been any change in the student's *attitude, or behaviour* generally? The student is
much better than better than the same as worse than
before the program's introduction.

Do you have any other comments that you think might be helpful to future planning? Please write them below.