Working Out What Works

Working Out What Works (WOWW) Training and Resource Manual: A teacher professional development program designed to support teachers to improve literacy and numeracy outcomes for students with learning difficulties in Years 4, 5 and 6 (2nd edition)
Contents

Foreword .......................................................................................................................... 1

Chapter 1 - Introduction ............................................................................................... 5

1.1 Introduction to Working Out What Works (WOWW) ................................................ 7
1.2 Underlying Principles of the WOWW Program ....................................................... 9
1.3 Summary of Findings from the Literature Review .................................................. 11
1.4 Direct Instruction ....................................................................................................... 13
   • Direct Instruction - what is it? ................................................................. 13
   • Direct Instruction - how is it taught? ...................................................... 15
   • Direct Instruction - who is it for? ........................................................... 17
1.5 Strategy Instruction .................................................................................................. 19
   • Strategy Instruction - what is it? ............................................................. 19
   • Strategy Instruction - how is it taught? .................................................. 21
   • Strategy Instruction - who is it for? ......................................................... 23
1.6 Combined or Eclectic Approach ................................................................................. 25
   • Comparisons between Direct Instruction and Strategy Instruction .......... 25
   • Combined or Eclectic Approach - what is it? .......................................... 27
   • Combined or Eclectic Approach - who is it for? ...................................... 29

Chapter 2 - Resource Materials ..................................................................................... 31

2.1 Classroom Management ........................................................................................... 31
   • The physical positioning of students in the classroom ............................ 32
   • The structure of teaching groups ............................................................. 34
2.2 A Team Approach ..................................................................................................... 37
   • Additional staff support within the school ............................................. 37
   • Parents and caregivers ............................................................................. 38
   • Establishing and using networks with other professionals .................... 40
2.3 Teacher Observations of how Students Learn Best ................................................. 41
2.4 The Process of Acquiring Reading Skills ............................................................... 51
2.5 The Process of Acquiring Numeracy Skills ............................................................ 63
Contents

Chapter 3 - Intervention Program ........................................... 89

3.1 The WOWW Numeracy Intervention program ............................................ 89
   • Direct Instruction component ...................................................................... 89
   • Strategy Instruction component ................................................................ 91
3.2 The WOWW Reading Intervention program .................................................. 93
   • Direct Instruction component ..................................................................... 93
   • Strategy Instruction component .................................................................. 97
3.3 The WOWW Spelling Intervention program ................................................. 99
   • Direct Instruction component ..................................................................... 99
   • Strategy Instruction component .................................................................. 102
3.4 Working Out What Works long term ............................................................ 107

Chapter 4 - The Findings ........................................................................ 109

4.1 The Project, Training and Data Collection .................................................... 109
4.2 Key Findings from the Student Data ............................................................. 113
4.3 Key Findings from the Case Studies ............................................................. 119
4.4 Teachers’ Trials, Triumphs and Tips – the Reading program........................ 123
4.5 Teachers’ Trials, Triumphs and Tips – the Numeracy program ....................... 127
4.6 The Learning Support for Teachers ............................................................... 131
4.7 The Future of WOWW .................................................................................. 133

Appendices ............................................................................................... 135

Appendix 1 - Principles of Effective Professional Development ....................... 135
Appendix 2 - Examples of Learning Strategies ................................................ 139
Appendix 3 - Corrective Reading Program: Teacher Skill Form .......................... 169
Appendix 4 - Auditory Processing Capacity and Assessment .............................. 173

References ................................................................................................. 175
Three major principles underlie the contents of this manual. First, young Australians are the most valuable resource for our nation’s social and economic prosperity. Second, the key to such prosperity at both the individual and national level is the provision of quality schooling. Third, because teachers are the most valuable resource available to schools, it is vital that teachers be equipped with evidence-based teaching practices that are demonstrably effective in meeting the developmental and learning needs of all students – regardless of their ethnic and socioeconomic backgrounds, and whether or not they experience learning difficulties.

Nowhere are these three principles more important than for teaching and learning in literacy and numeracy, since being both literate and numerate are foundational, not only for school-based learning, but also for students’ psychosocial wellbeing, further education and training, occupational success, as well as for productive and fulfilling participation in social and economic activity. Moreover, the rapidly changing nature of global communication systems, including computer-based technologies, demand competence in increasingly complex multiliteracies, of which high levels of literacy and numeracy skill are essential.

Equipping young people to engage productively in the knowledge economy and in society more broadly is fundamental to both individual and national prosperity. This objective depends primarily on two factors: (a) students’ ability to read, write and undertake mathematical computation; and (b) the provision of quality teaching delivered by teachers who have acquired during their pre-service teacher education and in-service professional learning, evidence-based teaching practices that are effective in meeting the developmental and learning needs of all students. Our young people and their teachers require no less. Indeed, there is a strong body of evidence indicating that many cases of learning difficulty and related under-achievement can be attributed to inappropriate or insufficient teaching, rather than to deficiencies intrinsic to students such as cognitive, affective and behavioural difficulties, as well as their socioeconomic, socio-cultural backgrounds and contexts (see: Foreword...
As with the first edition of the manual for the Working Out What Works (WOWW) Professional Development Program (Hoad, Munro et al., 2005), the second edition has been specifically developed to meet these objectives. The contents have been informed by scholarly contributions from a competent team of experienced practitioners and researchers, including:

- Drs Louise Ellis and Nola Purdie who have provided a comprehensive review of the local and international evidence-based research literature related to effective teaching strategies that identifies the superiority of direct (or explicit) instruction and strategy instruction approaches to the teaching of literacy and numeracy (Ellis, 2005; Purdie & Ellis, 2005; see also: Farkota, 2003, 2005; Hattie, 2003, 2005); and
- Kerry-Anne Hoad, Cath Pearn, and Drs John Munro and Kathy Rowe, each of whom have outlined essential, practical elements of evidence-based strategy instruction, numeracy teaching, the teaching of reading, and how children best learn, respectively.

These contributions are supported by:

- reported findings and recommendations from the 2004-2005 Australian Government’s National Inquiry into the Teaching of Literacy (Rowe, 2005a,b);
- the contents of an award-winning paper by Rowe, Pollard and Rowe (2005), supported by a multimedia teacher professional development and assessment kit by Rowe, Pollard and Rowe (2006);
- the contents of an invited paper by Rowe (2006); and
- findings from the highly successful “Third Wave” Project (Rowe, Stephanou & Hoad, 2007).

Key findings from the “Third Wave” Project, which used the first edition of the WOWW manual, are reported in Chapter 4.

In the interests of building evidence-based professional learning capacity in schools’ most valuable resources (i.e., teachers), and enhancing the learning achievement progress in literacy and numeracy of all students, I commend the contents of this manual to all those committed to the vital task of quality teaching and learning provision.
The valuable contributions by students and teachers from the participating schools in the “Third Wave” Project are very much appreciated. Similarly the financial support of the Australian Government Department of Education, Science and Training is gratefully acknowledged.

Dr Ken Rowe
Research Director, Learning Processes Research Program
Australian Council for Educational Research
Robbie had somehow made it to Grade 5 without being able to read with the fluency, or comprehension, of the majority of the Grade 2 students at his school. He had not been a candidate for Reading Recovery but had accessed some additional support from the school’s support teacher in Grade 3. Slight improvement was noted but the effects did not endure and he continued to fall behind his classmates. He was slightly stronger in mathematics but still only at the level of simple double digit addition and subtraction. He was not disruptive in the classroom and in a busy classroom with a high proportion of very active boys he sometimes went unnoticed. Robbie seemed happy, he enjoyed group work and his classmates willingly helped him. Teachers commented that he was inclined to daydream and was often disengaged or disinterested in what was happening in the classroom. His Grade 5 teacher was keen to intervene to improve Robbie’s reading and mathematics skills but in the face of his complacent lack of motivation and the demands of a busy classroom she was not sure how to proceed.

Many teachers find themselves in a similar situation. They want to help but are unsure of how to begin or what strategy might work best. Upper primary teachers are often confronted by students who, after five or more years of formal schooling, have developed a sense of themselves as failures at reading and numeracy and have stopped trying.

In Robbie’s case previous attempts to ‘help’ had been unsuccessful and he had developed an entrenched belief about his ability as a learner. He now believes that he is too stupid to be able to learn like his classmates. Since he ‘knows’ he is stupid there seems no point in trying. With a lack of belief that he can learn and no motivation to try, school can become torture.

Robbie avoids drawing attention to himself in the classroom and distracts himself by daydreaming. Some students’ avoidance strategies are less compliant as they seek whatever peer approval, and relief from boredom, they may find in the role of class clown or class troublemaker.
By the time the student reaches upper primary school beliefs and behaviours are well established.

To challenge and reverse this belief, the student will need to see himself as a competent learner. To see himself as a competent learner alongside his classmates provides an even stronger challenge to his entrenched belief that he is a failure at school. An intervention program conducted in the whole class format where opportunities for success are maximised provides the setting for such a challenge.

This Professional Development Program provides information for teachers on intervention strategies which research has found to be most effective with students with learning difficulties. It provides resources and support to guide teachers to work out which of these evidence-based interventions is appropriate for their students and their school context. It also provides the training and the opportunity to trial these interventions with their students.

The Working Out What Works Professional Development program recognises that all students are different, all teachers are different and that all school contexts are different. Despite efforts to group children with learning difficulties under medical or educational labels and design interventions as a consequence of the label, the evidence of every teacher is that each student has a unique blend of personality, learning needs, social and emotional needs, cultural orientation and behavioural characteristics.

Therefore, it would be foolhardy to suggest that one intervention approach will fit all.

There are a plethora of intervention strategies that come the way of teachers keen to find an approach or strategy to support students with learning difficulties. While this program emphasises the importance of fitting the intervention strategy to the needs of the student, with due consideration to the many factors that render each student and each situation unique, it also emphasises the importance of selecting intervention strategies which research has found to be effective.

The interventions that have been shown, by a strong body of research evidence,
(Purdie & Ellis, 2005), to be most effective with students with learning difficulties are Direct Instruction and Strategy Instruction. An even stronger effect on student learning outcomes was reported when these two strategies were used in combination. Within these three proven approaches, namely, Direct Instruction, Strategy Instruction and Combined Direct Instruction and Strategy Instruction, is a range of materials, pre-designed programs, strategy choices and implementation choices which will provide for the flexibility needed to support teachers to successfully Work Out What Works for their students in their context.

With the Working Out What Works Professional Development Program the teacher will become the expert in designing and implementing the intervention strategy that will be the best fit for her students. The program focuses on improving teachers’ skills and confidence to:

- Observe and understand how their students learn;
- Access support and information from parents and other professionals working with their students;
- Understand the process of acquiring reading and numeracy skills;
- Understand evidence-based intervention strategies;
- Trial evidence-based intervention strategies in the classroom;
- Reflect on consequent student outcomes and adapt strategies appropriately; and
- Share their experience and expertise with other teachers in a collegiate professional learning team.

The Working Out What Works Professional Development Program has been developed from the findings of the Literature Review funded by the Australian Government Department of Education, Science and Training and conducted by Dr Nola Purdie and Dr Louise Ellis of the Australian Council for Educational Research. This Literature Review considered the empirical evidence identifying effective

“Skilled and well resourced teachers are best placed to work out what works for their students.”
interventions and teaching practices for students with learning difficulties in years 4, 5 and 6. A full copy of this review can be located at http://acer.edu.au/research/programs/documents/literaturereview.pdf
All students are different.

Students with learning difficulties will require specific interventions.

There is no single effective intervention approach that fits all students with learning difficulties.

All students are capable of learning.

All teachers are different.

Teaching and teachers are the most significant factor in student learning.

Successful selection of intervention strategies relies on teacher understanding of students and of a range of evidence-based approaches.

“Shared beliefs are the foundation of all effective endeavours.”

The key issues and/or findings from the Literature Review are:

- Defining what is meant by a learning difficulty is a contentious and difficult endeavour in its own right. In Australia, there is inconsistency in definitions used, and this influences both the processes by which students are identified as having a learning difficulty and the calculation of prevalence rates.

- Contemporary understandings of what constitutes effective classroom practice will influence the pedagogical practices of teachers of students with learning difficulties. The prevailing educational philosophy of constructivism has had a marked influence on how teachers interpret how they should teach students who find it difficult to learn.

- Claims about what constitutes an effective pedagogical practice should be strongly founded on the evidence that accumulates from rigorous research. There are several approaches to synthesising research in a nominated area and each has its own inherent strengths and weaknesses. The current review of the literature on interventions for students with learning difficulties relies largely, though not exclusively, on well-designed meta-analyses which:
  a) partialled out methodological artefacts from the effect sizes, and
  b) based their classification procedures on the actual procedures and components of instruction used in the studies reviewed.

- The strongest evidence to be had in support of a particular approach or intervention for students with learning difficulties is one which demonstrates that students make robust learning gains. Such gains are generally evident in interventions that involved either Explicit Instruction in a relevant essential skill (Direct Instruction, Content Enhancement approaches) or ones that focused on the development of cognitive, metacognitive, or self-regulation strategies (Strategy Instruction approach). An eclectic approach, whereby teachers combine, as appropriate, elements from both Explicit Instruction and Strategy Instruction approaches may provide...
students with the best opportunities for success.

- Despite the research evidence that some interventions work better than others, no one intervention or approach can address the complex nature of learning difficulties. Because not all students and tasks are the same, teachers must have a full repertoire of strategies for helping students learn; they must also have a clear understanding of how and when to implement each strategy.

The second last point in these key issues and findings provides the guidance for the development of the intervention program to be trailed by teachers as part of the Working Out What Works Professional Development Program.

“A Combined Explicit Instruction and Strategy Instruction approach may provide students with the best opportunities for success.”
Direct Instruction - what is it?
(Purdie & Ellis, 2005)

Direct Instruction Approach is described as “a systematic method for presenting material in small steps, pausing to check for student understanding, and eliciting active and successful participation from all students” (Rosenshine, 1986, p. 60).

Direct Instruction is based on the theory that learning can be greatly accelerated if instructional presentations are clear, rule out likely misinterpretations, and facilitate generalisations (Northwest Regional Education Laboratory, 2003). The principles upon which this approach is based include:

- all children can learn;
- the teaching of basic skills and their application in higher-order skills is essential to intelligent behaviour and should be the main focus of an instructional program; and
- instruction with students with learning difficulties must be highly structured and permit large amounts of practice (Block, Everson & Guskey, 1995; Engelmann, 1999).

Direct Instruction assumes that all children can learn and, thus, failure in student learning is viewed as a deficiency in teacher instruction. The goal of Direct Instruction is to develop “faultless instruction” (Engelmann, 1980), that is, sequences or routines for which there is only one logical interpretation. The approach may be considered student-centred (Veenman, Denessen, van den Oord & Naafs, 2003) and characterised by explicit performance expectations, systematic prompting, structured practice, monitoring of achievement, reinforcement and corrective feedback (Jones, Wilson & Bhojwani, 1997). Lessons follow a prescribed model-lead-test format, whereby the teacher first models a strategy, and guides the students through examples. After students are able to respond correctly on several prompted trials, they are urged to commence independent practice. Typically, lessons close with a review of what was learnt during the lesson, as well as a brief preview of the instructional objectives for the next session. These teaching practices are not content specific and can be applied to any curriculum and any instructional strategy (Stein, Carnine & Dixon, 1998).
The features that distinguish Direct Instruction from most other behavioural approaches include:

a) the explicit teaching of “general case” problem solving strategies wherever possible;

b) an emphasis on small group instruction as opposed to students working alone;

c) a systematic technology of correction procedures;

d) principles for cumulative review of previously learned material; and

e) insistence on mastery of each step in the learning process (Gersten, 1985).

If Direct Instruction is used appropriately we are finding that there is as yet no ceiling in sight for the progress possible. This applies to maintaining children in the regular classroom, continuing to improve the skills of the more severely handicapped child and in integrating an increasing number of children into effective participation in the regular classroom. There is no other major output of acceptable educational research in Australia that has shown the results obtained by this Direct Instruction research. (Lockery & Maggs, 1982, pp. 286-287)
Direct Instruction - how is it taught?

(Purdie & Ellis, 2005)

Descriptions of some of the most salient features of Direct Instruction programs are provided below.

1. **Scripted presentations.** Scripted lesson plans are a hallmark of Direct Instruction and are intended to control the quality of instruction. It is anticipated that the particular examples and sequences of each lesson have been field tested with other learners and have been designed to maximise learning and minimise confusion. The program developers recognise that most teachers are deficient in the training of instructional design and thus are unlikely to select and sequence teaching examples effectively without explicit instructions. They assume that without guidance, teachers may use language that students do not understand or that distracts students’ attention from examples. As a result, Direct Instruction is based on the view that teachers are more likely to use effective instructional sequences when given explicit scripts for using field-tested procedures (Binder & Watkins, 1990).

2. **Teach the essentials.** The essentials are determined from task analysis, whereby the specific skills needed to accomplish certain tasks are identified. These skills are taught to students in an explicit, step-by-step manner. Direct Instruction is founded on the principle that proficiency in reading and mathematics can be achieved by analysis and teaching of sub-skills in a cumulative framework. (Hempenstall, 1996).

3. **Small groups.** Direct Instruction lessons are typically taught with groups of five to ten students. The approach assumes that small group instruction is more efficient than one-to-one instruction and provides the opportunity for more adult direction, attention, feedback, and individualisation than large group instruction (Binder & Watkins, 1990). Students are often grouped on the basis of ability, which allows students with advanced skills to progress quickly and less advanced students to receive the extra help and practice they need.

4. **Rapid Pacing.** Lessons are characterised by rapid pacing and choral group response punctuated by individual turns. This approach is based on the assumption that student with learning
difficulties can catch up with their peers if they are provided with more, not less, teaching that involves the efficient use of technology and time (Cotton & Savard, 1982).

5. Practice and Drill. Teachers guide student practice by providing prompts, checking for understanding, and providing corrective feedback. The amount of practice decreases as the relevant skill is incorporated into more complex skills. In addition, teachers provide students with written exercises for independent practice (Veenman, Denessen, van den Oord & Naafs, 2003). Students are encouraged to practise a given task until mastery is attained (Hempenstall, 1996).

“Direct Instruction teaches students mastery of skills and subskills.”
Direct Instruction - who is it for?

(Kerry-Anne Hoad, ACER)

Direct Instruction is suitable for students:

• Who have low motivation to learn independently;
• Who have not achieved at a functional level in reading, spelling or numeracy;
• Who will benefit from structured practice of basic skills leading to more complex skills;
• Who respond well to a predictable instruction format;
• Who are able to concentrate for short periods of time;
• Who respond well to repeated learning;
• Who respond well when the classroom, or the group, is well organised, quiet and orderly;
• Who respond well when information is presented both auditorily and visually, and
• Who respond well to immediate feedback and success.
Strategy Instruction - what is it?
(Purdie & Ellis, 2005)

**Strategy Instruction Approach**
focuses on teaching techniques, principles or rules that enable students to learn, and to solve problems and complete tasks independently.

Learning strategies may be broadly classified as **cognitive**, **metacognitive**, and **self-regulatory** in nature.

Cognitive strategies can be defined as those that focus on developing or enhancing particular task-related skills, such as underlining, note taking, rehearsal and summarising. They also include strategies such as categorising, chunking, using visual imagery or mnemonics. As observed by Pintrich (1999), these strategies can be applied to simple memory tasks (for example, recall of information, words, or lists) or to more complex tasks that require comprehension of the information (for example, understanding a piece of text).

On the other hand, metacognitive strategies are those that focus on the self-management of learning, that is, on planning, implementing, and monitoring one’s learning efforts, and on the conditional knowledge of when, where, why, and how to use particular strategies in their appropriate contexts (Hattie, Biggs & Purdie, 1996; Pintrich, 2002).

Similarly, self-regulation strategies have been defined in terms of self-generated thoughts, feeling, and actions, which are systematically oriented toward the attainment of students’ own goals (Zimmerman & Schunk, 1989).

Alexander, Graham and Harris (1998), observed that although self-regulation and metacognitive strategies have several overlapping features (such as the oversight, monitoring, or control of one’s thinking), there are important distinctions. Boekaerts (1996) defined self-regulatory learners as “students who are (meta)cognitively and (meta)motivationally aware of what they are doing and what needs to be done to successfully attain self-defined or set goals” (p. 102). Thus, self-regulation pertains not only to the intentional monitoring or management of one’s cognitive performance, but also to the regulation of one’s motivational or
affective state, behaviour, and social environment.

In summary, Strategy Instruction concentrates more on the learning of generic or global strategies than on the acquisition and retention of specific skills (Dole, Duffy, Roehler & Pearson, 1991; Swanson, 2001).

“Strategy Instruction focuses on cognitive, metacognitive and self-regulatory learning strategies.”
Strategy Instruction - how is it taught?  
(Purdie & Ellis, 2005)

Some of the instructional components of Strategy Instruction include modelling from teachers, step-by-step prompts or multi-process instructions, reminders to use certain strategies or procedures, and provision by teacher of necessary assistance only (Swanson & Hoskyn, 1998).

Instruction begins with the teacher describing each step of a strategy, providing a rationale for the steps, and discussing how the steps are to be used to cue important thinking behaviours. Accordingly, during the initial stages of instruction, the teacher commences discussion on the parameters of generalisation and the process of enabling students to understand what the strategy is and how it works. The teacher models the strategy using think-aloud, dialectal, and scaffolding techniques and then guides the students through a number of practice examples. Gradually, there is a decrease in teacher control as the students become confident and competent with the strategy. Throughout the teaching process, the teacher directs students to think about instances where the strategy might be used, ways in which they can remember to use the strategy, and how to evaluate if the strategy has been successful (van Kraayenoord, 2004).

Some of the most salient features, or the how, of Strategy Instruction are described below.

1. **Present strategy in small steps.** Proponents of Strategy Instruction have drawn on varying theoretical assumptions about teaching and learning associated with instructional practices, and correspondingly, they vary in the degree to which explicit instruction of task-specific strategies is emphasised (see Butler, 2003). Theorists who have been heavily influenced by cognitive-behavioural theories stress the importance of explicit methods of teaching, particularly in the early stages of instruction. They advocate the importance of presenting new strategies to students in several small, concrete steps. However, as the instruction progresses and students move towards mastery, there is a conscious and marked shift to more implicit methods to enhance the generalisation of strategy.
use, as well as adaptation, independent design, and application of strategies by the students themselves (Schumaker & Deshler, 2003).

2. **Modelling.** Other Strategy Instruction theorists have emphasised Vygotsky’s socio-cultural models of teaching and learning when describing learning and teaching processes. They contend that students become more strategic when they internalise cognitive processes that are first explained or modelled by others (see Butler, 2003). Advocates of this perspective stress the importance of after teachers modelling using think-aloud, dialectal, and scaffolding techniques. Initially, the modelling of a strategy should be simple and straightforward, focusing mainly on the surface features of the strategy (for example, self-cueing performance of the strategy steps). However, as the lesson proceeds, teachers gradually reveal more sophisticated cognitive processes and increase their collaboration with students through open dialogue (Ellis, 1993).

3. **Guided student practice and feedback.** Researchers influenced from sociocultural perspectives also emphasise the imperative for teachers to monitor students’ progress as they apply their newly learned strategies to a range of tasks in a variety of contexts. Students are often encouraged to use overt verbalisations to guide their own thinking processes. The practice of encouraging students to think-aloud also gives teachers an opportunity to encourage and reinforce appropriate use of strategies, or to provide assistance when necessary (van Kraayenoord, 2004).
Strategy Instruction
- who is it for?
(Kerry-Anne Hood, ACER)

Strategy Instruction is suitable for students:
• For whom withdrawal from the classroom for individual teaching could have negative social/emotional consequences;
• Who are motivated to improve their learning;
• Who believe that they have the personal control to improve their learning;
• Who would respond well to developing, or regaining, personal control over learning outcomes;
• Who have experienced a variety of difficulties in their learning;
• Who are able to retain and recall a variety of strategies;
• Who are able to plan, evaluate and regulate strategy use;
• Who are able to accommodate the flexibility of using the same strategies in different circumstances;
• Who are persistent when facing difficulties;
• Who respond well to encouragement to persist with the strategy use; and
• Who believe that success will follow use of the strategy.
Comparisons between Direct Instruction and Strategy Instruction  
(Purdie & Ellis, 2005)

It is widely recognised that Strategy Instruction is based on a different view of the student than Direct Instruction. Whereas Direct Instruction “assumes a passive reader who has mastered a large number of subskills and automatically and routinely applies them to all texts...[Strategy Instruction] assumes an active reader who constructs meaning through the interrogation of existing and new knowledge and the flexible use of strategies to foster, monitor, regulate and master comprehension” (Dole, Duffy, Roehler & Pearson, 1991, p. 242). Furthermore, contrary to Direct Instruction, which is seen to focus primarily upon the acquisition of foundational skills (a “bottom-up” approach), Strategy Instruction aims to develop students' higher-order cognitive abilities (a “top-down” approach).

Although Strategy and Direct Instruction are based on different underlying philosophies, they share a number of similar techniques (Block, 1993; Dole et al., 1991). Dole et al. (1991) summarised the similarities of and differences between the two approaches as follows:

- Both emphasise explicit cues by teachers about what is going to be learned, guided practice of the to-be-learned material, and application to independent situations. However, there are three major differences
- There is no assumption that the strategy will be broken down into componential subskills. The strategy is modeled, practiced, and applied to the whole comprehension task
- There is no single correct answer or a single best way to apply a particular strategy. The strategy is modeled in a variety of ways and with different tasks.
- There is no feedback about the correctness of applying a particular strategy; rather the adaptability and flexibility of strategies are emphasised. (p. 252)

Strategy Instruction and Direct Instruction have many commonalities. Both approaches involve the active presentation of information, clear organisation, step-by-step progression from subtopic to subtopic, use of many examples, demonstrations, and visual prompts...Clearly, however,
there are differences in focus...strategy interventions focus on routines and planful action and/or general principles of handling information, whereas Direct Instruction focuses on isolated skill acquisition to support higher-order processing...Thus, although Direct Instruction has been associated with the behavioral paradigms, cognitive paradigms use some of the same procedures. (Swanson, 2001 p. 12)

“Direct Instruction and Strategy Instruction have many commonalities but differ in focus. Together they offer a complementary approach.”
A Combined or Eclectic Approach - what is it?  
(Purdie & Ellis, 2005)

A number of researchers and educational professionals worldwide are now promoting the benefits of employing teacher-directed approaches in conjunction with student-directed approaches in the classroom (for example, Butler, Miller, Lee & Pierce, 2001; Harris & Graham, 1996; Harris & Alexander, 1998; Spiegel, 1992; Westwood, 1999, 2003a, 2003b). Notably, these educators do not endorse a laissez faire combination of approaches, but rather a thoughtful, carefully integrated selection of validated instructional components (Harris & Alexander, 1998). For example, Galton, Hargraves, Comber, Wall & Pell (1999) have proposed that methods of instruction that best suit the types of learning involved in a lesson should be adopted, and that in deciding such matters the age, ability, and aptitude of the students must be taken into account. Accordingly, a teaching method should be judged on fitness for purpose (Galton et al., 1999).

The ultimate goal for teachers is to find the best fit between the instructional approach and task, and also between the instructional approach and student.

An integrated approach to literacy development is a decision-making process through which the teacher makes thoughtful choices each day about the best way to help each child become a better reader and writer. An integrated approach is not constrained by or reactive to a particular philosophy. It is responsive to new issues while maintaining what research has already shown to be effective. It is an approach that requires and frees a teacher to be a reflective decision maker and to fine-tune and modify what he or she is doing each day in order to meet the needs of each child.

Swanson (2001) concluded that students with learning difficulties are most positively influenced by teaching approaches that combine essential elements of both direct instruction and strategy instruction:

“Effective instruction is neither a bottom-up nor a top-down approach in isolation. Lower-order and higher-order skills interact to influence treatment outcomes.”

1.
Clearly, performance at complex levels (writing prose, inferring the meaning of text) cannot occur without some critical threshold of skills. Children with LD [learning difficulties] vary in these skills. What is clear from this synthesis, however, is that varying degrees of success across treatment domains draw from treatments that focus on both high- and low-order instruction (i.e., strategy and direct instruction).” (p. 11)

Likewise, Vaughn, Gersten & Chard (2000), in their synthesis of research findings in the literacy domain, concluded that an integration of bottom-up and top-down instruction is valuable. These researchers reminded us that, although it is important to capitalise on the benefits of explicit teaching, this does not mean the abandonment of top-down teaching that focuses on the development of metacognitive skills.

“A combined or eclectic approach selects elements from both approaches to suit the needs and characteristics of their students.”
A Combined or Eclectic Approach - who is it for?
(Kerry-Anne Hood, ACER)

A Combined or Eclectic Approach suits students:
• Whose long-term learning outcomes will be best supported by harvesting the immediate rewards and self esteem benefits available in the structured, skill-based, success-orientated Direct Instruction; and
• Who are able to use this personal capital to invest in the acquisition of Learning Strategies which, when persistently employed, are flexible across content and contexts to produce independent learners.
Classroom management would be a simple task if all students had the same educational and social/emotional needs. The diverse needs we can expect in any given classroom makes classroom management a much more complex task. It is recognised that the needs of the students who fall within the scope of this project present only one facet of the complexity that challenges classroom teachers.

As effective teachers strive to meet the individual needs of students they need to consider how the physical environment and the social environment can be structured to maximise the student’s opportunities to learn.

The two prime advantages of the classroom are the teacher and the other class members. The teacher brings her expertise and experience to the classroom to direct the instruction and also to set the social context. Students who feel that their teacher cares for them and is interested in them as people, as well as being interested in their academic progress, tend to perform better educationally and socially.

For students with learning difficulties the classroom environment often needs to be consciously manipulated to allow them maximum access to the educational and social advantages available.

The key aspects of classroom management which present for immediate consideration are:

- The physical positioning of students in the classroom; and
- The structure of teaching groups.

“For students with learning difficulties the classroom environment needs to be consciously manipulated to maximise learning opportunities.”

(Kerry-Anne Hoad, ACER)
The physical positioning of students in the classroom.

Students who have experienced difficulties with basic literacy and numeracy skill development over a period of five or more years of formal schooling are likely to have difficulties with attention which are either inherent or acquired as a result of persistent classroom failure. Physical positioning of these students is very important to their opportunity to access the teaching and learning available in the classroom.

When Rohan entered Grade 5 he was well known at the school. He was obvious in the playground where he was renowned for having lots of energy and was always eager for a new game or to be the first to try a new piece of sports equipment. Variety was indeed the spice of life for Rohan. He didn’t stay at the games for long however, and was often a disruptive influence in others’ games. His friendships changed frequently and teachers on yard duty always had one eye on where Rohan was as chaos often followed. It seemed that every teacher had a ‘Rohan story’ to share in the staffroom. In the classroom, teachers were as keen as Rohan himself was, to send him on messages to the Principal’s office or to another classroom as the need arose. When the bell rang Rohan was always the first out the door.

The Grade 5 teacher, knowing this, decided to place Rohan near the door to allow for his message running and his easy exit at break times.

Placed near the door Rohan was able to see and hear all hallway traffic, was close to all movement in and out of the classroom as well as the movement of other students as they went to and from their bags hanging in open lockers on the wall beside him. Rohan was happy with this placement as he had long ceased to try to attend to what the teacher was doing or saying to the class and so the constant distractions were welcome.

Rohan’s attention difficulties created a problem for him and for his teacher. The placement near the door seemed to be a good solution for both of them. However, Rohan’s opportunity to access the teacher, and consequently the opportunity to learn, was minimised.

Students who have difficulty focusing their attention on a particular stimulus
(in this case the teacher), maintaining that focus, switching focus from one stimulus to another and back again are better positioned where the distractions in the environment are limited. Positioning near windows, or people traffic areas are probably best avoided. For these students a noisy classroom, or one heavily adorned with colourful and stimulating displays, may provide an environment that is so stimulating as to make focusing attention on a single stimulus, such as the teacher, very difficult.

Sometimes these students also need support to keep their desk orderly and free of distracting clutter.

For students with attention difficulties, a classroom that is orderly and predictable with an undemanding visual and auditory environment and physical positioning that minimises exposure to external distractions provides the best opportunity for learning.

Opportunities for learning will also be optimised if the student is socially comfortable in the classroom. Students who have endured five or more years of formal schooling without the rewards of seeing their achievements keep up with their classmates are likely to have developed negative or apathetic attitudes to school, a sense of failure as a student and a sense of difference from other students. Their desire to be the same as others and be accepted by their classmates can be very strong. They may be very sensitive to anything that appears to highlight their difference. In a traditional classroom where desks face the front a position in the front row, directly under the gaze of the teacher may not be welcomed by the student. Similarly, a position in the far corner might be very welcome by the student but is not likely to support their access to the teacher auditorily, visually or emotionally. Opportunities to learn are significantly affected by the student’s positioning in the classroom.

Teacher observations of how the student learns and an understanding of what will support or detract from the student’s ability to access the social, as well as the teaching and learning, opportunities available in the classroom will guide decisions about physical placement in the classroom.
2.1

The structure of teaching groups

The specific interventions which are necessary to advance the learning of students with learning difficulties will be conducted either in the context of the whole class, individual work or small group work with small groups arranged on the basis of friendships, similar ability or mixed ability. The teacher’s observations of the student and her understanding of the dynamics of her class will support her decision making regarding the structure of teaching groups.

Students with learning difficulties have frequently been withdrawn from the class for individual work to ‘catch up’ with other students. While this has often been done with a goal of allowing the student to develop a relationship with a person who can devote her full attention to his social and educational needs it has also emphasised the student’s difference and isolated him from his classmates and the social and educational opportunities of an interactive classroom. For this reason individual withdrawal of students is seldom recommended and is not recommended for the Working Out What Works Intervention Program (Chapter 3).

Wherever possible the WOWW Intervention Program will be incorporated into whole class time. This may be as part of a whole class activity or as part of a small group, or individual work, within the context of the classroom. Small group work within the context of the classroom would be recommended at a period when all students in the class are engaged in small group work. Similarly, individual work within the context of the classroom would be recommended at a period when all students are engaged in individual work. The student is then engaged in work in the same way as his classmates.

The advantages of collaborative and interactive learning have been well documented. However, students with learning difficulties do not always welcome collaborative learning. For a student whose reading and numeracy skills are noticeably below those of his classmates, collaborative learning activities, especially in a mixed ability group, often present a glaring reminder
of his difference. In some cases the student in such a situation will exhibit disruptive behaviour in an effort to avoid a further exposition of his own shortcomings. This often has the ultimate effect of drawing the displeasure of both the teacher and his classmates and cementing his role as an outsider.

Similarly, in a classroom where students are grouped around tables according to ability levels, being a member of a static group of low achievers may only serve to highlight the student’s difference, in his own eyes, if not, in the eyes of his classmates.

A desirable arrangement would be one where students are engaged in activities with the whole class or grouped in similar ability and mixed ability groups for different activities. Flexible groups allow all students to access the social and educational benefits available from the range of student abilities and personalities.

One aspect of the WOWW Intervention Program is an intensive reading program. This program requires small group participation and paired reading. As well as reading aloud, listening is very important to this intensive reading program and as such would be best supported in an environment where there are minimal visual as well as auditory distractions. For this aspect of the intensive reading program it is advisable that the small group be withdrawn from the distractions of the classroom.

An intensive reading program, such as this, that provides a rich opportunity for improvement in reading skills can provide the group with its own positive social environment. The social benefits, which accrue as students increase their self-efficacy in concert with their group members, ameliorate any potential social disadvantages of being withdrawn from the whole class.

The WOWW Intervention Program will encourage teachers to share ideas about successful classroom management and the challenges of accommodating a range of student needs.
Additional staff support within the school

School support is very important to the overall effectiveness of the intervention program. Support from the school leadership team will indicate to parents, other teachers and students that this program is considered valuable. Commitment to providing resources of staff time and materials, as well as professional interest in the intervention program by the school Principal and leadership team, is an indication of the value the school places on teacher effort and student learning.

Additional staff support within the school has many benefits. It provides a colleague to discuss the program with, to share and compare observations about the students learning, to contribute to planning decisions and construction of strategy instruction methods and materials. It also provides the opportunity to conduct small group work within the context of the classroom or to team-teach the whole class. If the additional staff member is a trained teacher then there is the opportunity for small group work to be conducted outside of the classroom while still leaving a trained teacher with the class.

Vital to the use of additional staff support is effective communication so that each member of the team is fully aware of the program and its implementation guidelines. Consistency of implementation is very important to the successful delivery of a Direct Instruction program and is also important in the initial learning stages of Strategy Instruction. Regular scheduled meetings as well as unscheduled conversations about the student’s learning will support an effective team approach.

With two trained teachers it may be possible to allocate the teaching of the WOWW Numeracy Intervention Program to one and the teaching of the WOWW Reading Intervention Program to the other. The student should feel that both teachers are equally interested in him as a person and as a learner. The student’s attitude to learning and his motivation to persist with the intervention programs will be influenced by his belief that his teachers care about him and believe that he can succeed as a learner.
Parents and caregivers

The parents or caregivers present as a rich resource and a natural partner for the teacher in the intervention program. Regular channels of communication need to be established and maintained.

Parents’ or caregivers’ depth of knowledge and understanding of their child is a resource that is of great value to any collaborative effort aimed at the student’s development. They are able to let the teacher know about the student’s feelings about school and feelings about the program and how it is progressing. They are able to let the teacher know if the student is on any new or changed medication, if he has a cold or a temporary ear infection, for example. They can also give the teacher some information about the family that may be helpful. For example, the student’s parents or other family members may also have experienced difficulties at school. Some parents may seek to normalise their child’s school experience for him by telling him - “Grandpa could never read. You are just like him” or “Your father has always been hopeless at maths. You are just like him.” If there is a family history that serves to explain to the student why he has difficulties with literacy or numeracy this may reduce his sense of personal control over his learning and consequently reduce his motivation to learn.

Parents are also a very good source of knowledge about what rewards a student or what may placate him in times of distress or support his social interactions.

These parents are often as sensitive about school as their children. They have endured five years or more of receiving negative reports about their child’s progress and ability as a learner. Their self esteem as parents may be affected. It may take some time to establish a positive and equal partnership. It is important to recognise and show respect for the parents’ skills and knowledge. This may be done by seeking their advice and listening to what they know about their child. Sharing information about the program and noting examples of positive developments in the child’s learning and attitude to school reinforces parents’ connectedness with their child’s learning. The benefits of establishing positive fruitful partnerships with parents
are great. Teachers develop a new understanding of the student. Parents can support generalisation of learning strategies. When students observe their parents and their teacher working together to support them it adds value to the program in the student’s eyes and also serves to raise his self-esteem.

At all times parents need to know that their support and interest is welcomed and respected. They need also to know that their instructional support is valued but not mandatory. Relationships between the student and his parents around learning may be fraught and complex and expecting them to implement a program at home may not be comfortable for parent or student. If parents wish to provide intervention support at home they may wish to implement a modelled reading program that is different but complementary to the program being delivered at school. It is important to let the parents know that the program should be short and enjoyable. If it becomes conflictive it is better to abandon it.
Establishing and using networks with other professionals
(Kerry-Anne Hoad, ACER)

There are a number of people involved in every child’s education and development. The effective teacher is aware of, and able to utilise, the support and expertise of the other people involved in the student’s education and development. Teachers may have access to additional staff support within the school, to parents and caregivers as well as other professionals who are familiar with the student. These people represent a team who are all working towards the common goal of this student’s growth and development.

The initial step towards a team approach to this student’s development is identifying who that team is. If the student is accessing support from other professionals such as medical practitioners, speech and language pathologists, physiotherapists, audiologists or others it would be useful to have a list of these professionals.

The next step would be to seek and share information (with parental permission) with other members of the team.

Once permission has been given teachers may initiate contact with other professionals supporting the student. An initial letter of introduction and letting them know of the intensive instruction which you are going to begin with this student is often a good way to initiate contact. The letter could include some brief background on why this intervention was chosen, how it is to be implemented and over what period of time. It would be useful to seek any information the particular professional may have regarding their observations of how this student prefers to receive information, or learn, as well as the goals they may have for the student in this same time frame. The letter could conclude with an undertaking to provide an update on the student’s progress and an offer to engage in further communication regarding the student as desired.
These observations focus on three interrelated questions:
1. How do children learn?
2. What have teachers discovered about how their students learn?
3. What resources/strategies were useful?

Objectives
- To provide an outline and framework for thinking about how students learn.
- To consider how students with learning difficulties may learn and in what modalities they might struggle to learn.
- To assist teachers with observing and understanding strengths and difficulties in the way such students learn.
- To learn how to use the information they gain from observation, and to use information from professionals that might help them to find ways that students learn best.
- To consider common principles for learning when there are difficulties.
- To consider the implications for learning given the various diagnoses.

What constitutes a good teacher?
“They care about me”
“They are enthusiastic about what they are teaching”
“They are interested in whether I am learning”
“They are fair”

How do children learn?
This is a brief overview to provide a structure for considering how students may learn more easily and in what modalities they may struggle to learn.
Ways of teaching using modalities that students find easier or that can accommodate the difficulties (that is, keeping instructions short if they have problems processing long instructions) have more chance of success. We do not expect a student who is vision impaired to learn easily if we only present visual information; we combine it with other modalities. Similarly, for a child with severe hearing impairment we do not yell louder at them to ‘listen’, we use other modalities in addition to compensating for their hearing impairment.
2.3

What senses are used to learn?

Auditory
• Need to be able to hear.
• Need to be able to hear if there is competing noise (background noise problem - ‘cocktail party syndrome’). Approximately 10 per cent of children can’t hear if there is background noise - they have trouble hearing the words in a song, holding a tune in a choir if they can’t hear their own voice, or get confused with noise. Usually they can hear vowel sounds because they are louder and lower in pitch than many consonants. This has major implications for spelling, for example, CAT, BAT. It is important to consider the effects of noisy classrooms, traffic or air-conditioner noise, or ‘open plan’ classes. These students need to sit closer to the voice and learn to watch the face to gain additional clues. They often learn to ‘lip-read’.
• Need to be able to ‘listen’.
  – Processing auditory information. This can be likened to a doorway that gradually widens through childhood to allow more information in. (See Appendix 4 Auditory Processing Capacity and Assessment; Rowe, Pollard & Rowe, 2005, 2006).
  – It is the most common problem contributing to difficulties with learning but improves slowly with time. It becomes a problem if we are not aware of what is ‘normal’ for age and overload them with information.
  – There are variations in the normal development of children - some students have a delay in the rate of increase in the amount of words or unrelated information (digits) that can be recalled. There are implications for delivering information or explanations or new concepts; for reading; comprehension; spelling; ordering information to write or speak; numeracy; and also social interaction.
  – It can be quite unrelated to cognitive ability, although children with borderline or mild ID usually have difficulty. Many very able children can have this difficulty.
  – There is a small group of children who have a difficulty called central auditory processing problem and this overlaps with receptive language difficulties.
Children who have difficulty with processing auditory information often have problems with linking letters and sounds (phonemic awareness).

Other children may have a functional problem ‘listening’ and processing auditory information that it can be due to:
- A concentration issue, for example, AD/HD, anxiety, depression;
- Poor understanding of language;
  - ESL;
  - Receptive language difficulty;
  - Lack of exposure to language, maternal depression in the early years, poor communication in family;
- Difficulty understanding the ‘meaning’ of words. Some children are very ‘literal’ in their understanding. Young children usually are, but as they get older they understand the meaning ‘behind’ the language, for example, “pigs might fly” is taken at face value and considered a ‘ridiculous’ statement by a child with Asperger’s Disorder. Directions therefore need to be very specific and unambiguous.

To compensate for problems with processing auditory information:
- catch attention;
- keep instructions short;
- chunk information;
- pause; and
- wait for compliance.

Understand what is normal for the age, as these strategies are helpful for all children and boys in particular.

Once a student can recall five digits (in standardised testing), then ‘adult length’ sentences, classroom information and acquisition of literacy skills is much easier.

Visual
A student needs to be able to see:
- Distance and close vision. Can they see the black/white board or the book?
- The ‘big picture’ and to see the parts in a context - not just small parts of it, for example, calling a pillow on a bed “ravioli” because it looked like ravioli, but not seeing that it was sitting on a bed so it was more likely to be a pillow. Seeing components of the picture “out of context” is common with Aspergers. They often
have difficulty with puzzles by only seeing the small pieces rather than the whole.

- The detail in a picture - children who are impulsive (for whatever reason, for example, ADHD), or anxious, are often so rushed that the detail is not noticed.

- Identify the ‘direction’ of the letters or words. For example, we will call a chair a ‘chair’ irrespective of which way it is facing or whether it is upside down or ‘back to front’, but we require letter and number symbols to have a particular orientation. For a letter such as ‘b’ changing the orientation makes it ‘p’, ‘d’, ‘q’, or ‘w’ becomes ‘m’, ‘n’ becomes ‘u’, or ‘h’ becomes ‘y’ or ‘men’ becomes ‘new’. If this occurs after the age of 7 it represents a significant difficulty. Some students can write left-to-right, right-to-left, left-to-right upside-down, or right-to-left upside-down with equal ease, and read it as the same word. Often such students find 3-D art, anatomy or fluid mechanics easy, as they can ‘flip’ objects in space easily ‘in their head’.

- The information in a sequence in order to be able to read. Some students can only take in a small amount of visual information, that is, visual span is short. Implications are that they can only ‘see’ a few letters or words at a time and become confused or ‘overloaded’. For example, some will look at a page of writing and say that they “can’t read all that” implying that they can’t see it in one go and therefore cannot read it. This is a similar concept to auditory processing except that it is visual. There is a need to compensate by showing a small amount of information at a time.

Motor

Most children need to practise physical or motor activity many times to learn it, and some learn other information by moving, either by being ‘on the move’ or using movement linked with other sensory input. Others learn by mimicking patterns and watching how tasks are done.

Sensory

Some learn by ‘touch’ or physical manipulation, and this can be an added modality when one of the other senses is impaired, for example, vision, or when there are difficulties with visual perception, for example, writing on the
student’s back to confirm the direction of letters.

For children who have difficulty with processing information in more than one area, for example, auditory and visual, they can often learn by using associations with motor sensations, colour and touch combined with visual images and sound.

Others learn by association, that is, linking words with pictures or letters with colours or words in songs, using mnemonics (every Indian goes home tonight). Many of these other ways of linking and organising information will be considered in the ‘strategies for learning’ section.

Observation of students
By careful observation of a few simple tasks you can gain a lot of information about the way a child learns as well as areas of difficulty.

By asking a child to select a book that they are comfortable reading, or one where they can recognise some words, you can not only assess the level they can read at, but also their perceived skill level. You can identify any letter or word reversals (or vertical flipping), whether they only ‘see’ the first few letters of the word, or whether they can decode unfamiliar words, etc.

By asking a student to write a brief sentence you can determine whether there is phonetic spelling, letter or word reversals, problems with words of a certain length, inappropriate inclusion of recently learnt phonemes, for example, phish for ‘fish’. Some children with sequencing and visual perceptual problems can write ‘pid’ instead of ‘pig’ or ‘saud’ instead of ‘sand’.

By assessing auditory processing capacity (digit span and sentence length) (see Appendix 4) you can estimate of the number of phonemes they can combine and the number of words they can recall accurately when being given verbal instructions.

Observing the way students can manage a jigsaw or block pattern can give you an idea as to whether they have difficulty with seeing the whole picture from the parts, can notice visual detail, spatial orientation and organisation.
<table>
<thead>
<tr>
<th>What to look for</th>
<th>What does it mean</th>
<th>Do I need extra information and who could provide it?</th>
<th>What do I do? Suggestions to try</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter and word order reversals</td>
<td>In children &gt;7 years of age - it indicates difficulty with sequencing. May also have auditory processing difficulties.</td>
<td>Do auditory processing (AP) assessment and check if they can hear. Check understanding of letter-sound links. Speech and language assessment may be helpful.</td>
<td>Keep instructions short, ‘chunk’ information, break down the components of word/sentence/task into smaller parts, use strategies to help with order and organising. Phonetic instruction often helps, but the ‘chunks’ should be short.</td>
</tr>
<tr>
<td>Digit span</td>
<td>If scoring &lt; 4 digits (spoken 1 sec apart) students will have problems holding and connecting sounds for reading and spelling. If students can recall 5 digits, they can usually manage much easier.</td>
<td>If strategies for difficulty with AP are not working, speech and language assessment, and/or psychological assessment could give more information.</td>
<td>Compensate for the fact that they can’t take in a lot of auditory information at one time. Keep it ‘short and sweet’. They may be very good visually.</td>
</tr>
<tr>
<td>Sentence length</td>
<td>Poor ability to follow verbal instructions unless they are brief</td>
<td>As above</td>
<td></td>
</tr>
<tr>
<td>‘Flipping’ of letters and words or parts of words</td>
<td>If persisting after 7 years (or if very severe before)- visual perceptual problems - often called ‘dyslexia’</td>
<td>Check that they don’t also have difficulty with AP. Often have sequencing difficulties as well.</td>
<td>Use other modalities to link with visual - touch, sound, motor, other associations, ‘overlearning’. If AP is OK then they may learn better using auditory methods.</td>
</tr>
<tr>
<td>Reading the first few letters and guessing the rest of the word</td>
<td>Visual span</td>
<td>Can be assessed by speech pathologists but will improve with time.</td>
<td>Reduce amount of visual information presented at any one time - using ‘windows’, covering the line just read, breaking words up, using colours for parts of words.</td>
</tr>
<tr>
<td>What to look for</td>
<td>What does it mean</td>
<td>Do I need extra information and who could provide it?</td>
<td>What do I do? Suggestions to try</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
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<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Very 'concrete' and literal response to questions. Doesn't understand jokes that play on words, 'rule policeman', likes things very structured.</td>
<td>May have problems with meaning (semantics) and function (pragmatics) of language.</td>
<td>Speech pathology assessment and possibly consideration of Aspergers.</td>
<td>Tends to have trouble with negotiating group work, prefer more solitary structured tasks and has difficulty seeing the whole picture (instead tends to see the detail out of context). Keep instructions very explicit without ambiguity.</td>
</tr>
<tr>
<td>Problems getting started, being organised, staying on task, easily distracted and very impulsive</td>
<td>Possibly has ADHD</td>
<td>Paediatric assessment, and often a psychological assessment is helpful to assess information processing ability.</td>
<td>Medication can be helpful to stay 'on task'. Often needs variety and frequent changes to keep interested eg computer learning games.</td>
</tr>
<tr>
<td>Both visual and auditory processing difficulties</td>
<td>These probably fit true 'dyslexia'</td>
<td>Need both speech pathology and psychological assessment to confirm the diagnosis as these children often see themselves as 'unintelligent'.</td>
<td>Needs a very creative approach using short auditory instructions, 'chunked' visual information combined with using other senses and an opportunity to 'overlearn' up to 30 times - rarely less than 7 times. It is very hard work for them, and those teaching them need to be patient. it is very rewarding when it 'clicks'.</td>
</tr>
</tbody>
</table>
Recent findings about children’s brains:
New pathways can form especially when linked with ways that they can learn more easily, for example, if there are difficulties with auditory processing but visual skills are good - link the two together, but rely on the visual cues to get the message across.

Even children with severe difficulties can learn if the task is broken down into smaller ‘chunks’ and opportunity is given to ‘overlearn’. Often up to 30 rehearsals are required. Once it is ‘in’ it is usually remembered. We allow children frequent opportunities to learn motor skills without expecting them to get it right after a couple of tries. For example, a child with Cerebral Palsy learning to put on a hat, throw a frisbie or put a page in a folder needs the task broken down into components, and each part practiced before it is put together. A child with visual and auditory sequencing difficulties linking sound and appearance of ‘a-l-I’ may need up to 30 attempts before it becomes automatic and can then be linked with other letters.

It is more helpful to consider how the individual learns rather than thinking in terms of diagnoses. The diagnosis can give some clues as to strategies that may be helpful but there can be wide variations. Each child is different, and it is necessary to find out ways each student can learn and ways that it is difficult to learn, so that you can compensate for the difficulty and link the difficult way with the easier way, relying on the strengths to get it across.

There are other ‘background’ issues that will impact on the availability to learn such as anxiety, distress, sense of failure, unwillingness to take risks, distractibility, interest, concentration, social interactions (for whatever reason) and whether they can work better by themselves or in a group.

For specific diagnoses:
For children with ADHD (Attention Deficit Hyperactivity Disorder)
• Check whether they are easily distractible and reduce the distractions (visual, auditory, motor, social, that is, working alone);
• Check whether concentration is a problem - often they need constant
changes of activity to keep the interest - ‘overlearning’ may be completely inappropriate unless it is a computer program that teaches the same thing in lots of different ways;

• Check whether they know what they are meant to be doing;
• Check whether they can sequence information;
• Check whether they are overloaded;
• Are there auditory processing problems or other specific learning difficulties?
• Usually they like gratification linked closely to what they are doing ie., ‘bribery and corruption schemes’ work well.

For children with Asperger’s Disorder

• Check how much difficulty they have with the subtleties of language, and how clear and literal you need to be in directions;
• Check how much difficulty they have in seeing the ‘big picture’ or the context;
• Check whether they prefer to work alone and pace themselves;
• Check how much difficulty they have seeing something from another person’s point of view;

• Check whether they need ‘factual’ story writing and whether it is always on their current topic of interest;
• Check whether the child doesn’t pick up on social clues and whether the conversation is quite out of context, inappropriate or whether they persist with their topic of interest until they have finished;
• Check whether they can produce good work if they work from what they know. Assistance may need to be very explicit if the task requires social perceptiveness.

For children with dyslexia, specific learning difficulties or speech and language difficulties

• Check the modalities that the child finds easiest to learn;
• Find what activities and interests the child has;
• Check whether there are concentration difficulties or distractibility;
• Confirm whether there are difficulties processing auditory information and use those strategies when communicating;
• Consider using several modalities at the same time;
2.3

- Consider using ‘overlearning’ in whatever way acceptable.

If you cannot work out from observation and trying various strategies which way a child can learn, you may need to enlist the aid of professionals such as a speech pathologist or psychologist. If the child has great difficulty with concentration, impulsiveness distractibility and activity levels, a paediatric assessment may be useful. If ADHD is the problem, medication to assist with concentration can be very helpful and allow that child to learn. You then have an opportunity to be able to teach more effectively.

Once the child realises that you are going to try and work out with them the easiest way for them to learn because you are expecting that they are going to succeed, you will inevitably have someone who will ‘walk over hot coals’ for you even though they might get very frustrated with you.

When they get very frustrated because it is ‘too difficult’ because they can’t get it right - stop and back-off - but only stop when you have achieved a success, even if it is dropping back a level or two.

Self esteem is a ‘realistic view of their strengths and weaknesses’. They may have an inflated view of their weaknesses but they don’t want an inflated view of their strengths. Their esteem will improve when they have some evidence of success and achievement, but they need to know that you believe that the effort is worth it (that is, you care and you are interested in whether they learn). Psychological testing can be useful even if it is to prove to the student that they are of normal intelligence (that is, not ‘dumb’) and can learn. By the time they have reached grades 4-6 they are convinced that there is something wrong with themselves, since they are so far behind. Explain why it has been hard for them to learn in the past can be very helpful, especially if it is an auditory processing problem. Explaining that they need to catch up what they missed hearing can be helpful. This may also be very helpful for children who have been ‘unavailable for learning’ due to distress, abuse, family social circumstances, illness etc.
How do children learn to read? Few questions, when asked of teachers, parents or the community at large are more likely to elicit debate (often heated). Even the validity of the question itself is sometimes doubted, in comments illustrated by reading is caught, not taught. An understanding of the answer is necessary if one is to implement effective reading instruction and to assist those students who seem to have difficulty ‘catching it’. In this section we will examine the knowledge people use when they read and how they go about learning it.

What are the reading skills that readers acquire?

What do you do when you read? You can get an idea of the skills you use when you read by reflecting on what you do when you read text that is unusual or unfamiliar. Have a go at reading the following text. Your goal is to retell it. As you read it, keep track of what you need to do.

You may have heard a lot about strokes that are grooved. The idea behind this is actually very simple. The chance of you moving like this increases every time you move in a particular way. In hits yaw earnyou motor patterns that become part of your play. Disengroovement occurs during prolonged unuse.

Like other readers, you may have:

• read parts of the text more than once;
• tried to link the text with what you know by trying to work our its topic. You probably found yourself early in the reading trying to discover its topic or theme. You may have used this to predict other ideas that might be mentioned. As you continued, you may have matched the ideas you encountered with what you expected.
• tried to use your meaning of the written words heard, strokes and grooved to understand each sentence;
• used the grammar of each sentence to tell you the intended way in which to link the ideas. In the first sentence, the grammar tells who did the hearing (you) and what might have been heard. You know that the strokes were not hearing.
used what you already know to link strokes and groove. Seeing strokes may have led you to predict grooved. If you hadn’t already linked these in your knowledge, you will form a temporary link. When the text challenges existing links, ‘alarm bells ring’ and signal us to re-read and to change how we are analysing the data.

• tried to work out the questions that each sentence answered;
• tried to fit together or integrate the ideas in different sentences;
• tried to work out why the intention of hits, and yaw in the fourth sentence. They may not seem to match either the grammar or context of the sentence.
• tried to make sense of the letter string earnlyou because it doesn’t match the letter patterns for words you know. Sometimes when readers don’t have a written label for a letter string, they try saying it, to make sense of it. Saying earnl may help you guess that it sounds like learn and earnlyou might be intended to be you learn.
• made sense of the letter clusters disengroovement or unuse. Although you may not have seen or heard them before, you can make analogies between them and familiar words such as disengagement and transfer the meanings and infer how to say them. Often we make these analogies without being aware that we are doing it.
• believed that you could read it. Successful readers don’t usually realise that this belief underpins their reading. However, people who have difficulty reading are well aware of how their beliefs about how they might be successful or not, and the consequences of being seen as not able to read, can impact significantly on the reading performance.

These reflections indicate some of skills that readers use in an integrated and systematic way. Some of the skills are applied to single words, some to sentences, some to the text as a whole and some to making links with existing knowledge. You can see how they fit with the areas of knowledge that reading investigators have identified.
Models of reading skills.

One model of reading (Freebody & Luke, 1990) identifies four roles or areas of skill that readers employ as text users:

- as code breakers, by using their knowledge of the relationship between the spoken sounds in language and the graphic code and symbols used to represent those sounds;
- as meaning makers, by using their knowledge of the meaning patterns operating in written and spoken texts;
- as text users, by using their knowledge of the functions of various kinds of literacy; and
- as text analysts, by using knowledge of the ways texts represent different points of view.

A second model looks at what readers do during text comprehension. This is the construction-integration (CI) theory of text comprehension (Kintsch, 1988; Adam & Butler, 1999). It proposes that readers comprehend written text by identifying its propositions and linking them with corresponding ideas in their existing knowledge. They do this by:

- inferring meanings implied by each sentence;
- generating an impression of the gist, summary or topic of the text (Guindon & Kintsch, 1984; Lorch, Lorch, & Mathews, 1985; Mross, 1989).

Kintsch believes that mature readers build these propositions automatically as they read. They use their knowledge of written language conventions such as syntax and morphography and explicit markers such as topic sentences. Similar ‘levels of text processing’ models have been proposed by Just & Carpenter (1980) and Haberlandt (1988).

A third type of model identifies two main areas of skill, decoding and comprehension (Gough & Tunmer, 1986; Hoover & Gough 1990). It proposes that these areas are relatively independent of each other. It leads to the possibility that some children can read text accurately but not understand it, while others may be able to understand it but not read it accurately. Decoding is often assessed by having the children read individual words or pseudo words and comprehension is measured by assessing their listening...
comprehension or their ability to comprehend written text without reading it aloud. The model has been supported both by patterns in reading and in teaching students who have reading difficulties (Dermody & Speaker, 1995; Lysynchuk, Pressley & Vye, 1990). Aaron, Joshi and Williams (1999) provide a useful review of the support for this model.

A preferred model of reading skills

These models illustrate the range of perspectives for understanding the knowledge and skills required for effective reading. When your goal is to understand, diagnose and remediate reading difficulties, you need a framework that allows you to make comparatively fine distinctions about how a person reads and to do this systematically. The above models can be synthesised and extended to include additional areas of knowledge that influence reading. The following elaborated model (Munro 2004, 1999a, 1996) is used:

Reading knowledge comprises at least three aspects:

• a knowledge of the conventions of written text (that is, literacy knowledge, such as letter patterns, how sentences are written and how ideas are organised in a written story);
• how to manage one’s reading activity (that is, metacognitive knowledge); and
• oral language knowledge (for example, what words mean, how they are said and how to use grammar).

There are five types or knowledge readers have about written text. When they read they know:

• how words are written, said and what they mean (word level knowledge);
• the meanings and grammar of written sentences (sentence level knowledge);
• how to link ideas across sentences and with what they already know (conceptual level knowledge);
• a summary or main ideas in the text (topic level knowledge); and
• the intended purposes of the text, for example, to persuade, to scare, to teach, to show how a set of ideas is interesting or useful (dispositional level knowledge).
A text may sometimes have words, sentence types or ideas that are unfamiliar to a reader. In these cases the reader uses actions or reading strategies to bridge between the text and what they know. At the word level readers read unfamiliar words by segmenting and recoding them, at the sentence level they may visualise or paraphrase sentences read, at the conceptual level they may predict or infer ideas or feelings, at the topic level they may summarise and at the dispositional level they may detect the attitudes in a text.

Readers also have attitudinal knowledge or beliefs about reading and themselves as readers. They may believe that they can be successful as readers and believe that there is value in them working at each level of the text. They may also see reading as a valuable activity, worthy of their engagement. They may, for example, believe that it is useful to try to detect a writer’s attitudes or values in a text.

When reading a text, readers use these areas of knowledge simultaneously. They integrate them into a summary of what the text says. When information from different areas clash, for example, when what they expected the text ‘to say’ wasn’t ‘said’, they switch attention to particular aspects of information and to re-read or take other ‘remedial’ actions. The text is comprehended when the accumulated evidence most strongly supports one interpretation.

The amount of information readers can handle at any time, or their ‘short-term working memory’, is restricted. They handle some of the areas automatically while other aspects demand attention. Those aspects that demand least attention, that is, are more automatic, require least capacity. Recognising words by seeing their spelling pattern uses less attention than converting the spelling to sounds and then blending. Using the meaning network to predict meanings and confirming predictions reduces the amount of short-term working memory needed.

This review indicates that readers use a range of reading skills that operate at various levels of text in a systematic, integrated way. They are sometimes used automatically and on other occasions with an investment of attention. In the latter case they are referred to as strategies rather
2.4

than skills. A frequent goal of reading education is that readers learn to use them relatively automatically.

How do readers acquire these skills?
There are several aspects to examining this question. First, reading skills don’t ‘just happen’; they emerge from skills in other areas of knowledge. Second, they don’t ‘stay the same’. An able 8-year-old reader uses word level reading skills that are different from those used by an able 12-year-old or 16-year-old reader. An examination of this question needs to take account of these influences.

Reading skills emerge from knowledge in other areas.
Readers build their literacy and metacognitive knowledge from knowledge in a range of other areas (Aaron, Joshi & Williams, 1999). Oral language knowledge, an ability to reason, an ability to learn visual symbols and to store them in memory, and knowledge of how to learn are all relevant to learning to read (Stothard, 1994).

To learn word level skills, children need to:
• manipulate sound patterns in spoken words (phonological and phonemic awareness);
• learn symbolic codes for letters (orthographic processing);
• build a vocabulary of word meanings;
• recall the names and sounds of letter clusters (rapid automatised naming speed); and
• learn how to use what they know about some words to read others (orthographic analogy learning). (Berninger, Abbott, Thomson, & Raskind, 2001; Foorman, Francis, Fletcher & Lynn, 1996; Lyon, 1995; Munro, 2004, 2000, 1999a, 1999b; Rack, Snowling & Olson, 1992; Wolf, Bowers & Biddle, 2000).

They need to synthesise these skills.

To learn sentence level skills, children need to know how:
• ideas are linked into sentences in spoken language;
• to use the word order or grammar; and
• to retain ideas in verbal short-term working memory (for example, to rehearse and to chunk knowledge).
To build conceptual and topic level skills children need to:

- link ideas into themes;
- use the links to organise what they know;
- think ahead; and
- summarise.

Dispositional level skills:
Dispositional level skills involve understanding how the social context affects how ideas are communicated (Dermody & Speaker, 1995; Lysynchuk, Pressley & Vye, 1990; Munro, 2004, 2003, 2002a).

Self-management and control strategies:
Self-management and control strategies while reading develops from the skill to direct and regulate one’s thinking in other areas of endeavour, for example, to decide when and why to take particular actions during play, to evaluate the effectiveness of one’s activity in terms of achieving a particular goal or purpose. Children learn to plan and monitor their reading activity, review their progress towards their goals and to initiate corrective action when particular behaviours don’t allow them to achieve their goals (Asselin, 2004; Commander & Smith, 1996; Horner & Shwery, 2002; Lambert, 2000; Pintrich, 2002; Ruban, McCoach, McGuire & Reis, 2003; Stone & May, 2002; Vaidya, 1999; Weir, 1998).

Many children show a ‘natural’ propensity to learn to read. These are the children who are often said to ‘catch reading’. This isn’t accidental. These students acquire enough of these areas of knowledge and integrate them into a ‘critical mass’ of knowledge that they can use to learn about written text. Different children may have different ‘mixes’ of these areas of knowledge but still be able to learn the same reading skills.

A key capacity here is an ‘analytic-sequential’ learning style that allows them to link the detailed aspects of the written language code with matching aspects of their oral language. Children whose learning style is more ‘global wholistic’ often find reading more difficult to learn.

These areas of knowledge provide a type of ‘reading readiness’ and contribute to a foundation for reading skills at any time. They are not, however, reading readiness skills in the traditional sense.
of providing ‘pre-literacy knowledge’. In the 1950s-1970s, reading readiness was conceptualised as the knowledge and skills students were assumed to need before they began to read. These included visual perceptual skills, motor co-ordination and spatial skills, oral language and general reasoning skills. Evidence for the extent to which these skill areas actually predicted later reading ability was indecisive.

In the present context, on the other hand, reading readiness is assumed to have on-going relevance as one develops reading skills. Phonological skills relevant to multisyllabic words and the notion of the schwa, for example, are necessary for learning to read words of two or more syllables. Similarly, the ability to relate two or three events in oral language provides a base for comprehending the grammar of written sentences that have embedded temporal and spatial clauses.

**Developmental trends in reading readiness skills and knowledge**

Children’s knowledge in all of these areas develops gradually. As their phonological knowledge, for example, develops, they move from playing with rhyming patterns in words to segmenting spoken words into onset and rime and then into separate sounds. This trend is linked closely with learning to read words.

They first understand concepts in perceptual ways, then linked with concrete real-world references and finally in an abstract way. Gradually they learn new ways to think about concepts, for example, to infer, to anticipate ideas, to comprehend causal relationships, generalisations and conditional relationships. They learn grammar for simple active voice sentences and later more complex structures such as the passive voice and sentences that have subordinate clauses.

Their self management of reading strategies and skills develops from egocentric speech. The strategies children first learn to use in reading are ones they have already used in oral communication. They use them initially when cued or scaffolded and gradually exercise self control.
Reading skills develop gradually

As we noted earlier, reading skills at each level gradually develop as students’ reading readiness and exposure to written text changes. As an example of this, we can look at how their word level skills change.

Various developmental sequences for learning to read words, for example, have been proposed. Early stage theories proposed that all developing readers progress through the same three broad stages of reading skill (for example, Seymour & MacGregor, 1984);

- first they use only some of the letters in a word and perhaps its appearance to read it (Adams, 1994; Ehri & Robbins, 1992) (the logographic stage);
- next they use letter-sound decoding, that is phonic or alphabetic skills (the phonic or phonological stage); and
- finally they read the word directly (the orthographic stage).

These do not adequately explain differences in reading or variation in the types of words a reader can read at any time. Some children, for example, begin at the phonic stage (Stuart & Coltheart, 1988); they don’t use logographic reading skills.

A second aspect of learning to read words is how children use what they know about some words to read unfamiliar ones and therefore to add to their orthographic knowledge. Goswami (1999) proposed they move through the following developmental sequence making analogies between written words; they

- use onset and rime,
- use the onset and part of the rime; and
- use phonemes and groups of phonemes.

Their phonological knowledge initially constrains the letter patterns they learn; they learn the patterns that match the rimes they know. Practice recoding letter clusters to sounds successfully provides a self-teaching mechanism for gaining new word-specific letter patterns knowledge (Share, 1995; Thompson, Cottrell & Fletcher-Flinn, 1996).

Children first learn simple letter-sound links and then larger letter clusters and patterns that match specific words. This learning is assisted by their phonemic awareness, having them read increasingly
complex words, their sensitivity to how a context can constrain the words used in prose, their preparedness to try out alternative pronunciations and supportive feedback. The frequency with which they encounter a written word affects how accurately they read it (Laxon, Masterson & Moran, 1994). At any time, they can read some words directly and others using letter cluster-sound recoding.

How are new links learnt? Young readers modify their existing letter cluster knowledge using a ‘self-teaching mechanism’. When they first encounter an unfamiliar written word, they use various reading skills to read it; letter-sound links they have learnt, how it looks like words they know (analogy cues) and its context (Thompson, Cottrell & Fletcher-Flinn, 1996). As they see it more often, the links between the letters that comprise it are strengthened and this stored letter cluster is used to identify it. As a result, they can bypass needing to use the reading skills they used when they first saw the word (Van Orden, Pennington & Stone, 1990) and they learn the links between phonological and orthographic components for that word. What we are seeing here is a transition in reading skills at the word level as a reader’s knowledge increases.

A similar developmental sequence could be assembled to describe changes in the reading strategies used at the other levels of text. Throughout this development it is useful to see developing readers as ‘integrated wholes’, learning to apply their reading knowledge in a systematic way to texts of increasing complexity. The contemporary approach of describing students’ reading skills in terms of the types of texts they can read comparatively independently is seen as supporting this.

The acquisition of reading skills in all areas is dependent on another set of beliefs: whether the child believes she or he can be a successful reader and can learn to read (Pintrich, 2002). This is the person’s self efficacy as a reader. A positive self-efficacy is essential for learning to read (Casteel, Isom & Jordan, 2000; Henk & Melnick, 1998; Zimmerman, 2000) and is correlated with reading achievement (Chapman & Tunmer, 2003). It influences children’s motivation and preparedness to engage in reading activity (Baker & Wigfield 1999; Linnenbrink & Pintrich, 2003;
Pajares, 2003), the reading goals they set for themselves and how they evaluate their on-going reading performance (Schunk, 2003).

The process of acquiring reading skills

What then can we say about the process of acquiring reading skills? This review has identified the types of skills that readers use in an integrated and systematic way. These are used at various levels of the text in a simultaneous, ‘parallel’ way. These are sometimes used automatically and on other occasions with an investment of attention.

Several issues relating to how readers acquire these skills were examined. First, learning reading skills were linked with learning skills in other areas of knowledge, including psycholinguistic and cognitive knowledge, the ability to symbolise and the beliefs readers have about reading and their ability to operate as readers. Second, the reading skills themselves change gradually, both in parallel with changes in readers’ ‘reading readiness’ knowledge and with exposure to more complex texts, the development of a self-teaching mechanism for enhancing literacy knowledge and effective corrective feedback.

In the past there has been a tendency to focus more on separate reading skills than on the reader acquiring them. The emphasis needs to be on the use of the skills and knowledge in an integrated way by a reader. A model of reading skill acquisition that sees readers on a literacy learning journey, gradually learning the knowledge and tools for comprehending increasingly more complex text needs to underpin reading education.

One area of reading skill acquisition that has been seriously under-developed in the past is teaching readers to integrate what they are learning about a text as they read. This is more than summarising. It involves reading any text in a discerning and strategic way. It is reasonable to expect that in the information-rich age of the future, teaching readers to elaborate and innovate using what they read, map it into a range of contexts and make links with other areas of knowledge will be more valued skills.
Research studies by Gray and Tall (1994) have shown that young children who are successful with numeracy use different types of strategies from those who are struggling with numeracy. Students struggling with numeracy, are usually procedural thinkers dependent on the procedure of counting and limited to the ‘count-all’ and ‘count-back’ procedures. In summary, Gray & Tall (1994) defined procedural thinking as being demonstrated when:

... the numbers are used only as concrete entities to be manipulated through a counting process. The emphasis on the procedure reduces the focus on the relationship between input and output, often leading to idiosyncratic extensions of the counting procedure that may not generalize. (p. 132).

As part of the Victorian Government Department of Education and Training’s Early Numeracy Research Project (Clarke, Gervasoni, & Sullivan, 2000), growth points were described for:

- Counting
- Place Value
- Strategies for Addition and Subtraction
- Strategies for Multiplication and Division
- Time
- Length Measurement Framework
- Mass Measurement Framework
- Properties of Shape
- Visualisation and Orientation

Growth points are described as key ‘stepping stones’ along paths to numerical understanding. According to the research, growth points are useful because they help teachers:

- understand how children learn;
- assess and monitor children’s growth in understanding;
- identifying children who are at risk;
- identify the zone of proximal development for children’s learning; and
- plan and target teaching so that we can identify the experiences that will most effectively help children to reach the next growth point in their numerical learning.

The Early Numeracy Research Project growth points therefore provide teachers with a useful framework for reflecting on and evaluating the strategies a child uses to solve numerical problems. This information can be used...
as a starting point in planning future instructional activities that meet the learning needs of each child and provoke and support children move towards the next growth point in their learning.

Each growth point has six clearly defined steps. The following table takes the six steps on each of the first four growth points, Counting, Place Value, Addition and Subtraction and Multiplication and Division, and provides an understanding of the step, the incremental steps towards achievement of that step and some suggested activities or strategies to support the student’s progression.
## Growth Points

### 1. Counting

<table>
<thead>
<tr>
<th>0. Not apparent</th>
<th>Incremental steps</th>
<th>Suggested activities or strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not yet able to state the sequence of number names to 20.</td>
<td>When children start to count they recite the verbal sequence, either successfully or with partial success but do not realise that counting is done for a purpose. For these students counting is a recitation of number names and is dependent on their memory.</td>
<td>Students at this stage need to be given opportunities to count both verbally and physical objects.</td>
</tr>
<tr>
<td>Suggested sequence for verbal counting:</td>
<td></td>
<td>Activities could include:</td>
</tr>
<tr>
<td>• Count by ones forwards to 5</td>
<td>• Count small numbers of objects (up to 5)</td>
<td></td>
</tr>
<tr>
<td>• Count by ones forwards to 10</td>
<td>– eyes, hands, feet, fingers</td>
<td></td>
</tr>
<tr>
<td>• Number after (up to 10)</td>
<td>– fruit in a bowl</td>
<td></td>
</tr>
<tr>
<td>• Number before (up to 10)</td>
<td>– lollies on their plate</td>
<td></td>
</tr>
<tr>
<td>• Number between (up to 10)</td>
<td>– pictures on a page of a picture book</td>
<td></td>
</tr>
<tr>
<td>• Count by ones forwards to 19</td>
<td>Change the size, type or colour of containers e.g. saucers, bowls, cups, plastic containers, and children see these as a new activity.</td>
<td></td>
</tr>
<tr>
<td>• Number after (up to 19)</td>
<td>• glue pictures cut from magazines then count the number of ..., for example, “animals” or ...</td>
<td></td>
</tr>
<tr>
<td>• Number before (up to 19)</td>
<td>• make number book with numbers 1 - 5 (extend as verbal count range increases)</td>
<td></td>
</tr>
<tr>
<td>• Number between (up to 10)</td>
<td>• draw small numbers of objects. e.g. Say to child: “Draw 3 apples”. After child has drawn the apples then count them with the child</td>
<td></td>
</tr>
</tbody>
</table>

Activities could include:

- Say or sing Nursery and Counting Rhymes and songs - Baa Baa Black Sheep, Ten Little Indians
- Count small numbers of objects (up to 5)
  - eyes, hands, feet, fingers
  - fruit in a bowl
  - lollies on their plate
  - pictures on a page of a picture book
- Change the size, type or colour of containers e.g. saucers, bowls, cups, plastic containers, and children see these as a new activity.
  - glue pictures cut from magazines then count the number of ..., for example, “animals” or ...
  - make number book with numbers 1 - 5 (extend as verbal count range increases)
  - draw small numbers of objects. e.g. Say to child: “Draw 3 apples”. After child has drawn the apples then count them with the child
  - Ask the child to move a number of times
    - jump three times
    - walk two steps
    - skip five times
<table>
<thead>
<tr>
<th>Growth Points</th>
<th>Incremental steps</th>
<th>Suggested activities or strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• listen and count how many times I:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- clap my hands</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- click my fingers</td>
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<tr>
<td></td>
<td></td>
<td>- tap my fingers</td>
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<tr>
<td></td>
<td></td>
<td>- watch and count how many times I:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- nod my head</td>
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<tr>
<td></td>
<td></td>
<td>- touch my nose</td>
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<tr>
<td></td>
<td></td>
<td>- tap the table</td>
</tr>
</tbody>
</table>

1. **Rote counting**

Rote counts the number sequence to at least 20, but is not yet able to reliably count a collection of that size.

**Suggested sequence to develop rote and physical counting**
- Count by ones forwards to 20
- Count by ones backwards from 10
- Accurate physical count to 5 (one-to-one correspondence)
- Accurate physical count to 10
- Number after (up to 20)
- Number before (up to 20)
- Number between (up to 20)
- Count by ones forwards to 30
- Count by ones backwards from 20
- Accurate physical count to 12
- Number after (up to 19)
- Number before (up to 19)
- Number between (up to 10)

**Activities should include:**
- count verbally forwards and backwards by ones to increase the length of known verbal sequence  
- sequence or order number cards within known range  
- make a group of objects where the size of the group is within their verbal sequence limits e.g. using dice (or cards) then make the number rolled or chosen. For example, the dice is rolled and 5 (or pattern of 5 dots) is showing student uses counters to show five counters.  
- count group of objects where the group size is just outside their known verbal sequence with assistance from more knowledgeable other - another student, parent, or teacher  
- use dice or cards to target a certain number e.g. Race to 10, 15, 20 etc  
- Draw a group of objects of specified size e.g. draw 7 elephants, 10 bananas, 12 frogs
### Growth Points

<table>
<thead>
<tr>
<th>Growth Points</th>
<th>Incremental steps</th>
<th>Suggested activities or strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2. Counting collections</strong></td>
<td>Suggested sequence to develop rote and physical counting</td>
<td>Activities should include:</td>
</tr>
<tr>
<td>Confidently counts a collection of around 20 objects.</td>
<td>• Count by ones forwards to 40                                                  • count verbally forwards and backwards by ones to increase the length of the known verbal sequence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Count by ones backwards from 30                                                • extend the range for the sequencing or ordering of number cards</td>
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</tr>
<tr>
<td></td>
<td>• Accurate physical count with teen numbers                                     • sequence consecutive numbers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Count by ones forwards to 50                                                  • sequence random numbers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Count by ones backwards from 40                                                • What’s Missing? Teacher places sequence of cards in front of student. Student hides eyes while teacher turns card over. Student says what number is missing, turns card over and checks whether response is correct. Repeat with 2 or 3</td>
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<td></td>
<td>• Accurate physical count to 20                                                  • Unjumble: Students are given jumbled set of cards and asked to put cards in order.</td>
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<tr>
<td></td>
<td>•                                                                        • make group of objects where the total size of the group is within their verbal sequence limits</td>
<td></td>
</tr>
<tr>
<td><strong>3. Counting by 1s (forward/backward, including variable starting points; before/after)</strong></td>
<td>Suggested sequence to consolidate count from 1-100</td>
<td>• Oral counting by ones forwards and backwards starting at any point within the range 1 - 100</td>
</tr>
<tr>
<td>Counts forwards and backwards from various starting points between 1 and 100; knows numbers before and after a given number.</td>
<td>• Count by ones forwards to 100                                                  • A hundreds grid is cut into strips so that the numbers are horizontally consecutive (Number Strip). The Number Strip is a great resource for students struggling to remember the verbal sequence. When these students count get them to track the numbers as they say them. Ask students to point to a given number then to say the number before and after; two numbers before and after…</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Count by ones backwards from 50                                                • Number after (up to 50)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Number before (up to 50)                                                      • Number between (up to 50)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Count by ones forwards to more than 100                                       • Count by ones backwards from 100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Number after (up to 100)                                                      • Number between (up to 100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Number before (up to 100)                                                    • Number between (up to 100)</td>
<td></td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
<td>Suggested activities or strategies</td>
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<tr>
<td>---------------</td>
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<tr>
<td></td>
<td></td>
<td>• The Counting Game: Teacher gives the starting number and students write down as many numbers as they can before being stopped by the teacher. Students take it in turns to read out what they have written. (Fast students can be handicapped!)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Students choose card (from 1 to 100) and complete counting by ones forwards and backwards (can be oral or written)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Number Before: cards are shuffled (1-100) and one card chosen. Students are asked to give the number before the number chosen.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Number After: as previous activity</td>
</tr>
</tbody>
</table>

4. Counting from 0 by 2s, 5s, and 10s

Can count from 0 by 2s, 5s, and 10s to a given target.

<table>
<thead>
<tr>
<th>Suggested sequence</th>
<th>Hundreds Grid:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Count forwards by tens from 10 to 90</td>
<td>• What’s the number that is ten more than…?</td>
</tr>
<tr>
<td>• Count forwards by tens from 10 to 100</td>
<td>• What’s the number that is ten less than…?</td>
</tr>
<tr>
<td>• Count backwards by tens from 100 to 10</td>
<td>• Ask students to point to a number e.g. 40 and then show the number that is ten more than 40.</td>
</tr>
<tr>
<td>• Count forwards by tens from a multiple of 10 to 100 (e.g. start at 40 and count by tens to 100)</td>
<td>• Watch to see if they count by ones or can move to the number in one move. Say “So the number ten more than 40 is 50. What would the number be that is ten more than 50?”</td>
</tr>
<tr>
<td>• Count backwards by tens from a multiple of 10 to 10 (e.g. start at 80 and count by tens to 10)</td>
<td>• Colour all the numbers on the Hundreds Grid that you say when you count forwards by tens from 10 to 100. What did you notice? How can you use this to count backwards from 100 to 10?</td>
</tr>
<tr>
<td>• Count forwards by tens from a multiple of 10 to more than 100 (e.g. start at 40 and count by tens as far as you can)</td>
<td>• Use constant function key on calculator to add by tens from multiple of ten.</td>
</tr>
<tr>
<td>• Count backwards by tens from a multiple of 10 to 10 (e.g. start at 120 and count by tens to 10)</td>
<td></td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
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</tr>
<tr>
<td></td>
<td>• Count forwards by fives to 50</td>
</tr>
<tr>
<td></td>
<td>• Count forwards by fives to 100</td>
</tr>
<tr>
<td></td>
<td>• Count backwards by fives from 50 to 5</td>
</tr>
<tr>
<td></td>
<td>• Count forwards by fives from a multiple of 5 to 50 (e.g. start at 25 and count by 5s to 50)</td>
</tr>
<tr>
<td></td>
<td>• Count backwards by 5s from a multiple of 5 back to 5 (e.g. start at 55 and count backwards by 5s to 5)</td>
</tr>
<tr>
<td></td>
<td>• Count forwards by fives from a multiple of 5 to 100 (e.g. start at 45 and count by 5s to 100)</td>
</tr>
<tr>
<td></td>
<td>• Count backwards by fives from a multiple of 5 back to 5 (e.g. start at 95 and count by fives to 15)</td>
</tr>
<tr>
<td></td>
<td>• Count by twos to 20</td>
</tr>
<tr>
<td></td>
<td>• Count by twos to 40</td>
</tr>
<tr>
<td></td>
<td>• Count by twos to 100</td>
</tr>
<tr>
<td></td>
<td>• Count backwards by twos from 20 to 2</td>
</tr>
<tr>
<td></td>
<td>• Count forwards by twos from a multiple of 2 to 40 (e.g. start at 14 and count by twos to 40)</td>
</tr>
<tr>
<td></td>
<td>• Count backwards by twos from a multiple of 2 to 2 (e.g. start at 40 and count by twos to 2)</td>
</tr>
<tr>
<td></td>
<td>• Count forwards by twos from a multiple of 2 to 100 (e.g. start at 40 and count by twos as far as you can)</td>
</tr>
<tr>
<td></td>
<td>• Count backwards by twos from a multiple of 2 to 2 (e.g. start at 52 and count back by twos to 2)</td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
</tr>
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<td>---------------</td>
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</tr>
</tbody>
</table>
| 5. Counting from $x$ (where $x > 0$) by 2s, 5s, and 10s | Suggested sequence  
- Count forwards by tens from non-multiple of 10 between 10 and 100  
- Count backwards by tens from non-multiple of 10 between 100 and 10  
- Count forwards by tens from a non-multiple of 10 to more than 100 (e.g. start at 40 and count by tens to 130)  
- Count backwards by tens from a non-multiple of 10 to 10 (e.g. start at 82 and count back by tens to 2)  
- Count forwards by tens from a non-multiple of 10 to more than 100 (e.g. start at 40 and count by tens as far as you can)  
- Count backwards by tens from a non-multiple of 10 to 10 (e.g. start at 123 and count back by tens to 13)  
- Count forwards by fives from non-multiple of 5 to more than 50  
- Count forwards by fives from non-multiple of 5 to more than 100  
- Count backwards by fives from non-multiple of 5 back from 100 to 0  
- Count forwards by fives from a non-multiple of 5 to 100 (e.g. start at 43 and count by fives to 100)  
- Count backwards by fives from a non-multiple of 5 to less than 10 (e.g. start at 80 and count by tens to 10) | The previous activities can be adapted for counting by twos.  
The following activities can be adapted for counting by tens, fives or twos from non-multiples of these numbers.  
Hundreds Grid:  
- What’s the number that is ten more than…?  
e.g. What is the number that is ten more than 17?  
- What’s the number that is ten less than…?  
e.g. What is the number that is ten less than 53?  
Ask students to point to a number e.g. 47 and then show the number that is ten more than 47. Watch to see if they count by ones or can move to the number in one move. Say “So the number ten more than 47 is 57. What would the number be that is ten more than 57?”  
What would the number be that is ten less than 57?  
- Colour all the numbers on the Hundreds Grid that you say when you count forwards by tens from 8 to 98. What did you notice? How can you use this to count backwards by tens from 98 to 8?  
- Use constant function key on calculator to add by tens from non-multiple of ten. |
## Growth Points

<table>
<thead>
<tr>
<th>Incremental steps</th>
<th>Suggested activities or strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Count forwards by fives from a non-multiple of 5 to more than 100 (e.g. start at 40 and count by tens as far as you can)</td>
<td>• Counting Grid: Draw grid with 5 columns and 10 rows and ask students to complete the grid.</td>
</tr>
<tr>
<td>• Count backwards by fives from a non-multiple of 5 to less than 10 (e.g. start at 120 and count by fives to 10)</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>• Count by twos from non-multiple of 2 to more than 20</td>
<td>6 7 ...</td>
</tr>
<tr>
<td>• Count by twos from non-multiple of 2 to more than 40</td>
<td>...</td>
</tr>
<tr>
<td>• Count by twos from non-multiple of 2 to 100</td>
<td>What do you notice about your Counting Grid?</td>
</tr>
<tr>
<td>• Count backwards by twos from non-multiple in range from 100 to 10</td>
<td>How might this grid help you:</td>
</tr>
<tr>
<td>• Count forwards by twos from a multiple of 2 to more than 100 (e.g. start at 40 and count by twos to 100)</td>
<td>- count forwards by fives starting at 8?</td>
</tr>
<tr>
<td>• Count backwards by twos from a non-multiple of 2 to less than 10 (e.g. start at 80 and count by twos to 10)</td>
<td>- count backwards by fives from 92?</td>
</tr>
<tr>
<td>• Count forwards by twos from a non-multiple of 2 to more than 100 (e.g. start at 40 and count by twos as far as you can)</td>
<td></td>
</tr>
<tr>
<td>• Count backwards by twos from a non-multiple of 2 to less than 10 (e.g. start at 43 and count by twos to less than 10)</td>
<td></td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
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<tr>
<td>------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>6. Extending and applying counting skills</td>
<td>Suitable activities for this level can be found in resources such as Number Sense</td>
</tr>
<tr>
<td></td>
<td>(Alistair McIntosh et al) which are available at most school book suppliers.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Place Value</td>
<td></td>
</tr>
<tr>
<td>0. Not apparent</td>
<td>• read numbers 1 - 5</td>
</tr>
<tr>
<td></td>
<td>• write numbers 1 - 5</td>
</tr>
<tr>
<td></td>
<td>• make groups (1 - 5) of discrete items e.g. using counters</td>
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<td></td>
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</tr>
<tr>
<td>1. Reading, writing, interpreting, and ordering single digit numbers</td>
<td>• read numbers 1 - 9</td>
</tr>
<tr>
<td></td>
<td>• write numbers 1 - 9</td>
</tr>
<tr>
<td></td>
<td>• make groups of discrete items e.g. counters up to 9</td>
</tr>
<tr>
<td></td>
<td>• order numbers 1 - 5</td>
</tr>
<tr>
<td></td>
<td>• order numbers 1 - 9</td>
</tr>
<tr>
<td></td>
<td>• read numbers 0 - 9</td>
</tr>
<tr>
<td></td>
<td>• write numbers 0 - 9</td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
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<tr>
<td>-------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>2. Reading, writing, interpreting, and ordering two-digit numbers</td>
<td>• order numbers 0 - 9</td>
</tr>
<tr>
<td>Can read, write, interpret and order two-digit numbers.</td>
<td>• read numbers 1 - 1 9</td>
</tr>
<tr>
<td></td>
<td>• write numbers 1 - 1 9</td>
</tr>
<tr>
<td></td>
<td>• use discrete items in bundles of tens and ones e.g. icy-pole sticks up to 19</td>
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<tr>
<td></td>
<td>(e.g. 13 can be 13 single icy-pole sticks or 1 bundle of 10 icy-pole sticks and 3 single sticks)</td>
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<tr>
<td></td>
<td>• order numbers 1 - 1 9</td>
</tr>
<tr>
<td></td>
<td>• read numbers up to more than 20</td>
</tr>
<tr>
<td></td>
<td>• write numbers up to more than 20</td>
</tr>
<tr>
<td></td>
<td>• use discrete items in bundles of tens and ones e.g. icy-pole sticks up to more than 20 (e.g. 13 can be 13 single icy-pole sticks or 1 bundle of 10 icy-pole sticks and 3 single sticks)</td>
</tr>
<tr>
<td></td>
<td>• order numbers up to more than 20</td>
</tr>
<tr>
<td></td>
<td>• read numbers up to more than 30</td>
</tr>
<tr>
<td></td>
<td>• write numbers up to more than 30</td>
</tr>
<tr>
<td></td>
<td>• use discrete items in bundles of tens and ones e.g. icy-pole sticks up to more than 30 (e.g. 34 can be 34 single icy-pole sticks or 3 bundles of 10 icy-pole sticks and 4 single sticks)</td>
</tr>
<tr>
<td></td>
<td>• order numbers up to more than 30</td>
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<tr>
<td></td>
<td>• read numbers up to more than 50</td>
</tr>
<tr>
<td></td>
<td>• write numbers up to more than 50</td>
</tr>
<tr>
<td>count groups of objects (up to 19)</td>
<td>count groups of bundles of objects (up to 30)</td>
</tr>
<tr>
<td>make groups of objects e.g. using cards (from 0 - 19) make the number chosen.</td>
<td>make groups of objects e.g. using cards (from 0 - 30) make the number chosen.</td>
</tr>
<tr>
<td>sequence or order number cards 1 - 19</td>
<td>sequence or order number cards 1 - 30</td>
</tr>
<tr>
<td>sequence or order number cards 0 - 19</td>
<td>sequence or order number cards 0 - 30</td>
</tr>
<tr>
<td>count groups of individual or bundles of objects (up to 50)</td>
<td>count groups of individual or bundles of objects (up to 50)</td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
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<tr>
<td>2.5 Growth Points</td>
<td>• use discrete items in bundles of tens and ones e.g. icy-pole sticks up to more than 50 (e.g. 43 can be 43 single icy-pole sticks or 4 bundles of 10 icy-pole sticks and 3 single sticks • order numbers up to more than 50 • read all 2 digit numbers • write all 2 digit numbers • use discrete items in bundles of tens and ones e.g. icy-pole sticks for all 2 digit numbers (e.g. 13 can be 13 single icy-pole sticks or 1 bundle of 10 icy-pole sticks and 3 single sticks • order all 2 digit numbers</td>
</tr>
<tr>
<td>3. Reading, writing, interpreting, and ordering three-digit numbers</td>
<td>• make groups of objects e.g. using cards (from 0 - 30) make the number chosen. For example: Student picks a card at random (from 0 - 50) and uses icy-pole sticks (singles &amp; bundles and singles) to show the number. • sequence or order number cards 0 - 50 • use dice or cards to target a certain number e.g. Race to 20, 30, 40, 50 etc • sequence or ordering number cards 0 - 50</td>
</tr>
<tr>
<td>Can read, write, interpret and order three-digit numbers</td>
<td>• read numerals up to 109 • write numerals up to 109 • use discrete items in bundles of tens and ones e.g. icy-pole sticks up to 109 (e.g. 103 can be 103 single icy-pole sticks or 10 bundles of 10 icy-pole sticks and 3 single sticks • order numbers up to 109 • read numbers up to 200 • write numbers up to 200</td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
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<tr>
<td></td>
<td>use discrete items in bundles of tens and ones e.g. icy-pole sticks up to 200 (e.g. 135 can be 130 single icy-pole sticks or 13 bundles of 10 icy-pole sticks and 5 single sticks or 1 bundle of 100 (10 bundles of 10) and 3 bundles of 10 icy-pole sticks and 5 single sticks)</td>
</tr>
<tr>
<td></td>
<td>order numbers up to 200</td>
</tr>
<tr>
<td></td>
<td>use MAB to model numbers up to 200</td>
</tr>
<tr>
<td></td>
<td>read numbers up to more than 300</td>
</tr>
<tr>
<td></td>
<td>write numbers up to more than 300</td>
</tr>
<tr>
<td></td>
<td>order numbers up to more than 300</td>
</tr>
<tr>
<td></td>
<td>use MAB to model numbers up to 300</td>
</tr>
<tr>
<td></td>
<td>read numbers up to more than 500</td>
</tr>
<tr>
<td></td>
<td>write numbers up to more than 500</td>
</tr>
<tr>
<td></td>
<td>use MAB to model numbers up to 500</td>
</tr>
<tr>
<td></td>
<td>order numbers up to more than 500</td>
</tr>
<tr>
<td></td>
<td>read all 3 digit numbers</td>
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<tr>
<td></td>
<td>write all 3 digit numbers in symbols</td>
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<tr>
<td></td>
<td>write all 3 digit numbers in words</td>
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<tr>
<td></td>
<td>use MAB to model numbers all 3 digit numbers</td>
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<tr>
<td></td>
<td>order all 3 digit numbers</td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
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</tbody>
</table>
| 4. Reading, writing, interpreting, and ordering numbers beyond 1000          | • read all 4 digit numbers  
• write all 4 digit numbers in symbols  
• write all 4 digit numbers in words  
• use MAB to model numbers up to 10,000  
• order numbers up to 10,000  
• read all 5 digit numbers  
• write all 5 digit numbers in symbols  
• write all 5 digit numbers in words  
• use MAB to model numbers up to 100,000  
• order numbers up to 100,000 | • orally read all 4 digit numbers  
• write all 4 digit numbers in symbols  
• write all 4 digit numbers in words  
• count given number of MAB blocks (1000s), flats (100s), longs (10s) and ones for numbers up to 10,000  
• make the number chosen up to 10,000 with MAB. For example: Student picks a card at random and uses MAB (flats, longs and ones) to show the number  
• sequence or order number cards up to 10,000  
• orally read all 5 digit numbers  
• write all 5 digit numbers in symbols  
• write all 5 digit numbers in words  
• count MAB flats (100s), longs (10s) and ones for numbers up to 10,000  
• make the number chosen up to 100,000 with MAB. For example: Student picks a card at random and uses MAB (flats, longs and ones) to show the number  
• sequence or order number cards up to 100,000  
• Use Montessori cards to show 4 & 5 digit number then make with MAB blocks.  
• Use Number expanders to make 4 & 5 digit number then students stand in order of their cards. |
<table>
<thead>
<tr>
<th>Growth Points</th>
<th>Incremental steps</th>
<th>Suggested activities or strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Extending and applying place value knowledge</td>
<td></td>
<td>Suitable activities for this level can be found in resources such as Number Sense (Alistair McIntosh et al) which are available at most school book suppliers.</td>
</tr>
<tr>
<td>Can extend and apply knowledge of place value in solving problems.</td>
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<tr>
<td>A possible extension to the ENRP growth points is reading, writing and interpreting number involving millions, decimals and fractions.</td>
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</tbody>
</table>

3. Addition and Subtraction

<table>
<thead>
<tr>
<th>Growth Points</th>
<th>Incremental steps</th>
<th>Suggested activities or strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>0. Not Apparent</td>
<td></td>
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<tr>
<td>Not yet able to combine and count two collections of objects</td>
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<tr>
<td>To be successful children need to be able to:</td>
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<tr>
<td>• count verbally using the conventional sequence of number names,</td>
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<tr>
<td>• give each object counted a number name (one-to-one correspondence)</td>
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<tr>
<td>• recognise that the last number said is the number in the set of objects counted</td>
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<tr>
<td>• trust their original count (Piaget’s conservation of number)</td>
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<tr>
<td>• count verbally to increase the length of the known verbal sequence</td>
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<tr>
<td>• extend the range for the sequence or order of number cards</td>
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<tr>
<td>• count a group of objects where the size of the group is within their verbal sequence limits</td>
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</tr>
<tr>
<td>• use Tens Frames to show variety of arrangements for same numbers.</td>
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<td></td>
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<tr>
<td>For example</td>
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<tr>
<td>5 can be seen as 3 in the top row and 2 in the bottom row</td>
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<td></td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
<td>Suggested activities or strategies</td>
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</tbody>
</table>
| 1. Count all (two collections)                                              | • Until students are confident in counting one collection accurately using the conventional number sequence and one-to-one correspondence they will be unable to combine collections.  
  • Given two collections students will initially count each of the collections separately before trying to count the two collections as a whole.  
  • Initially this count is unsuccessful because they become tired and their co-ordination (one-to-one correspondence) seems to drop off.  
  • Once they count the two collections as a combined group successfully they will then attempt to count objects that are hidden by tapping or nodding or some way of representing these objects. | Activities should include:  
  • count verbally to increase the length of the known verbal sequence  
  • extend the range for the sequence or order of number cards  
  • count groups of objects where the total size of the two groups is within their verbal sequence limits  
  • Use discrete items such as counters, shells, leaves, blocks etc to make the groups.  
  • Students should draw two groups of counters and the total (Divide piece of paper in half and ask students to show the groups on one half and draw the groups on the other)  
  • use Tens Frames to add two numbers. For example  
    5 and 3 can be shown as 5 in the top row and 3 in the bottom row and child counts the 8 by ones (usually touching every counter) |
### Growth Points

<table>
<thead>
<tr>
<th>Incremental Steps</th>
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</thead>
<tbody>
<tr>
<td>or as 5 can be shown as 2 (top row) + 3 (bottom row) and 3 more in bottom row gives 8 (count by ones)</td>
<td>To add larger numbers e.g. 9 and 7 child places 9 in one Tens Frame and 7 in other and counts by ones to determine the total.</td>
</tr>
</tbody>
</table>

To be successful students using the ‘count-on’ strategy need to:

- Student counts on from whichever number they see or hear first. For example, if asked for the answer for 6 + 3 = they will attempt to count on from the 6. Initially this is three counts including the six. For example, 6, 7, 8.
- Recognise the commutativity of addition. That is, that 6 + 3 will give the same answer as 3 + 6.

2. **Count on**

Counts on from one number to find the total of two collections.
<table>
<thead>
<tr>
<th>Growth Points</th>
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</thead>
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<tr>
<td></td>
<td>After a while the three counts do not include the six but becomes 6 (said to locate themselves), 7, 8, 9. At this stage given something like 3 + 6 the count would be 3, 4, 5, 6, 7, 8, 9.</td>
<td>use the ‘count on’ strategy from the larger or most efficient number.</td>
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<tr>
<td></td>
<td>It is only when students can successfully count on from the first number and recognise the commutativity of addition that they start choosing then “counting on” from the larger number.</td>
<td>make groups of objects where the total size of two or more groups is within their verbal sequence limits e.g. using dice (or cards) make the number rolled or chosen.</td>
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<tr>
<td></td>
<td>(I have seen many teachers try to teach their students to count on from the larger number before checking whether they could count on successfully from the ‘first number’. The students perform successfully when working as a whole group with teacher support but when the students are left to their own devices they revert to count all or guessing)</td>
<td>At this stage students do not count each individual number as they move themselves or their counter but are able to move in one jump when playing games. Games could include:</td>
</tr>
<tr>
<td></td>
<td>• visualise or represent objects that are hidden</td>
<td>• using dice or cards to target a certain number e.g. Race to 10, 15, 20 etc.</td>
</tr>
<tr>
<td></td>
<td>• use the ‘count on’ strategy from the larger or most efficient number.</td>
<td>• Snakes and Ladders</td>
</tr>
<tr>
<td></td>
<td>• make groups of objects where the total size of two or more groups is within their verbal sequence limits e.g. using dice (or cards) make the number rolled or chosen.</td>
<td>To add larger numbers e.g. 9 and 7 student may:</td>
</tr>
<tr>
<td></td>
<td>• place 9 in one Tens Frame and 7 in other but count on from the 9 saying 9, 10, 11, 12, 13, 14, 15, 16 as they track the 7 in the bottom row rolling their eyes or tapping on their legs or tables to keep track that only 7 counts have been made.</td>
<td>• place 9 in one Tens Frame and 7 in other but count on from the 9 saying 9, 10, 11, 12, 13, 14, 15, 16 as they track the 7 in the bottom row rolling their eyes or tapping on their legs or tables to keep track that only 7 counts have been made.</td>
</tr>
</tbody>
</table>
## Growth Points

### 2.5 Growth Points

<table>
<thead>
<tr>
<th>Incremental steps</th>
<th>Suggested activities or strategies</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>• count on from the 9 without any reference to physical objects. They keep track of the 7 counts as they count in their heads.</td>
</tr>
<tr>
<td></td>
<td>• visualise or represent objects that are screened or hidden</td>
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<tr>
<td></td>
<td>For example: Here are 6 counters. Under the paper are 3 more. How many do I have altogether?</td>
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<tr>
<td></td>
<td>• Students find subtraction very difficult as there are various interpretations of subtraction. The easiest is the &quot;What’s left?&quot; Strategy.</td>
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<td></td>
<td>For example in the task: I had 9 cakes. I gave 6 to my friend. How many cakes did I have left?</td>
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<tr>
<td></td>
<td>• A student using “What’s Left “ would model the 9 cakes using counters then remove 6 of the counters. To find the solution students count the number of counters left probably touching each counter as they count by ones.</td>
</tr>
<tr>
<td></td>
<td>For the Count Back/Count down strategy students need to be able to count backwards. While this is relatively easy with small numbers success is limited by the student’s ability to count backwards.</td>
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<tr>
<td></td>
<td>To be successful students using the ‘count-back/count-down’ strategies need to:</td>
</tr>
<tr>
<td></td>
<td>• count verbally forwards and backwards from various starting points to increase the length of the known verbal sequence</td>
</tr>
<tr>
<td></td>
<td>• extend the range for the sequencing or ordering of number cards both from largest to smallest &amp; smallest to largest</td>
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<tr>
<td></td>
<td>• find the difference between groups of objects where the size of each of the groups is within their verbal sequence limits</td>
</tr>
<tr>
<td></td>
<td>• recognise the commutativity of addition and the non-commutativity of subtraction</td>
</tr>
<tr>
<td></td>
<td>• use the ‘count on’ strategy from the larger or most efficient number.</td>
</tr>
<tr>
<td></td>
<td>• choose between count back, count back to and count on for subtraction depending on the size of the numbers</td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
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<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>• For the previous example a student using the Count Back/Count down strategy may put out 9 counters or may talk about “seeing it my brain” (i.e. visualising either a group of counters or Tens Frame). They usually say the starting number (used to locate themselves) then count backwards keeping track of the number of counts (sometimes with their fingers). In this case students say “9” then “8, 7, 6, 5, 4, 3. The answer is three”. For the Count down to/Count back to strategy the student is determining the difference between two numbers. • Students using this strategy tend to work mentally (or talk about visualising objects). For example for the task 19 - 13 students use counting backwards to count from 19 to 13: 19, 18, 17, 16, 15, 14, 13 while keeping track of the number of numbers counted (in this case 6) • If the student can choose the most appropriate strategy for the task e.g. count back for 17 - 3 or count back to for 17 - 13 they then realise that addition and subtraction are inverse. For example: “I know that 13 take away 11 is 2 because 11 and 2 is 13”.</td>
<td>At this stage the expectation would be that children do not have to count each individual number as they move themselves or their counter but are able to move either backwards or forwards in one jump. For example, play games like Snakes and Ladders, Ludo, and ask: • Who moved further, • Who’s closest to one? 20? • How many do you need to roll to get to…?</td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
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</tr>
</tbody>
</table>
| 4. Basic strategies (doubles, commutativity, adding 10, tens facts, other known facts) | - Tens facts: 5 + 5 9 + 1 8 + 2 7 + 3 6 + 4 1 + 1 2 + 2 3 + 3 4 + 4 5 + 5 10 + 10 4 + 6 3 + 7 2 + 8 1 + 9 6 + 6 7 + 7 8 + 8 9 + | Activities should include tasks such as:  
- How are 6 + 3 and 3 + 6 the same? How are they different? Show me!  
- Doubles: Roll a dice or pick a card and the first student to call out the number that is double the number shown gets a point. First student to gain ... points is the winner!  
- Use 100s grid to add 10. (Does student count by ones or can they add 10 in one jump?)  
- How many ways can you make 10?  
- Two numbers have a difference of one. What might the numbers be?  
- Is 6 - 3 the same as 3 - 6? How do you know? Show me. |
| Given an addition or subtraction problem, strategies such as doubles, commutativity, adding 10, tens facts, and other known facts are evident. | - Tens Facts 4 + 6 3 + 7 2 + 8 1 + 9 6 + 6 7 + 7 8 + 8 9 +  | |
| - Doubles: 6 + 6 7 + 7 8 + 8 9 +  |  |
| - Commutativity 6 + 3 is the same as 3 + 6  |  |
| - Adding 10 without counting by ones.  |  |
| 5. Derived strategies (near doubles, adding 9, build to next ten, fact families, intuitive strategies) | - Near doubles: e.g. Given 7 + 6 I can add 6 + 6 + 1 or I can add 7 + 7 and take one away  
- Add 9: Given 17 + 9 I can add 10 and take one away  
- Build to next ten: to add 16 + 7 I know 7 = 4 + 3 so I add 4 to 16 to make 20 then add the 3  
- Fact families: If I know 3 + 9 = 12 then I also know 9 + 3 = 12 & 12 - 3 = 9 and 12 - 9 = 3  
- Intuitive strategies: Are the strategies students have developed for themselves. Usually different to those taught at school. | Suitable activities for this level can be found in resources such as Number Sense (Alistair McIntosh et al) which are available at most school book suppliers. |
<p>| Given an addition or subtraction problem, strategies such as near doubles, adding 9, build to next ten, fact families and intuitive strategies are evident. |  |  |</p>
<table>
<thead>
<tr>
<th>Growth Points</th>
<th>Incremental steps</th>
<th>Suggested activities or strategies</th>
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</thead>
<tbody>
<tr>
<td>6. Extending and applying addition and subtraction using basic, derived and intuitive strategies</td>
<td></td>
<td>• List all the different strategies that could be used to solve:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>39 + 43 =</td>
</tr>
<tr>
<td></td>
<td></td>
<td>34 + _ = 51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>51 - 27 =</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Record these strategies on blank number lines</td>
</tr>
<tr>
<td>4. Multiplication and Division</td>
<td></td>
<td>Suggested activities</td>
</tr>
<tr>
<td>0. Not Apparent</td>
<td></td>
<td>Students at this level probably need assistance making the groups and then counting them.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students need ongoing practice with counting backwards and forwards by ones and numbers other than one.</td>
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<tr>
<td></td>
<td></td>
<td>• Make two small groups using counters, blocks, shells, farm animals ...</td>
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<tr>
<td></td>
<td></td>
<td>How many altogether?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Draw two small groups (of bees, flowers, frogs, pets, animals ...)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How many altogether?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Make and draw several small groups.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How many altogether?</td>
</tr>
<tr>
<td>1. Counting group items as ones</td>
<td></td>
<td>Students at this level can make and draw the groups and but may need assistance counting them.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Success will depend on their fluency with the verbal sequence. Students need ongoing practice with counting backwards and forwards by ones and numbers other than one.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Make and draw two small groups.</td>
</tr>
</tbody>
</table>

Given a range of tasks (including multi-digit numbers), can solve them mentally, using the appropriate strategies and a clear understanding of key concepts.

List all the different strategies that could be used to solve:

- 39 + 43 =
- 34 + _ = 51
- 51 - 27 =
- Record these strategies on blank number lines

Not yet able to create and count the total of several small groups.

Students at this level can make and draw the groups and but may need assistance counting them. Success will depend on their fluency with the verbal sequence. Students need ongoing practice with counting backwards and forwards by ones and numbers other than one.

- Make and draw two small groups.

Students at this level probably need assistance making the groups and then counting them. Students need ongoing practice with counting backwards and forwards by ones and numbers other than one.

- Make two small groups using counters, blocks, shells, farm animals ...
- How many altogether?
- Draw two small groups (of bees, flowers, frogs, pets, animals ...)
- How many altogether?
- Make and draw several small groups.
- How many altogether?
<table>
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<th>Suggested activities or strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Modelling multiplication and division (all objects perceived)</td>
<td>• Students model all multiplication and division tasks with concrete materials and uses skip counting to determine the total&lt;br&gt;• Students model all multiplication and division tasks with concrete materials and uses known multiplication facts and skip counting to determine the total&lt;br&gt;• Students model all multiplication and division tasks with concrete materials and multiplication facts to determine the total</td>
<td>Students at this level can make and draw the groups and use skip counting to determine the total. Students need ongoing practice with counting backwards and forwards by ones and numbers other than one.&lt;br&gt;• Make and draw groups.&lt;br&gt;How many altogether?&lt;br&gt;Student says something like “3, 6, 9, 12, 15”&lt;br&gt;• Make and draw groups.&lt;br&gt;How many altogether?&lt;br&gt;• Share 12 apples between 4 people.&lt;br&gt;• Share 12 counters between 3 Lego dolls.&lt;br&gt;Make arrays with single coloured counters up to $6 \times 6$&lt;br&gt;Play the Groups Game (1). Teacher calls out (or holds up given number of fingers) and students have to make a group of that size.&lt;br&gt;Play the Groups Game (2). Teacher calls out (or holds up given number of fingers) and students have to make that number of groups.</td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
<td>Suggested activities or strategies</td>
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<tr>
<td>3. Abstracting multiplication and division</td>
<td>• Students model some of the multiplication and division tasks with concrete materials and uses skip counting or multiplication facts to determine the total. E.g. to make 9 groups of 5 the student may place out 9 counters and then touch each of the four counters left as they count by fives: 25, 30, 35, 40, 45.</td>
<td>Students at this level only need part of the task modelled as they can then use other strategies to complete the task. • Make arrays with single coloured counters up to 6 x 6. • Make arrays with single coloured counters up to 10 x 10. • Use rectangular arrays up to 6 x 6. • Use rectangular arrays up to 10 x 10. • Counting grids. • Multiplication Grids (up to 6 x 6). • Multiplication grids (up to 10 x 10). • Play games such as Mulo (2). • Play the Groups Game (1). Teacher calls out (or holds up given number of fingers) and students have to make a group of that size. • Play the Groups Game (2). Teacher calls out (or holds up given number of fingers) and students have to make that number of groups.</td>
</tr>
<tr>
<td></td>
<td>• Students model some of the multiplication and division tasks with concrete materials and uses multiplication facts to determine the total. E.g. to make 9 groups of 5 the student may place out 9 counters and then say I know 9 groups of 5 are 45.</td>
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</tbody>
</table>
|                                                                              | • Students use a variety of strategies to solve multiplication and division tasks.  
  - skip counting to work out 7 groups of 4: 4, 8, 12, 16, 20, 24, 28 (keeps track of the number of counts made)  
  - commutativity: To solve 5 groups of 9 might use 9 groups of 5 because they can count by fives.  
  - Build up from known facts would include things like: to solve 40 x 6 I know 4 x 6 is 24 so I multiply by 10 to get 240 | Students at this level can use a variety of strategies to complete multiplication tasks. At this stage students should be able to make, draw and explain work on multiplication. They probably have automatic recall of their multiplication tables. • Make arrays with single coloured counters up to 10 x 10. • Make arrays with single coloured counters of more than 10 x 10. • Use rectangular arrays of more than 10 x 10. |
<p>| 4. Basic, derived and intuitive strategies for multiplication                |                                                                                   |                                                                                                    |</p>
<table>
<thead>
<tr>
<th>Growth Points</th>
<th>Incremental steps</th>
<th>Suggested activities or strategies</th>
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<tbody>
<tr>
<td>2.5 Growth Points</td>
<td></td>
<td>• Counting grids</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Multiplication grids (up to 10 x 10 and beyond)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Play games such as Multo (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Play the Groups Game (1). Teacher calls out (or holds up given number of fingers) and students have to make a group of that size.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Play the Groups Game (2). Teacher calls out (or holds up given number of fingers) and students have to make that number of groups.</td>
</tr>
<tr>
<td>5. Basic, derived and intuitive strategies for division</td>
<td></td>
<td>Students at this level can use a variety of strategies to complete division tasks. At this stage students should be able to make, draw and explain work on division. They probably have automatic recall of their multiplication tables and use these to solve division tasks.</td>
</tr>
<tr>
<td>Can solve a range of division problems using strategies such as fact families and building up from known facts.</td>
<td></td>
<td>• Make arrays with single coloured counters up to 10 x 10. e.g. How many ... in ...?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Make arrays with single coloured counters of more than 10 x 10 e.g. How many boxes would I need for 108 eggs if there are 12 eggs in a box?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use rectangular arrays of more than 10 x 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Counting grids (up to 200)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Multiplication grids (up to 10 x 10 and beyond)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Play games such as Multo (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Play the Groups Game (1). Teacher calls out (or holds up given number of fingers) and students have to make a group of that size.</td>
</tr>
<tr>
<td>Growth Points</td>
<td>Incremental steps</td>
<td>Suggested activities or strategies</td>
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</tr>
<tr>
<td>6. Extending and applying multiplication and division</td>
<td>Can solve a range of multiplication and division problems (including multi-digit numbers) in practical contexts.</td>
<td>• Play the Groups Game (2). Teacher calls out (or holds up given number of fingers) and students have to make that number of groups. Suitable activities for this level can be found in resources such as Number Sense (Alistair McIntosh et al) which are available at most school book suppliers.</td>
</tr>
</tbody>
</table>
The WOWW intervention program is a combined, Direct Instruction and Strategy Instruction, approach. This is consistent with the findings of the Literature Review that identified effective practices for teaching students with learning difficulties in years 4, 5 and 6.

It comprises Numeracy Intervention, Reading Intervention and Spelling Intervention programs.

The WOWW Numeracy Intervention program

(Kerry-Anne Hoad, ACER)

Direct Instruction
Component of the Numeracy Intervention program

The Direct Instruction component of WOWW Numeracy Intervention program was provided by an Australian-designed numeracy program that has been successfully trialled over a period of more than five years (Farkota 2003a). It is a comprehensive numeracy program that covers 20 different strands of numeracy knowledge (Farkota 2003b).

The program covers:
Addition
Subtraction
Multiplication
Division
Number patterns
Equations and inverse operations
Whole number properties
Fractions
Decimals
Measurement
Space
Geometry
Average, percentage, ratio, chance
Numeracy language
Money
Time
Algebra
Visual perception
Data analysis, and
Problem solving.

Each pre-scripted lesson contains a question on each of these strands and is designed around the Australian National Mathematics Curriculum Profile. The program content is ideal for upper primary and lower secondary. An adapted version of the program will be developed specifically for the WOWW Numeracy Intervention program to ensure content suitability for grade 4.

The lessons start at base level and develop greater complexity as students
move through the lessons. The initial lessons assume nothing in terms of student academic level and are able to accommodate a very broad range of student abilities within the Grade 4, 5 and 6 classroom. All students’ skills are elevated, through this program, regardless of their initial skills and knowledge. It can be delivered in a whole class format and so is ideal for students for whom withdrawal from the classroom is not desirable.

The program is designed for daily lessons of 15-20 minutes with an additional 5-10 minutes for instant feedback, diagnosis and correction procedures.

Timetabling decisions will be made at the discretion of the school and with consideration to other school management issues. In many schools this program is implemented in the first period each day, for example, 9.00-9.30. It often serves the dual purpose of a focused numeracy session as well as a structured settling period.

All lessons are pre-scripted and the program has been developed in such a way that teachers, regardless of their level of numerical expertise, will find it easy to implement.

The program is ideally suited to students with learning difficulties as:

- it does not require withdrawal from the classroom;
- it allows all students to work on the same material simultaneously which supports group identification and a sense of inclusiveness;
- it is delivered at a brisk pace to reduce opportunities for ‘off task’ behaviour;
- it provides immediate feedback and correction;
- it provides optimum success opportunities;
- it is provided in a controlled environment where distractions are eliminated or minimised;
- it is presented both orally and visually;
- it encourages students to focus and to extend their attending behaviour; and
- it increases students’ self-efficacy and motivation to learn.

Specific training in Direct Instruction techniques are required to implement this program effectively.
Strategy Instruction Component of the Numeracy Intervention program

The Strategy Instruction component of the WOWW Numeracy Intervention program is centred on the specific student’s needs. The student’s knowledge, skills and existing strategies will be the guide for the selection of new strategies to be taught. The teacher will work out what strategies are needed and how they will be introduced, taught and reinforced.

The selection, or design, of numeracy learning strategies for each student will be guided by:

- student assessment results which determine the student’s current skill and knowledge level;
- the teacher’s understanding of the process of acquiring numeracy skills (Chapter 2) and consequently where errors are occurring and what teaching steps are required;
- the teacher’s observations of how the student learns (Chapter 2) and consequently how best to present learning materials;
- the teacher’s knowledge of available learning strategies (Appendix 2); and
- the teacher’s knowledge of how to teach the learning strategy (Chapter 2).

The Elementary Maths Mastery program is succinct and complements rather than replaces the teacher’s regular numeracy program. This allows the Strategy Instruction to be conducted in the context of the teacher’s regular numeracy program. Often this regular numeracy program follows on immediately after the Elementary Maths Mastery program but this is not a requirement and the regular numeracy program may be timetabled for a different period during the day.

The numeracy learning strategies selected, or designed, for the student with learning difficulties may also be judged as useful for other students and could therefore be incorporated into whole class or small group numeracy work. To support generalisation of the numeracy learning strategy it is useful to find opportunities for practice and reinforcement across other curriculum areas where numeracy knowledge is required.
Learning strategies can be taught auditorily/orally as well as visually, using auditory/oral supports such as rhythms and rhymes or visual supports such as classroom posters and pictures.

The Literature Review identified two strategies that have been found to be effective for students with learning difficulties - **advance organisation** and **explicit practice**:

Advance organisers provide students with a mental scaffold with which to build understanding of information. Thus, providing statements about the content to be learned provides a structure to students for new information, and for relating this new information to information they already possess.

Explicit practice focuses on activities that relate to distributed review and practice, repeated practice, sequenced reviews, daily feedback, and/or weekly reviews. In terms of explicit practice, there is strong evidence to suggest that distributed practice is more effective for retention than the intensive practice of newly-learned information that often occurs in the early stages of learning (for example, Dempster, 1987).

It is recommended that these two strategies be incorporated into the strategy instruction component of this intervention program to complement the cognitive strategies selected.
The Direct Instruction component of the Reading Intervention program

The Direct Instruction component of the WOWW Reading Intervention program will be provided by a corrective reading program whose effectiveness with students with learning difficulties has been well evidenced in both Australian and international research studies.

Corrective Reading (Englemann, Meyer, Carnine, Becker, Eisele & Johnson 2001) covers both decoding and comprehension programs, each with its own student book, student workbook, teacher’s guide and teacher’s presentation book. Since the students in this intervention program have experienced persistent difficulties with reading over five years or more the decoding strand of the Corrective Reading program has been selected for trial. With familiarity with this program and knowledge of their students and their particular environment, teachers may choose to trial the comprehension strand after the completion of this trial intervention program.

The decoding strand consists of four programs each of which can be used independently of the others. The four programs are:
- Decoding A
- Decoding B1
- Decoding B2
- Decoding C

Each program is a core program and contains all the materials teachers need and provides students with all the practices they need to learn skills. Each decoding program consists of 65 pre-scripted lessons and so can be covered in around 17 weeks - under two terms in most States.

Lessons are designed to be delivered in small groups of students at the same level or one a one-to-one basis. Paired reading is a feature of this program so a small group would ideally consist of an even number of students. Where the instruction is on a one-to-one basis the teacher can act as a student’s partner.

The Corrective Reading group can be taught in the classroom while other small groups are working on team projects if necessary. However, since reading aloud and listening are important elements of
the program a quiet environment free from distractions is preferable. It may therefore, be necessary to withdraw the students to work together in their small group. Withdrawal times must be carefully considered to ensure that it is not a de facto punishment due to students missing out on a favourite class. Withdrawal time can be enjoyable for the students as the group forms into a cohesive social group who experience success together.

The lessons will take around 40-50 minutes and are recommended to be taught five times a week. If lesson frequency falls to three sessions a week the rate of progress will be affected and students may not have a chance to ‘catch up’ as effectively as they would with daily lessons.

In some circumstances the school and family work in partnership with the school providing one or two sessions per week and the family providing two or three sessions per week at home.

It is very important to the success of this program that teachers follow the script and the instructions **consistently and unerringly**. As it is a prescribed program and recalling and mastering all the elements can be difficult, it is recommended that teachers work together with colleagues in the school, or parents in partnership, to provide peer support as they move towards mastery. If there are two or more teachers or instructors learning how to implement the Corrective Reading program it is very useful to work together to remind and rehearse the strategies used such as the signalling and the wording. If there is only one teacher learning and implementing the Corrective Reading program she may need to enlist the support of a colleague within the school to observe and support her mastery of the instruction method. To facilitate this collegiate support as teachers move towards mastery of the Corrective Reading implementation, a Teacher Skill Form has been provided in Appendix 3. It is recommended that teachers observe their colleague implementing the program and provide feedback as they move towards mastery of the program.

Poor ‘treatment fidelity’ can seriously undermine the success of the program. ‘Treatment fidelity’ refers to the accuracy and consistency with which the program is implemented.
Timetabling is at the discretion of the classroom teacher but it is recommended that the Corrective Reading program be implemented at a regular time each day. A time when students are reasonably fresh and able to concentrate is desirable. Corrective Reading has often been scheduled during the first period after morning recess.

To place the student in the most appropriate strand of the Corrective Reading Program students complete a brief decoding placement test before commencing the program. Students with learning difficulties in years 4, 5 and 6 are often found to be at the level of Decoding B1. However, some students may place at Decoding A or Decoding B2.

Decoding A is appropriate for students from grade 3 upwards who virtually lack any decoding skills. These students may recognise a few words but functionally they are non-readers. They read so haltingly that they cannot understand what they read. Decoding A teaches word attack skills such as phonemic awareness, sound-symbol identification, sounding out, regular and irregular words and sentence reading.

Decoding B1 is appropriate for students from grade 3 upwards who do not read at an adequate rate and confuse words. These students guess at words and have trouble with words such as what, that, a, and the when these words appear in a sentence. Decoding B1 teaches decoding strategies such as letter and word discrimination, sound and letter combinations, word endings, story reading, literal and inferential comprehension.

Decoding B2 is appropriate for students in grade 4 upwards who have some decoding problems, who do not read at an adequate rate, who still tend to confuse words with similar spellings, and who tend to make word-guessing mistakes. Decoding B2 teaches similar skills as Decoding B1 but at a more advanced level.

The program is ideally suited to students with learning difficulties as:
- it provides for small group work where group learning as well as individual learning is emphasised;
- it can be delivered to a group of students at a similar level who can progress together and where individual differences are within a narrow range;
it can be delivered to an individual student in a one-to-one format;

it is delivered at a brisk pace to reduce opportunities for ‘off task’ behaviour;

it provides immediate feedback and correction;

it provides optimum success opportunities;

it is provided in a controlled environment where distractions are eliminated or minimised;

it is presented both orally and visually; and

it increases students’ self efficacy and motivation to learn.

Specific training in Direct Instruction techniques is required to implement this program effectively.
The Strategy Instruction component of the WOWW Reading Intervention program is centred on the specific student’s needs. The student’s knowledge, skills and existing strategies will be the guide for the selection of new strategies to be taught. The teacher will work out what strategies are needed and how they will be introduced, taught and reinforced.

The Strategy Instruction component of the WOWW Reading Intervention program will rely on:

- student assessment results which determine the student’s current skill and knowledge level;
- the teacher’s understanding of the process of acquiring reading skills (Chapter 2) and consequently where errors are occurring and what the next step for the student is;
- the teacher’s observations of how the student learns (Chapter 2) and consequently how best to present learning materials;
- the teacher’s knowledge of a range of learning strategies available (Appendix 2); and
- the teacher’s knowledge of how to teach the learning strategy (Chapter 2).

The Corrective Reading program takes 40-50 minutes at least four times a week. When possible it is recommended that the classroom teacher conduct the Corrective Reading program as it provides her with an ideal opportunity to observe the student’s approach to reading and the skills that he demonstrates. This knowledge is very useful to the selection or design of appropriate learning strategies. However, the lessons may be delivered by parents at home to support the school program. Teachers and parents can work in partnership to deliver the Corrective Reading Program and also to consider appropriate learning strategies for the student.

The selected learning strategies could be introduced to the student, and the whole intervention group, at the end of the Corrective Reading lesson. Alternatively, the teacher could use a separate session or classroom time to introduce the learning strategy to the intervention group, allowing adequate time for explanation, modelling and
opportunities for practice. These strategies can be practiced and reinforced during the many opportunities for reading that occur across all curriculum areas. Learning strategies are required at strategic moments in the student’s learning. These moments are not restricted to a particular subject area or period on the timetable. Generalised use is an important aspect of reinforcing the strategy and developing the student as an independent learner.
The Direct Instruction component of the Spelling Intervention program

The Direct Instruction component of the WOWW Spelling Intervention program will be provided by the Dixon and Engelmann (1999) Spelling Mastery program.

This is a strategy based Direct Instruction program and utilises three key strategic approaches to the teaching of spelling – the phonemic, the whole word and the morphemic approaches. The combination of these three key approaches is designed to maximise the benefits and balance the limitations of each approach. For upper primary school each of these three approaches is taught concurrently and review of prior learning is built in throughout the program.

Spelling Mastery is a program organised over six levels and is suitable for students from Grade 1 – 6. The progression through the Spelling Mastery program from level A to Level F begins with an emphasis on the sound-symbol strategy of the phonemic approach then combines with the whole word approach to teach high-frequency irregularly spelled words and moves towards an emphasis on morphemic strategies of building words through the combination of prefixes, suffixes, word bases and non-word bases.

The Spelling Mastery program recommends that students are placed at the appropriate level commensurate with their skills as assessed by a Placement Test which is included in the Teacher Presentation Book. “An ideal of mastery instruction is to place students at their appropriate skill levels, which may not correspond to their grade levels.” (Dixon & Englemann, 1999). While this is a recommendation of the program it is also recognised that within existing class structures this is sometimes impractical and that the Placement Test can serve as a guide to class groupings. Spelling Mastery has been implemented very successfully with small homogenous groups as well as with whole class groupings where the level (A – F) has been determined by the majority rule.

Spelling Mastery lessons are designed to be taught daily with lessons taking approximately 20 minutes. For upper
primary school the Spelling Mastery program consists of 120 lessons. Level A, designed for Grade 1, has 60 lessons.

Lessons are delivered by the teacher according to the script in the Teacher Presentation Book and supported by exercises in the Student Workbook. The scripts are designed to keep the instructional language consistent and the presentation of material faultless.

Student responses can be delivered by the whole class, part of the class or by individuals in whatever way supports the teacher to gain the most effective diagnostic information on student skill level. It is suggested that during whole group responses teachers move through the class to listen to individual student’s responses. The Spelling Mastery program recommends the use of signals to prompt the whole group response. Signals may include a pen tap, a click, an expectant pause or whatever strategy teachers choose to indicate to students that a group response is required.

Corrections are an important element of Spelling Mastery as they provide not only immediate feedback for students but also a correct model for future performance. Whole group corrections are designed to provide immediate corrective feedback for those students who need it as well as pre-correction for some students and reinforcement for others. A method for corrections that is based on the teacher’s understanding of the degree of difficulty for the students is outlined in the Teacher Presentation Book.

The key features of the delivery of the Spelling Mastery program are:

- Grouping – the Placement Test provides an indication of the appropriate level that will match the students’ entry skills;
- Script – the teacher presentation book provides the teacher script for each lesson;
- Pace – this needs to be fast but not rushed;
- Success Criterion – 100% success is required for each student at the end of each lesson to ensure success with later exercises;
- Formative assessment – this is achieved through listening to student daily responses, noting students’ points if using a point system and reviewing students’ results from the test at the end of each 5 week cycle;
Correction strategies – these need to be immediate, addressed to the whole class and, based on difficulty of the task, may involve a delayed test strategy;

Signals – these need to indicate a requirement for a group response but the type of signal can be determined by the teacher;

Student Motivation – this relies on teacher attitude and interaction but can be supported by a point system or other student focussed motivators.

This program is ideally suited to students with learning difficulties as well as other students as:

- it does not require withdrawal from the classroom;
- it allows students to work on the same material simultaneously which supports group identification and a sense of inclusiveness;
- it is delivered at a crisp pace to reduce opportunities for “off task” behaviours;
- it provides immediate feedback and correction;
- it provides optimum success opportunities;
- it is provided in a controlled environment where distractions are eliminated or minimised;
- it is presented both orally and visually;
- it encourages students to focus and to extend their attending behaviours; and
- it increases students’ self efficacy and motivation to learn.
Strategy Instruction Component of the Spelling Intervention Program

The Strategy Instruction component of the WOWW Spelling Intervention program is centered on supporting the individual student to learn, use, recall and evaluate strategies to help them to spell in any context.

Strategy Instruction relies on teacher knowledge of the student, teacher knowledge of the content to be taught and the teacher knowledge of a range of strategies that might support students to learn. While specific learning strategies may be found in a number of prescribed programs, successful Strategy Instruction occurs when teachers are able to select and teach strategies that respond to their students’ learning needs.

The goal of Strategy Instruction is to develop independent learners who have strategies to support them to approach the learning of content in a variety of contexts. Strategies are processes, rules or techniques to unlock content for learners.

Strategy Instruction is generally considered to incorporate three key elements:
Self Regulatory Strategies
Metacognitive Strategies, and
Cognitive Strategies.

Self regulatory strategies support students to manage their own learning, developing independent learning skills through preparing themselves emotionally, physically and motivationally to approach a learning task. Self regulatory strategies include students setting the environment to support their learning, choosing a physical space to do their homework or their reading that supports their learning style, providing their own motivation to learn “If I get five right then I can watch TV/ go outside and play/ show the teacher....”

Initially students will require guidance to understand what works best to support their learning, to feel motivated to approach and to persist with a learning task and to develop a positive sense of themselves as successful learner.
Metacognitive strategies support students to select an appropriate strategy, plan how to use it, implement it and evaluate its effectiveness and make changes as necessary to facilitate successful outcomes. Metacognitive strategies also include students recognising when a task is too hard and the application of a strategy may be called for as well as setting targets for their learning and reviewing external and personal feedback.

Cognitive strategies support students to manage the process of learning specific content. Spelling abounds with rules, conventions and exceptions. To learn spelling students must have a strategic approach to learning and remembering the rules, conventions and exceptions. Spelling instruction therefore also abounds with cognitive strategies to learn these rules, conventions and exceptions. Such strategies include:

Word lists,
Daily spelling drill,
Spelling lists for practise at home,
Look Say Cover Spell Check,
Writing practice,
Breaking words up into spellable chunks,

Mnemonics (PIECE of PIE, there is an ACHE in TEACHER, tell that MISQUITO to QUIT biting me),
Dictionary skills,
Finding words within words (FOOTBALL, foot, all, ball),
Ask a friend,
Visualise the word,
Guess and check,
Rhyming sets (bough, plough),
Sound symbol recognition,
Developing a sight vocabulary of frequently used words.

The plethora of strategic approaches to spelling is an indication of two things:
1. There has not been one ‘standout’ approach that works consistently with all students, and
2. Students are different and may require different strategies to acquire and retain spelling skills.

The Spelling Mastery Direct Instruction program adopts three specific strategies to teach spelling:

• the sound-symbol strategy of the phonemic approach,
• the whole word strategy to teach high-frequency irregularly spelled words, and
• the morphemic strategy of building words through the combination of meaningful prefixes, suffixes, and affixes.

Strategy Instruction and Direct Instruction both utilise an explicit approach to teaching. While Direct Instruction generally focuses on the teaching of content and Strategy Instruction generally focuses on the teaching of processes and techniques to approach learning, there are similarities in the teaching techniques.

In both Direct Instruction and Strategy Instruction the teaching approach includes:
• Explicit description of what is to be taught;
• Step-by-step teaching;
• Teacher modelling; and
• Guided practice and feedback.

To complement this teaching approach utilised in the WOWW Direct Instruction component of the Spelling Intervention program, the WOWW Strategy Instruction component of the Spelling Intervention Program will focus on the following key elements of the Strategy Instruction approach.

1. A consideration of individual student’s learning needs;
2. Generalisation of the strategy across curriculum areas; and
3. Supported shift of control from the teacher to the student for self regulation, planning, implementing and evaluating specific strategies.

1. **A consideration of individual student learning needs:**

The Strategy Instruction approach begins with individual student’s needs. Strategies are designed to support a student to approach a learning task and to successfully complete it. The selection of the appropriate strategy is a response to the individual’s learning needs.

The level of teacher support will also vary according to the needs of the student. Some students may need greater support to self regulate their learning – to monitor their physical learning environment, their emotional state or their motivational state. Some students will need greater support to think about their learning – to recognise when a strategy is needed, to plan their choice of strategies and to evaluate the effectiveness of their choice. Some
students may need strategies to be presented in different ways – with an emphasis on visual or auditory cues, for example, or with an emphasis on chunking information.

The teacher’s knowledge of her students will guide the support and strategies she provides for individual students to manage their physical and emotional environment as well as plan, use and evaluate strategy use.

2. Generalisation of the strategy across curriculum areas
Spelling, reading and writing are inescapably linked. Spelling is a system of encoding meaning through writing and reading is a system of decoding meaning. Both the encoding and decoding of meaning is made difficult by the abundance of rules in spelling and the multitude of exceptions.

To write and read successfully students need to learn and recall not only the rules but the many exceptions.

The strategies taught to students to assist this can be practiced in all reading and writing exercises across the curriculum. This will provide for rich and varied opportunities for explicit practice and distributed review and, practice of the strategies across different contexts. It will also support students to develop metacognitive strategies as they need to plan when they might need to use a particular strategy and how they might use it in a particular situation.

3. Supported shift of control from the teacher to the student for self regulation, planning, implementing and evaluating specific strategies.
Since the ultimate goal of all Strategy Instruction programs is to develop independent learners the use of support materials that can be accessed independently by students is important. After the initial teaching of a strategy, the teacher provides opportunities for independent distributed practice through cross curricula reading and writing activities and the provision of readily accessible support materials.

Support materials such as Rules and Exceptions posters, or Spelling Demons posters, on classroom walls can be used to support students to recall previous learning and to select the appropriate strategy for the situation. The use of ‘Jogger cards’ – hand held cards - to
jog student’s memories of rules and exceptions also supports independent selection, use and evaluation of strategies.

The Strategy Instruction component of the WOWW Spelling Intervention program is designed to reinforce, extend and complement the spelling strategies taught in the Direct Instruction component via the Spelling Mastery program.
The Direct Instruction component of this intervention program is a pre-scripted and fully developed program that requires the teacher to implement it faithfully and monitor outcomes. It is a teacher-driven and content-centred model.

The Strategy Instruction component of this intervention program is dependent on teacher knowledge and skills to work out what strategies to teach and how to teach them. It provides flexibility for the exercise of teacher judgment and teacher expertise. It is a teacher-driven and student-centred model.

The Purdie and Ellis Literature Review (2005) found that these two models, in combination, offer the most powerful and positive outcomes for students.

Working Out What Works allows teachers to trial these models and to discover what works best for their students in their context.

The process of Working Out What Works will continue for teachers each time they encounter students with learning difficulties and the training and resources provided by this program should have enduring effects on teacher expertise, teacher practice and student outcomes.

“Teachers will be able to draw on actual and supported experience with these approaches to work out what works for their existing and future students.”
The Australian Council for Educational Research (ACER), has developed this present teacher professional learning WOWW Manual with funding support from the Australian Government Department of Education, Science and Training (DEST). A brief description of the national Project in which the first edition of the WOWW program was used, together with key findings, are of interest to all stakeholders throughout the educational community.

The ‘Third Wave’ Project – a brief description

Beginning in June 2004, the purpose of this Project was to conduct research aimed at improving the literacy and numeracy outcomes of students with learning difficulties who are in Years 4, 5 and 6 in mainstream government, Catholic and independent schools. That is, the Project was primarily designed to identify, implement and evaluate school-based, ‘third wave’ intervention programs and teaching strategies that are demonstrably effective in improving the literacy and numeracy learning of students with learning difficulties. The Project design and methodology consisted of three parts, each of which occurred in parallel to ensure mutual support:

- Part 1: Literature review, and identification of participating government, Catholic and independent schools, and clusters;
- Part 2: Development and administration of data gathering tools, including diagnostic/developmental assessments of student achievement progress in Reading and Numeracy (calibrated against National Benchmark standards for these domains), based on the principles of objective measurement (see Masters, 2004).
- Part 3: Development, implementation, and evaluation of effective evidence-based ‘third-wave’ intervention strategies and related professional development programs that are demonstrably effective in supporting school-based interventions for students with learning difficulties. Evaluation methods also included qualitative Case Study visits to selected schools undertaken during March 2006.
The literature review of the available evidence-based research literature was conducted by ACER researchers Drs Nola Purdie and Louise Ellis (Purdie & Ellis, 2005), from which the first edition of the WOWW Manual was produced (i.e., Hoad, Munro et al., 2005). The review clearly identified two major strategies that consistently indicate larger positive effects on students’ learning and achievement progress than are obtained from any other strategies alone or in combination (i.e., Direct Instruction and Strategy Instruction). Specific emphasis on these teaching strategies was deemed important on three counts: (a) their ‘effectiveness’ as teaching methods are firmly grounded in findings from evidence-based research, (b) they are largely unknown to teachers (apart from those familiar with the relevant published research), and (c) with few exceptions, current in-service teacher PD programs in these strategies are not provided by State/Territory education jurisdictions, nor by most Australian higher education providers of teacher education.

The project evaluation and data-gathering methodology was based on a pre-test/post-test design among a sample of 56 participating schools: 35 intervention schools and 21 reference schools, with 694 students in the numeracy component and 653 in the reading component – across Years 4, 5, and 6 (or Years 5, 6 & 7 for QLD, SA and WA schools). Intervention schools included those whose teachers were provided with professional development (PD) in effective, evidence-based strategies for ‘third wave’ students with learning difficulties in Reading and Numeracy during February/March 2005. For comparative purposes, teachers from participating reference schools did not receive this PD during February/March 2005, but were provided with the same PD during May 2006.

In each of the State capital cities: Adelaide, Brisbane, Hobart, Melbourne, Perth and Sydney, the whole-day PD provided to intervention school participants during February/March 2005 included training in Direct Instruction (DI) and Strategy Instruction (SI). The DI PD was supported by a specially prepared DVD demonstrating delivery of lessons using Elementary Math Mastery (Farkota, 2003b) and Corrective Reading (SRA, 2002). In addition to the specific training provided in these teaching methods, training was provided in
Strategy Instruction, How Children Best Learn, and in Auditory Processing (Rowe, Pollard & Rowe, 2005, 2006; Victoria 2001). The training was supplemented by a comprehensive package of related teaching manuals and support materials for use in mainstream classrooms.

Pre-test/post-test data from students in both intervention and reference schools were collected in March 2005 and again in September 2005. In addition to the collection of repeated measures of students’ achievements in Reading and Numeracy, repeated measures of students’ externalizing behaviours were obtained for three domains: Sociable, Attentive and Settled, from teacher-ratings on the Rowe Behavioral Rating Inventories 12-Item Teacher Form (Rowe & Rowe, 1997, 1999). Repeated measures of students’ experiences and attitudes towards school were also collected for three domains: Enjoyment, perceived Curriculum Usefulness and Teacher Responsiveness – employed in earlier longitudinal studies (e.g., Rowe, 1997; Rowe & Hill, 1998). Data analyses and statistical modelling of have taken into account the measurement, distributional and structural properties of the data. The results of key findings are summarised in 4.2.

1 The DEST contract for the Project has been jointly directed by Ken Rowe (an ACER Research Director) and Andrew Stephanou (an ACER Senior Research Fellow), and managed by Kerry-Anne Hoad (Manager of ACER’s Centre for Professional Learning). The final report from the Project is available (see: Rowe, Stephanou & Hoad, 2007).

2 For the purposes of this Project, the ‘target group’ refers to students with learning difficulties located in mainstream schools in Years 4, 5 and 6 (or equivalent years) who do not meet national literacy and/or numeracy benchmark standards. Note that ‘first-wave’ teaching refers to regular classroom instruction, ‘second-wave’ refers to initial intervention for students experiencing learning difficulties, and ‘third-wave’ refers to intervention strategies for students continuing to under-achieve and/or experience learning difficulties during the middle years of schooling.


4 For recent expositions of Strategy Instruction, its practical applications and supporting research evidence, see: Ellis (2005, pp. 33-43); Purdie and Ellis (2005, pp. 28-31).

5 It is interesting to note that Recommendation 5 from the report of the parliamentary Enquiry Into the Education of Boys (Commonwealth of Australia, 2002, pp 107) reads:

The Committee recommends that:
(a) all State and Territory health authorities ensure that kindergarten children are fully tested for hearing and sight problems; and
(b) the Commonwealth and State and Territory governments jointly fund the implementation of the strategies used in the Victorian study on auditory processing in primary schools throughout Australia. Implementation should include:
• professional development for all primary school teachers to raise awareness about the normal development of auditory processing in children;
• the provision of the relevant auditory screening tests and training to equip teachers to administer preliminary tests with referral to specialised support where needed; and
• professional development for teachers in practical classroom management and teaching strategies to address the needs of children with auditory processing difficulties.
Key Findings from the Student Data

(Dr. Ken Rowe, ACER)

Student achievement growth

Following are key findings arising from the analyses of students’ achievements in the March and September 2005 assessments of Reading and Numeracy, derived from fitting multivariate analysis of variance (MANOVA) models to the obtained data, using STATISTICA (StatSoft, 2005) – as summarised in Figures 4.1 to 4.4 and in Figure 4.5 presented below.

From Figures 4.1 and 4.2, the findings indicate that in March 2005 there were no significant differences between intervention and reference school students’ average Reading and Numeracy achievements, at each of the target Year levels. However, the findings summarised in Figures 4.3 and 4.4 indicate that in September 2005 there were significant improvements in the achievements of students in intervention schools compared with those in reference schools (adjusted for their measured achievements in March 2005).

These summaries provide graphical plots of the adjusted mean-point estimates of students’ measured achievements (in intervention and reference schools) on the constructed Reading and Numeracy scales, bounded by 95% confidence
**4.2**

**Figure 4.2** Plot of mean-point estimates bounded by 95% confidence intervals for students’ Numeracy achievements in March 2005: Intervention and Reference schools

**Intervention effect:** $F(1, 648) = 17.619, \quad p = 0.00003$

(Adjusted for March 2005 Reading Score)

Vertical bars denote 95% confidence intervals

**Figure 4.3** Plot of mean-point estimates bounded by 95% confidence intervals for students’ Reading scores in September 2005, adjusted for their March 2005 scores: Intervention and Reference schools
differences between intervention and reference school students’ average Reading and Numeracy achievements, at each of the target Year levels. However, the findings summarised in Figures 4.3 and 4.4 indicate that in September 2005 there were significant improvements in the achievements of students in intervention schools compared with those in reference schools (adjusted for their March 2005 scores). The findings indicate that (on average), the professional learning, plus its implementation and support provided to intervention school teachers during and subsequent to the 2005 State Training Days, had significant positive effects on learning difficulties students’ achievement.

Initial analyses of the data indicated that in March 2005 there were no significant differences between intervention and reference school students’ average Numeracy in September 2005, adjusted for their March 2005 scores: Intervention and Reference schools.

4.2

Figure 4.4 Plot of mean-point estimates bounded by 95% confidence intervals for students’ Numeracy in September 2005, adjusted for their March 2005 scores: Intervention and Reference schools.
progress in *Reading* and *Numeracy*. Given the short duration between the March and September 2005 assessment periods (i.e., ~ 6 months), this result is remarkable.

**Student behaviour**

In addition to students’ achievement progress in *Reading* and *Numeracy*, three measures of their ‘behaviours in the classroom’ were obtained at the March and September 2005 data-collection stages. The three behaviour scales are: *Antisocial–Sociable; Inattentive–Attentive;* and *Restless–Settled*. For specific details of the item content of and related measurement properties of these domains, see Rowe and Rowe (1999). Figure 4.5 provides a summary of the findings from fitting a multivariate model to the computed behaviour scale score data.

These findings indicate that the behaviours of students in *intervention* schools were significantly more positive compared with the behaviours of students in *reference* schools, especially their *attentive* behaviours in the classroom. Again, given the short duration between the March and September 2005 assessment periods (i.e., ~ 6 months), these results have been particularly encouraging.

Of particular interest from Figure 4.5 are the findings that the behaviours of students in the *intervention* schools improved between March and September 2005, whereas the behaviours of students in the *reference* schools deteriorated – albeit not significantly since the respective confidence intervals overlap. Such findings, however, are consistent with those derived from a large body of both quantitative and qualitative research which indicate a strong overlap between students’ academic underachievement and their externalizing behaviour problems (e.g., Cantwell & Baker, 1991; De Watt et al., 2004; Hinshaw, 1992; Purdie, Hattie & Carroll, 2002; Rowe, 1991; Rowe & Rowe, 1992, 1999, 2000, 2002; Sanson et al., 1996; Smart et al., 2005). That is, the evidence indicates that repeated underachievement by students (especially in literacy) is strongly related to increasing disengagement at school, low self-esteem, as well as disruptive and dysfunctional externalizing behaviours at school.
In brief, the findings summarised in Figures 4.3, 4.4 and 4.5 indicate that (on average), the professional learning (together with its implementation and support) provided to intervention school teachers during and subsequent to the 2005 State Training Days had significant positive effects on learning difficulties students’ achievement progress in Reading and Numeracy, as well as on their behaviours in the classroom. Moreover, these findings were consistent with the qualitative information obtained from Case Study visits to schools (see 4.3).

![Figure 4.5](image.png)

**Figure 4.5** Plot of mean-point estimates bounded by 95% confidence intervals for students’ behaviour scale scores in September 2005, adjusted for their March 2005 scores: Intervention and Reference schools.
Using systematic Observation and Interview Schedules, Case Study visits to schools were undertaken during March 2006. The selection of schools (including their teachers and students) for these visits, were based on findings arising from analyses of the two data collection phases during 2005. That is, the Case Studies focused on those students (within teachers and schools) whose measured learning achievements had progressed ‘better-than-expected’ (or ‘worse-than-expected’), given their initial achievements, attitudes, behaviours and ‘intake/background’ characteristics, and to estimate the effects of being in an intervention school (compared with being in a reference school) on students’ achievement progress in Reading and Numeracy. These analyses were undertaken by fitting multilevel, ‘value-added’ models to the relevant data using MLwiN (Rasbash et al., 2005).

This rigorous, empirical approach to the selection of students within teachers and schools for Case Study visits was adopted to minimise the risk of selecting locations of ‘effective practice’ based on mere anecdotal reports in the absence of empirical justification for their selection. A brief summary of findings is given below.

**Teacher interviews.** Typical of the responses provided by teachers were:

*The State Training have been VERY helpful, especially the information about auditory processing. So was the training with Elementary Maths Mastery, Corrective Reading and Strategy Instruction. The WOWW manual has been great for all teachers at our school because the practical teaching strategies in it DO WORK. I only wish this kind of training had been given during my teacher education at university. Also, it’s a pity that this PD training is not provided by the Education Department, because ALL teachers need it.*

We are very grateful for being able to participate in this project. In only one year, it has turned around our entire school. The teachers are very pleased about the progress we see in all children, not just those with learning difficulties. About 50% of the children at this school come from indigenous backgrounds, and we’ve seen major improvements in their: *Attendance – attendance has improved a lot!*
• **Listening skills** – all children seem to be better listeners because teachers are a lot more aware of the need to slow down their instructions, ‘chunk’ the information and wait for children to respond;

• **Engagement** – children are better behaved in the classroom and seem to enjoy the structured lessons and debugging challenges of EMM (Elementary Math Mastery);

• **Learning progress** – we’ve seen major improvements in children’s learning progress in all areas, especially in numeracy.

**Following are the comments of a Deputy Principal:**

*As a school we are very appreciative of the opportunity to participate in your ‘Third Wave’ research project which also provides additional resources to staff and students. We believe our students have shown significant improvements due to the whole-school support approach and the Professional Learning the staff have been able to access. The program is purposefully linked to meet students at the point of need through planning and data analysis as well as the recognition of their social and emotional needs.*

**Below are the comments of another Deputy Principal:**

*Thank you for the follow-up information at the recent State Training Day.*

**What Worked.** Overall, children’s reading and numeracy levels have progressed dramatically. We had some students in Grades 5 & 6 who had been negative and reluctant readers. It was a thrill for us (and especially for the students) to witness them take part in a reading segment as part of our whole school assembly at the end of 2005. This would not have happened in Term One. Another student in Grade 4 who was ‘benchmark level’ in Grade 3, is now only about a year behind the average. She loves reading and reads often. She’ll get there in her own time with our continued support. She has increased confidence, and her work in spelling and writing has also improved.

**Why we are Continuing.** The children who were selected for this program are the children who concern teachers year after year. Other strategies have not worked for them and they have had many teachers try. In our school, many of these students have come to our school from elsewhere, or they might have other ‘baggage’ from home. This ‘Third Wave’ program offers great support. The program is predictable, regular and has
its built-in rewards where the children can see their progress. The stories are written so that children want to find out what happens in the next instalment. The research findings have supported what we are doing, and the results are evident. We are committed to continuing with the program.

**Student interviews.** Following is a brief summary of typical responses arising from the interviews with participating students:

‘I understand what the teacher is saying and I know what I need to do. I feel secure’ (Year 5 boy, under treatment for ADHD);

‘I used to hate school, but now it’s fun. I can read and do maths. I’m learning heaps’ (Year 6 Indigenous boy);

‘...feel...so...much...better...about...my...self’ (Year 5 girl from a very low SES family);

‘I came from another school where the teachers didn’t know how to teach, but the teachers at this school DO know how to teach. I love reading and maths is fun’ (Year 6 Lebanese girl).
The comments and strategies in this chapter have come directly from teachers involved in the implementation of the national ‘Third Wave’ intervention Project. They are representative of the range and content of trials, tips and triumphs reported by teachers via:

- the electronic Bulletin Board which was setup to provide ongoing communication between all teachers and ACER researchers during the program;
- the State Training Days in February/March 2005, June 2005 and May 2006;
- school visits conducted during April 2006; and
- direct contact from teachers to ACER research staff during the Project.

**Trials**

‘Withdrawing children for the Corrective Reading program was difficult. Initially they did not want to go and we had to be careful that they were not missing out on something else that was really important to them.’

‘We are a small school and did not have the staff to do the Corrective Reading program. We tried to use parents at home to do it but some parents were not confident readers themselves and were not comfortable doing it. We had to give up on the Corrective Reading but we could do the maths as it was with the whole class.’

‘When we did the placement test for children in the Corrective Reading program we had 1 student at a different level from the others. We put him in the group anyway but it did not work and he became so frustrated that we decided to take him out.’

‘It was working well but then one boy got sick and was away for a week. When he came back he was too far behind and the others did not want to go back. We tried to catch him up in other periods but it was too hard to fit in as the group kept moving ahead each day so he had to drop out.’

‘We used support teachers to do the Corrective Reading program with students but they often had difficulty managing the behaviour of the students – this became a real issue.

The stories in the reading program are so American that it put us off.’

The feedback from teachers on the difficulties of the Corrective Reading program were centered around:

- the social issues of withdrawal;
• the availability of staff to implement the program;
• behaviour management issues;
• timetabling for withdrawal;
• catering for student absences; and
• the American content of the program.

In discussions, all teachers acknowledged these difficulties. Most schools found ways to address these difficulties that worked for them. Some of these strategies are mentioned by teachers in the Triumphs and Tips section, outlined below.

**Triumphs and Tips**

‘This reading program has really boosted the confidence of these struggling kids. They feel that they can read – and they can! I have seen smiles on the faces of kids that I have never seen smile before. One kid has started reading everything he sees. He has become a little ‘show off’ and his Mum and Dad are delighted!’

‘We have provided recognition through school assembly, where the kids in the group were awarded a reading skills prize and at class level where the kids have read to the class and are called on now in the same way as other students — although I am careful not to go beyond their level. The recognition has been really important. They feel better about themselves and have a new status in the school.’

‘In conducting the reading program the school needs to work as a team to achieve the best outcome for the children. The learning environment, the time allocated to the program, the size and homogeneous grouping of the children needs to be given priority. The children need to be (in) the program during daily literacy time and not during the time other subjects are taught, so they don’t feel penalised by missing out on other learning.’

‘It is important to ensure children are aware of their progress in a positive manner. All forms of positive reinforcement are helpful. The program needs to be linked to the classroom program in an integrated way and not something that stands alone. A close working relationship needs to be fostered between the classroom teacher and the Ed Support teacher.’

‘We used students in the upper secondary section of the school to conduct the Reading program. We scheduled the lessons before school or in the lunch break so that no-one missed out on anything. We had the teacher who had been trained in
the program there as well and moving between the groups to offer support and guidance. This worked really well for all students as the senior girls loved doing it and it became fun for everyone. The children could not wait to come! Students who were not in the program kept ‘dropping in’ and obviously wanted to be a part of it as well.’

‘Doing the Corrective Reading every day was too difficult for us to manage with staff and other curriculum demands so the children do it with the classroom teachers once a week and with their parents twice a week. This works well as the parents feel involved and develop a good understanding of where their child is and what can help. The children didn’t want to go at first as they have had other programs ‘done to them’ and they are ‘over’ intervention. After the first two weeks they were eager to go and if they miss a session now they want to know when they can catch it up. It has become a punishment if they can’t go. The turn around in attitude has been quite amazing.’

‘We used the new language – the Americanisms – as a learning tool to broaden the children’s vocabulary. We have taken some of the words and used them in whole class discussions – things like the ‘taffy plant’ and the ‘tramp’. They have provided a springboard for some interesting cultural discussions in SOSE. The children in the reading program have felt good because they see their work and their knowledge being part of the whole class program – usually they feel a bit behind the others but using their reading words as a prompt for whole class discussion puts them in the centre. It has helped their self esteem enormously.’

‘The support teachers who have been taking this program love it. They feel really effective and see the joy and improvement in the children. They needed training and support in the beginning but now they are the ‘owners’ of the program and very proud owners too.’

‘I had three boys who could not read and were real behaviour problems. Once they began the reading program they changed and after two terms think they are really good readers. At the end of the year they all got up and read to the whole school assembly. They were very proud of themselves. They want to move on to the blue book next year.’

‘It was important to get on top of any behavioural issues in the group first. These boys who were the poor readers in grade 6 were also the ones with challenging behaviour. Once we set the
rules and kept the lesson running quite fast they were better and then once they saw that they could actually read the work they didn’t muck about so much. Students being away on extended holidays or through illness has been a problem but we now compromise. We take the group back a little bit – the revision is helpful for some anyway – we give the student who was away an ‘extra’ after school or at lunchtime and we ask his parents to do some extras as well. It is not easy but it works if it is important to the student. Some students have done the program with their parents while they were travelling.’

‘We loved the Strategy Instruction posters. We introduce one comprehension strategy every two weeks and leave the posters up as a reminder for children.’
Trials

‘When we started with the EMM it was taking almost 50 minutes. Doing this left no time for other maths or other curriculum.’

‘The clever students get frustrated with the other students speed and their mistakes.’

‘The students with significant learning difficulties cannot keep their work on the page — even when they draw columns it is hard for them. They also get confused with the speed of everything.’

‘When students are away sick they can’t keep up because they have missed the steps before. I can’t take the whole class back for one student so it becomes very difficult.’

‘The main difficulty is absent students. It really messes up the lesson as once they fall behind they can start to muck around and distract others.’

‘The de-bugging takes ages and the students who ‘got it’ get bored and restless.’

‘Our school is very progressive with a very involved parent group. At first the parents were very anti the way the lesson was being taught. They have come around now that they see the results but

it threatened to derail the program in the beginning.’

‘I simply could not teach in this way. It contradicts everything I have learned and it makes me feel very uncomfortable. The program was too difficult for my grade 4 students and even for some of my Grade 5 students. I am only using it with Grade 6.’

The feedback from teachers around the difficulties of the Numeracy program centred around:

• Catering for student absences;
• The time it took to deliver the lessons initially;
• The disparity of student’s entry skills and knowledge;
• The method of teaching;
• The time the debugging takes, and
• The difficulty of the content for grade 4 students.

In discussions, teachers shared their concerns and also shared their tips for what worked for them and their students. Some of these strategies are mentioned by teachers in the Triumphs and Tips section outlined below.
**Triumphs and Tips**

‘The numeracy program develops the children’s mathematic concepts, language and skills in a gradual, consistent way. **Children who are capable mathematicians may need to be given additional challenges when conducted as a whole class program for them to feel they are working at their level and are being challenged.** The program’s step-by-step development and gradual progression with de-bugging helps the children and teacher isolate learning bugs and have them eradicated.’

‘The clear instructions make it considerably easier for those with auditory processing difficulties to cope – everything is said in clear, consistent language. The students love it, particularly the immediate feedback of how they went – which is given within the same lesson period.’

‘You need to keep the delivery ‘snappy’ to maintain student concentration. I found you couldn’t follow the direct instruction session with another ‘intense’ lesson as the students were tired, but found that **scheduling direct instruction before a recess break was quite beneficial** as the students could then race around energetically and come into class again ready to focus.

This is nothing new, but what is so frustrating is the lack of uptake in education circles. It’s good practice being wasted.’

‘The EMM fits perfectly with the curriculum I need to cover. I know it is not designed for Grade 4 but we have started using some of the strands in Grade 4 and the students love it.’

‘We had a few student absences and that made it difficult to keep everyone at the same level. We decided to **go back a week**. It worked well for everyone but we can’t do this every time we have an absent student. We are now asking parents to cover the ‘lost ground’. On a couple of occasions we have had the integration aide do a couple of catch up classes.’

‘It took me a while to get into the rhythm to do the lesson in 20 minutes but I got there. The kids had to get used to the way it was delivered too. We all like the fast pace now. The debugging is done quickly – I just pick one student for each ‘bug’ and that covers it for all of them. We never debug question 20. As Rhonda says, they just have to ‘keep thinking about it’.

‘The students doing the program love it. The way it builds with each lesson gives them the confidence that they can attempt each new small step each day.'
They know it will be based on what they did yesterday and extend the learning one more step. The success is built in and gives the students growing self confidence that they can do maths.

‘I didn’t like the approach at all when ACER gave us the training. I tried it anyway and the results have convinced me. I am going to use EMM next year with my new grade 6. I would advise anyone to give it a go and see if it works for your students. It did for mine.’

‘The EMM is the best thing I have done with my students. They love it and it works. We have students who hate school and are serial absconders. Now they come for the EMM lesson and then disappear for the rest of the day! The clarity and clear goals are what appeals to them. They understand what is required and enjoy the built in success. This year the Elementary Math Mastery program was moved into the senior classroom – Years Five, Six and Seven – and the whole class takes part in this. Lessons follow sequentially and results are recorded. From this, any problem areas are highlighted and followed through in maths lessons. Debugging is important and I’m finding that this is not quite as easy to do with the wide range of classes in comparison to having only one class involved in 2005. I find I need to be very mobile during the marking segment and pick up on what the children might be reticent to discuss. I’ve introduced a small add-on to this section where I will ‘bug’ a question that I’ve noticed the children have not brought up for discussion.’
The Learning Support for Teachers

(Kerry-Anne Hoad, ACER)

The professional learning model provided ongoing learning support for teachers through multiple strategies to cater for different learning styles and to accommodate contextual and geographical considerations.

Teachers from all ‘intervention’ schools attended three Training Days in their State. Teachers from the ‘reference’ schools attended the final Training Day in their State. The first State Training Day in February/March 2005 introduced teachers from the ‘intervention’ schools to the program, provided training in pedagogical practices; ‘walked through’ the kits of support materials and enabled teachers to form Teacher Learning Clusters for each region. The follow-up State Training Day in June 2005 enabled the ACER research team to refresh teachers’ understanding of the intervention approaches, share experiences and address concerns about implementation of the program and issues for individual students. The final State Training Day in May 2006 allowed teachers to discuss the results achieved by their students, their ongoing delivery of the program and to share their knowledge and experience with teachers from the reference schools.

To support the application of the training provided during the State Training Days, teachers formed self-selected Teacher Learning Cluster (TLCs). These TLCs provided ongoing support and knowledge-sharing between teachers in the same region. The TLCs met monthly and were coordinated by a Teacher Learning Cluster Coordinator from the group. An agenda for each group was posted on the Bulletin Board and minutes from the meetings were also posted on the Bulletin board to facilitate the broader sharing of experience and expertise. The meetings were especially valuable to teachers in the initial stages of the research project when teachers were learning new approaches and were seeking collegial feedback and support, but became less important later in the program as they gained skills and confidence. Teachers who have become familiar with one another through the program also initiated informal contact with one another to maintain collaborative communication, a step that augurs well for a continuation of teacher-to-teacher professional learning beyond the life of the project.
By any criteria, the Bulletin Board – which closed in September 2005 – offered a most useful way for teachers to share experiences and seek support and guidance from staff at ACER and one another. There were 159 registered users; 142 posted articles on thirty-seven different discussion topics, with 105 replies; more than one post per day on average; and a total of 1,852 views on the discussion topics. Bulletin Board discussions focussed on student assessments, implementation of the Elementary Maths Mastery and Corrective Reading programs, as well as the content of Teacher Learning Cluster Meetings.

Teachers responded well to this range of professional learning strategies and feedback included the following comments:

‘The State Training Days were really useful. It was the best training we have had in this State for a long time. To have quality training and to be given the resources to implement the programs immediately is fantastic. I can’t wait to try this out.’

‘The Teacher Learning Clusters give us an opportunity to talk about local concerns and to talk with others who understand the programs that we are implementing. I was getting frustrated with how long the EMM was taking but when I heard that others had encountered the same thing and were now getting faster I felt much better.’

‘We are a long way away from other schools and it has been great to be able to get on to the Bulletin Board and write something about my concerns and then to get the responses from teachers from everywhere who had felt the same or had some ideas about what I could try. It was good to see that Kerry-Anne and Rhonda were there to reply to any specific queries straight away as well.’

Key elements of the professional learning support that teachers commented on were:

- The expertise of the trainers and the team-approach to the training;
- That the training came to their State;
- The information about Auditory Processing provided by Dr Kathy Rowe;
- The support of funding to release people for training;
- The benefits of having the resource materials provided immediately;
- The opportunity to talk with other teachers at the TLC meetings;
- The benefits of sharing concerns and strategies with other teachers at the TLCs and also on the Bulletin Board; and
- The chance to talk with Dr Ken Rowe about students’ results.
Teachers have reported gains in student confidence and self esteem that are evident beyond the gains reported in assessments results. These gains observed by teachers, combined with the gains reflected in the assessment results, have given teachers the confidence and the skills to include these strategies in their repertoire of effective pedagogical practices. This will provide valuable support for teachers in their continuing task of Working Out What Works for their students. This comment from a Grade 5 teacher in Western Australia reflects the many comments heard from teachers at the final State Training Days in 2006.

‘Both the literacy and numeracy programs are worthwhile and valuable. They are suitable to some children’s learning styles more than others, depending on the child’s capabilities. It has been a valuable and rewarding experience to have been part of the program, and it we hope to continue this with a whole-school awareness.’
Appendix 1

Principles of Effective Professional Development
(National Partnership for Excellence and Accountability in Teaching. Washington DC)

1. The content of professional development (PD) focuses on what students are to learn and how to address the different problems students may have in learning the material.

*The content of professional development is critically important to its effectiveness. While the content varies with the goals of the school, the content of professional development should deal directly with what students are expected to learn and the instructional strategies that research and experience have shown are effective.*

2. Professional development should be based on analyses of the differences between (a) actual student performance and (b) goals and standards for student learning.

*Professional development that is based on analysis of student learning helps teachers close the gap between actual student performance and goals for student learning. Goals for student learning also provide a basis for defining what teachers need to learn and a yardstick for improving professional development.*

3. Professional development should involve teachers in the identification of what they need to learn and in the development of the learning experiences in which they will be involved.

*Adherence to this principle ensures that professional development is relevant. When teachers help design their own learning, they are likely to feel a greater sense of involvement in the professional development experience. Teachers are most likely to use what they learn when professional development is focused on solving problems in their particular contexts.*

4. Professional development should be primarily school-based and built into the day-to-day work of teaching.

*Teachers learn from their work. Learning how to teach more effectively on the basis of experience requires that such learning be planned for and evaluated. Learning needs arise and should be met in real contexts. Curriculum development, assessment, and decision making processes are all occasions for learning. When built into these routine practices, professional development powerfully addresses real needs.*
5. Professional development should be organised around collaborative problem solving.

Without collaborative problem solving, individual change is possible, but school change is not. Collaborative problem-solving activities allow educators to work together to identify both problems and solutions. Activities may include interdisciplinary teaming, curriculum development and critique, collaborative action research, and study groups.

6. Professional development should be continuous and on-going, involving follow-up and support for further learning—including support from sources external to the school that can provide necessary resources and new perspectives.

Adoption and implementation of effective practices requires continued learning. Therefore the design of professional development must provide time to apply new ideas and, sometimes, must draw on additional outside expertise. Such follow-up and support ensures that professional development contributes to real change and continuous improvement.

7. Professional development should incorporate evaluation of multiple sources of information on (a) outcomes for students and (b) the instruction and other processes that are involved in implementing the lessons learned through professional development.

When done well, evaluation of professional development yields important lessons for refining professional development. Without such evaluation, future opportunities for teachers to learn may not be productive. Multiple sources of information should be used, including teacher portfolios, observations of teachers, peer evaluations, and student performance. Lessons become most clear when evaluators collect data during different stages of the change process.

8. Professional development should provide opportunities to gain an understanding of the theory underlying the knowledge and skills being learned.

Because beliefs filter knowledge and guide behaviour, professional development must address teachers’ beliefs, experiences, and habits. Furthermore, specific knowledge and skills that work in one setting, sometimes do not work in others. When teachers have a good understanding of
Appendix I

the theory behind particular practices and programs, they can adapt the strategy they learned about to the circumstances in which the teacher is trying to use it.

9. Professional development should be connected to a comprehensive change process focused on improving student learning.

Improving teacher capabilities without changing the conditions that influence the opportunities to use these capabilities is often counter-productive. These conditions include time and opportunities to try new practices, adequate funding, technical assistance, and sustained central office follow through. Thus, unless professional development is designed as part of a larger change process, it is not likely to be effective.
Examples of Learning Strategies.

A. Excerpt from:

The Theory

Many educators have theorised that, put simply, learning and memory problems for low achieving students involves a lack of an organised structure or network for storing incoming information (Anderson, 1984; Derry, 1990; Torgeson, 1985). In combination with a lack of effective strategies to retrieve this information, students give poor performances on memory tasks as a result.

Possible Solutions

The good news is that students can be taught to use effective strategies (Cole & Chan, 1990; Mastropieri, Scruggs, Whittaker & Bakken, 1994). When being taught new information in the classroom students can be assisted with storing this new information in a structured and organised way which will facilitate retrieval at a later date. Many of the strategies involve assisting students to organize information.

Summarising is another strategy that will assist students with learning problems (Pressley, Johnson, Symons, McGoldrick &Kurita, 1989). The add, zoom, flashback and squeeze strategy and reflective writing are examples of teaching techniques that involve students in summarising information. Linking prior knowledge from previous learning to new information being taught at school assists students in making sense of this new information (Derry, 1990; Sullivan, Mastropieri & Scruggs, 1995). This is especially so in the secondary school setting where the nature of the learning situation is not logical (that is, subjects and teachers alter throughout the day) and the information presented may appear unfamiliar, abstract and muddled to students. It is vital to teach these students to actively link prior knowledge to new information. The two point strategy, twenty questions and the caption strategy and the add, zoom, flashback, and squeeze strategy are examples of assisting students to
activate prior knowledge and link prior knowledge to new learning.

Imagery and Memory

Mnemonics are techniques to improve memory. As previously stated, students with learning problems have been shown to perform poorly on memory tasks (Male, 1996; Scruggs & Mastropieri, 1990; Torgesen, 1985). Paivio (1995) has been researching memory and the role of imagery for decades and has concluded that imagery has a powerful effect on memory. This effect has been demonstrated numerous times in research this century (Paivio). Both the strategies creating graphics and interacting images involve imagery. A point to note is that concerns about a decrease in comprehension due to the focus on mnemonic strategies have been dispelled. Research has shown that mnemonic instruction facilitates, rather than inhibits comprehension (Mastropieri, Scruggs, Whittaker & Bakken, 1994).

The Strategies

1. Two Point Strategy
   a) Students are to think of all they know about the topic to be covered.
   b) Students underline their two most important points.
   c) In small groups, the students discuss their two most important points and come to a consensus on two points for the group.
   d) The spokesman for the group tells the teacher the two most important points for that group and the teacher writes all the groups’ points on the blackboard in the form of a structured overview.

2. Caption Strategy
   (adapted from Whitehead, 1992)
   This strategy and its variations assist students to explore and record what they know. It encourages discussion using the students’ own words.
   a) Students form groups of 4 or 5.
   b) Students examine a number of pictures.
   c) In each group, they write a make-believe title for each picture.
   d) Each group feeds back their answers and justifies their answers to the whole class.
3. Creating Graphics  
(adapted from Morris & Stewart-Dore, 1984)  
One way of assisting students in comprehending graphics and to aid in comprehension of text is to have students create graphics themselves from the text. The completed chart, diagram, table, or graph can then be used as a revision tool at the completion of the topic.

For example, students work in small groups of two to four to create a chart or graph for the following information: Milk and butter are an important source of Vitamin A. Other sources include fish-liver oils and certain vegetables - carrots, tomatoes and dark green leafy vegetables are particularly valuable sources. Vitamin D is also found in fish-liver oil, butter, cheese, milk, and eggs. Vitamin C is found in fresh fruit and vegetables. Wholemeal bread, yeast, liver, and dairy foods contain Vitamin B.

4. Add, Zoom, Flashback, and Squeeze Strategy  
(adapted from Whitehead, 1992)  
The strategy enables students to share and expand what they know. If the students have a great deal of knowledge on the topic, use this strategy before starting the topic. If the students do not have existing knowledge of a topic, then use this strategy as a revision.

Teachers can use this strategy to informally assess students’ current knowledge.

a) Students form groups of 6 - 8.
b) The first student begins by recalling what s/he knows about a topic and when s/he decides, s/he stops and calls on another student to either “add”, “zoom”, “flashback”, or “squeeze”.

Add is an invitation to continue recalling the topic.
Zoom is an invitation to “zoom in” or add detail to the previous speaker’s contribution.
Flashback allows the next speaker to return to any point in the recall.
Squeeze is an invitation to summarise all that has been said in a sentence or two.

Introduce one component at a time before students attempt it in groups.

5. Twenty Questions  
The idea with this strategy is to develop questioning and answering skills and to
provide opportunities for students to discuss a concept relating to the current topic. This will assist the students in understanding the topic and is suitable as a revision exercise. It develops listening skills and provides opportunities for reflection. In addition, the teacher can informally assess the students’ comprehension of the topic.

a) Students form groups of 4 or 5. Each group has one “concept person” and one “questioner”.

b) The teacher gives the “concept person” in each group a card stating a concept.

c) The remaining group members develop two questions. The “questioner” asks the questions of the “concept person” who can only answer “yes” or “no”.

d) If the group cannot identify the concept at this stage (one guess only) they develop four questions for the “questioner” to ask of the “concept person”. Then a second guess is allowed. Six questions are asked then another guess is allowed. Eight questions are asked then the fourth and final guess occurs.

e) The aim is to guess the concept before the twenty questions are asked.

6. Mnemonics - Interacting Images (adapted from Matlin, 1983)

A mnemonic is a technique to improve memory. Interacting images is appropriate when there are lists of pairs of words to be learnt. This occurs in schools more frequently than at first realized. The point, though, is that imagery has a very powerful effect on memory.

Basically, there are 3 points about this technique.

a) The first one is to visualise the words.

b) The second is to have the images interacting with each other.

c) The third point is to make it bizarre. If the images are silly, weird, or funny, the chance of remembering the words is increased.

7. Reflective Writing.

Reflective writing involves students reflecting on what they have learnt in a lesson. It provides them with an opportunity to recall information and sort out this information into their own words. It aids comprehension and memory. Teachers are then provided with an informal basis for assessing whether the students have retained and
understood the information taught in the lesson.

B. An excerpt from:

The Strategies taught in the English/Reading intervention include:

a) Reading comprehension strategies of predicting, use of prior knowledge, selecting key sentences, summarizing, making use of logical structure, skimming, self-questioning;

b) Writing strategies of planning, drafting, structuring information, editing, revising; and

c) General Learning strategies of planning and goal-setting, keeping records, monitoring and self-evaluating, seeking social assistance, and environmental structuring.

Strategy posters, activity sheets, strategy record sheets, strategy diaries are all used to maximize student active engagement in learning and using strategies. During the weekly intensive strategy lessons, advantages of using the strategy are discussed as well as when and how to use it. The relationship between strategy use and successful performance is highlighted. The cognitive modeling, whole class discussion, small group interactive dialogues were employed to demonstrate and practice the use of strategies with the normal English class program.

In the Mathematics intervention, a standards metacognitive strategy was used in combination with a variety of specific cognitive strategies for different Mathematics topics. The metacognitive strategy involves students asking themselves questions and answering them while doing the computation to:

a) Clarify the problem;

b) Remind themselves of the important rules;

c) Direct themselves to complete the appropriate maths routine;

d) Remind themselves to estimate and check;

e) Reinforce themselves that they have done a good job; and
Appendix 2

f) Remind themselves that they did well because they used a good strategy, and because they used the strategy effectively.
Summarising

What should a summary be like?
A summary should be:
• Informative
• Brief
• In your own words
• The topic in a nutshell.

How can I summarise?
Underline key words
• Find the keywords by asking yourself: who, what, when. Where, why and how?

Rate the sentences in each paragraph
• Ask yourself if the paragraph makes sense without this sentence.
• If not this is a very important sentence - include the information in your summary.

Make notes of the key ideas
• Keep your notes brief
• Don’t use full sentences
• Keep to the main facts
• Use your own words
Appendix 2

Summary worksheet

“Licked” by Paul Jennings

A good summary is:
• Short brief, concise
• Written in your own words
• Contains all the main ideas

A good summary should answer six questions about the story:
• Who
• Where
• When
• Why
• What
• How

My summary of “Licked”

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

A main idea/question about “Licked”

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________


Appendix 2

On the Road to Understanding

- **Predicting**
  What is the paragraph likely to be about?

- **Clarifying**
  Is there anything I do not understand?

- **Questioning**
  What questions can I ask myself about the paragraph?

- **Summarising**
  What is the paragraph mainly about?
## Appendix 2

### A Map for Reading

<table>
<thead>
<tr>
<th>Purpose or Goal</th>
<th>Information</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why am I reading this?</td>
<td>What information do I want from this?</td>
<td>How should I read this to achieve my goal?</td>
</tr>
<tr>
<td>1. Pleasure or entertainment.</td>
<td>Plot or story</td>
<td>Read normally Read right through once. Make pictures in mind. Predicting</td>
</tr>
<tr>
<td>2. Understanding.</td>
<td>Main or key questions</td>
<td>Predicting Clarifying Questioning Summarising</td>
</tr>
<tr>
<td></td>
<td>Characters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Setting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Author’s purpose</td>
<td></td>
</tr>
<tr>
<td>3. Seeking Information.</td>
<td>Specific Details</td>
<td>Use table of contents and/or index Scan headings and/or pictures</td>
</tr>
<tr>
<td>4. Preparing for tests or exams</td>
<td>To remember specific points</td>
<td>Reading and rereading Note taking Summarising Retelling Self-questioning</td>
</tr>
</tbody>
</table>
# Strategy Diary

**Name:**

**School:**

*A Map for Reading*

<table>
<thead>
<tr>
<th>What have you read at school this week?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why did you read it? What was your goal?</td>
</tr>
<tr>
<td>What information did you want from it?</td>
</tr>
<tr>
<td>How did you read it? What strategies did you use to achieve your goal?</td>
</tr>
</tbody>
</table>

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<tr>
<td>How did you read it? What strategies did you use to achieve your goal?</td>
</tr>
</tbody>
</table>
Plan your Route to Success

What do I want to do?
What is my goal?

How could I do it?
Let’s make a plan.
What do I know?
What do I need to know?
Where can I find the information?
What do I have to do?
How long do I have?

Is my plan working?
Yes: Complete the plan
No: Try something else
How could I change my plan?
What additional information do I need?
Do I know enough now?
Is my plan working now?

Did I achieve my goal?
Did my plan work?
Appendix 2

Plans and Goals: Worksheet

What do I want to do? What is my goal?

How could I do it? Let’s make a plan.

What do I know?

What do I need to know?

Where can I find the information?

What do I have to do?

How long do I have to complete my plan?

Is my plan working?

What sort of questions should I be asking myself?

Did I achieve my goal? Did my plan work?

After finishing any assignment or project ask your self the following questions:

Did I collect enough information? Did I answer the question/keep to the topic and/or follow instructions? Did I complete my assignment on time? Am I happy with my work?
Appendix 2

Writing Strategies

1. **Think and Brainstorm**
   - Select a topic:
   - What do you want to say?
   - What do you know about the topic?
   - Access resources and generate notes.

2. **Plan**
   - How should you cover the topic?
   - Organise notes in a logical order.

3. **Write the Essay**
   - Follow the plan
   - Change the plan if necessary

4. **Edit and Revise**

5. **Publish**

---

Steps to Success in Revising

1. Read the first draft of your essay
2. Find the sentence that tells what you believe. Is it clear?
3. Add two more reasons why you believe it.
4. Scan each sentence. Does it make sense? Is it connected to your belief? Can you add more?
5. Correct punctuation and spelling mistakes.

---

Steps to Success in Editing

1. Does it have a good introduction, middle and end.
2. Should I add some more details?
3. Are my thoughts in the right order?
4. Read each sentence. Is it complete?
5. Are the first letters of each sentences and proper nouns capitalized?
6. Is there punctuation at the end of each sentence?
7. Check spelling.
8. Is there any part that is hard to understand?
### DIVISION INVOLVING FRACTIONS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What do I have to do?</td>
<td>I have to divide a fraction by another</td>
</tr>
</tbody>
</table>
| 2. What do I have to remember | a) To divide by a fraction, invert the fraction and multiply (multiply by the reciprocal)  
b) If there are mixed numerals, simplify first by changing them to improper fractions |
| 3. What should I do first? | If there are mixed numerals write them as improper fractions. |
| 4. How can I do that? | Multiply the whole number by the denominator and add it to the numerator to get the new numerator. |
| 5. What should I do next? | Invert the fraction after the + sign |
| 6. How can I do that? | Rewrite the whole number sentence again inverting the fraction after the + sign, and replacing the + sign with the x sign. |
| 7. What should I do next? | Multiply the two new fractions using the 'multiplication of fractions' strategy. |
| 8. How can I do that? | Simplify the fractions before I multiply if appropriate. Multiply the numerators and then the denominators. Simplify the fraction again if appropriate. |
| 9. Does it look right? | Check every step  
Check calculation  
Check if the fraction can be simplified any further. |
| 10. How do I feel? | I feel great. I've worked out the answer correctly because I've used the strategy effectively. |
Give the simplest answer: $3 \frac{1}{3} \div 1 \frac{1}{4}$

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>What do I have to do? I have to divide a fraction by another</td>
</tr>
<tr>
<td>2.</td>
<td>What do I have to remember c) To divide by a fraction, invert the fraction and multiply (multiply by the reciprocal) d) If there are mixed numerals, simplify first by changing them to improper fractions</td>
</tr>
<tr>
<td>3.</td>
<td>What should I do first? If there are mixed numerals write them as improper fractions.</td>
</tr>
</tbody>
</table>
| 4. | How can I do that? Multiply the whole number by the denominator and add it to the numerator to get the new numerator.  
   $3 \frac{1}{3} \div 1\frac{1}{4} = \frac{10}{3} \div \frac{5}{4}$ |
| 5. | What should I do next? Invert the fraction after the $\div$ sign |
| 6. | How can I do that? Rewrite the whole number sentence again inverting the fraction after the $\div$ sign, and replacing the $\div$ sign with the $\times$ sign.  
   $\frac{10}{3} \div \frac{5}{4} = \frac{10}{3} \times \frac{4}{5}$ |
| 7. | What should I do next? Multiply the two new fractions using the 'multiplication of fractions' strategy. |
| 8. | How can I do that? Simplify the fractions before I multiply if appropriate. Multiply the numerators and then the denominators. Simplify the fraction again if appropriate.  
   $\frac{10}{3} \times \frac{4}{5} = \frac{40}{15} = \frac{8}{3} = 2\frac{2}{3}$ |
| 9. | Does it look right? Check every step  
   Check calculation  
   Check if the fraction can be simplified any further. |
| 10. | How do I feel? I feel great. I’ve worked out the answer correctly because I’ve used the strategy effectively. |
## MEASUREMENT - PERIMETER (SOLVING PROBLEMS)

<table>
<thead>
<tr>
<th>Step</th>
<th>Question</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>What do I have to do?</td>
<td>I have to solve the problem. Let me read the problem carefully.</td>
</tr>
</tbody>
</table>
| 2. | What do I have to remember | To restate the problem in my own words.  
a) What am I asked to find?  
b) What am I given? |
| 3. | What should I do first? | Identify subgoals and plan the steps. |
| 4. | How can I do that? | Draw a diagram or make a chart. |
| 5. | What should I do next? | Estimate what the answer is likely to be. |
| 6. | How can I do that? | “The answer must be greater than... or The answer cannot be greater than.....” |
| 7. | What should I do next? | Do the calculation. |
| 8. | How can I do that? | Set out the solution clearly step by step. |
Check calculation.  
Does the answer make sense? |
| 10. | How do I feel? | I feel great. I’ve solved the problem correctly because I’ve used the strategy effectively. |
**MEASUREMENT - PERIMETER (SOLVING PROBLEMS)**

A concrete path is constructed around a rectangular lawn that is 16 m long and 10 m wide. If the path is 1 m wide what is the perimeter around the outside of the path?

| 1. What do I have to do? | I have to solve the problem  
Let me read the problem carefully |
|-------------------------|---------------------------------------------------------------|
| 2. What do I have to remember | To restate the problem in my own words  
c) What am I asked to find?  
The perimeter around the outside of the path  
d) What am I given?  
The lawn is 10m X 16m.  
The path goes around the lawn and is 1m wide. |
| 3. What should I do first? | Identify subgoals and plan the steps. |
| 4. How can I do that? | Draw a diagram or make a chart. |
|                         | ![Diagram] Path 1m wide  
Lawn 10 m X 16 m |
| 5. What should I do next? | Estimate what the answer is likely to be. |
| 6. How can I do that? | “The answer must be greater than...  
52m |
| 7. What should I do next? | Do the calculation. |
| 8. How can I do that? | Set out the solution clearly step by step.  
Length around outside of path =  
16 + 2 = 18m  
Width around outside of path=  
10 + 2= 12m  
Perimeter around outside of path =  
2 x (18 + 12) = 2 x 30m = 60m |
| 9. Does it look right? | Check every step  
Check calculation  
Does the answer make sense? |
| 10. How do I feel? | I feel great. I’ve solved the problem correctly because I’ve used the strategy effectively. |
## Appendix 3

### Corrective Reading Program: Teacher Skill Form Kerry Hempenstall, RMIT

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher displays evidence of having read and practised the script ahead of time.</td>
<td>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening</td>
</tr>
<tr>
<td>Teacher gets into the lesson quickly (without unnecessary discussion or rehearsal), and maintains an undistracted task focus.</td>
<td>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening</td>
</tr>
<tr>
<td>Teacher follows the script closely during group instruction.</td>
<td>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening</td>
</tr>
<tr>
<td>Teacher uses praise when children follow the rules, and when children perform especially well. For example, when they are seated appropriately, do a difficult exercise with no mistakes, respond well to error correction, try harder than during the previous exercise, etc.</td>
<td>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening</td>
</tr>
<tr>
<td>Teacher does all of the prescribed exercises.</td>
<td>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening</td>
</tr>
<tr>
<td>Teacher assigns points quickly and appropriately.</td>
<td>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening</td>
</tr>
<tr>
<td>When signals such as clapping are required, teacher claps in time and at a reasonable pace. Visual signals such as a board point-touch signal are well timed, not occurring whilst speaking.</td>
<td>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening not applicable</td>
</tr>
<tr>
<td>Teacher moves at a brisk, but not too fast, pace.</td>
<td>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening</td>
</tr>
<tr>
<td>Teacher ensures children remain alert. For example, by praising desirable behaviour, “You’re answering together, I like that”.</td>
<td>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening</td>
</tr>
</tbody>
</table>
## Appendix 3

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Teacher good humouredly challenges children. For example, “I know you really can do it. I bet you can do these 5 rows without even one mistake.” | 4. consistently well done  
3. mostly well done  
2. uneven  
1. mostly not happening not applicable |
| Teacher ensures all children can see the book or board when necessary. For example, not blocking the words with teacher’s own hand. | 4. consistently well done  
3. mostly well done  
2. uneven  
1. mostly not happening not applicable |
| Teacher follows the “Pause” instruction in the manual. For example, “Say (pause) happen with this ending.” | 4. consistently well done  
3. mostly well done  
2. uneven  
1. mostly not happening not applicable |
| Teacher responds if a rule is broken during the lesson, reminding children. “I need to hear you say the word clearly with your hand away from your mouth. Now let’s do that row again.” And later on, “I like the way you’re saying the word so clearly.” | 4. consistently well done  
3. mostly well done  
2. uneven  
1. mostly not happening not applicable |
| Teacher attends to the “Repeat until firm” instruction. If one or more children make a weak response, the teacher does the task again, making sure they are firm before going on. | 4. consistently well done  
3. mostly well done  
2. uneven  
1. mostly not happening not applicable |
| Teacher makes use of delayed tests to check-on and to firm-up items that were weak earlier. “Let’s do those ain words again. They’re hard. But we can do it.” | 4. consistently well done  
3. mostly well done  
2. uneven  
1. mostly not happening not applicable |
| Teacher employs the designated “Error Correction” procedure. | 4. consistently well done  
3. mostly well done  
2. uneven  
1. mostly not happening not applicable |
| Teacher corrects every error immediately, rather than waiting for the child to self-correct. Teacher returns to the beginning of the row or sentence as the manual indicates. | 4. consistently well done  
3. mostly well done  
2. uneven  
1. mostly not happening not applicable |
## Appendix 3

<table>
<thead>
<tr>
<th>Comments</th>
<th>Teacher performs the corrections quickly and with good humour - without any signs of frustration.</th>
<th>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comments</td>
<td>Teacher is able to present the tasks without making sounding-out errors or other conspicuous errors. Sounding out and saying it the fast way are well modelled.</td>
<td>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening</td>
</tr>
<tr>
<td>Comments</td>
<td>Teacher ensures that the Reading Checkouts are properly completed when the peer system is in use, and keeps accurate records of students’ rate and accuracy.</td>
<td>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening not applicable</td>
</tr>
<tr>
<td>Comments</td>
<td>Teacher puts vim, vigour and enthusiasm into the presentation.</td>
<td>4. consistently well done 3. mostly well done 2. uneven 1. mostly not happening not applicable</td>
</tr>
</tbody>
</table>

Total: Add the numbers in the middle column to obtain the maximum available score (M). Add the numbers in the last column to obtain the total score achieved (A). Divide M by A and multiply by 100 to establish the Teacher Mastery Score (TMS). The aim is to achieve a Mastery Score above 90% (SRA, 2001).
Appendix 4

Auditory Processing Capacity and Assessment.
(Dr. Kathy Rowe, Royal Children’s Hospital)

Auditory processing capacity is the ability to take in and recall accurately what is heard.

This ability is a developmental process that gradually improves throughout childhood. Children vary in their rate of development of this skill. It is important for those communicating with children to be aware of this, because it has significant implications for how information is presented.

It is measured by using a recorded presentation of both sentences and digits of increasing length. Children listen to the sentences or series of digits and repeat accurately what they hear.

Repetition of sentences of increasing length indicates their ability to understand what they hear, including instructions and explanations. The ability to repeat digits indicates how well children process information in order, for example phonemes or sounds that make up a word. This ability is also strongly associated with spelling ability (as this requires remembering letters in a sequence), and also the ability to structure information in order, such as in writing an essay or presenting oral information. It is therefore important for all aspects of literacy as well as basic classroom communication.

If those teaching children take this into account, children improve in their learning and behaviour. Children with many different conditions such as Attention Deficit Hyperactivity Disorder, speech and language disorders, central auditory processing difficulties, mild intellectual difficulty, unfamiliarity with English, or an isolated problem in a child with normal intelligence, or even children who are very stressed, can all experience difficulty with processing auditory information. This assessment does not make a diagnosis; it assesses how the child is functioning.

It is expected that the average child at school entry can recall 3 digits and a 9-word sentence. A good ‘rule of thumb’ is: average (both mean and median) sentence length recall is: \((age \text{ in years} + 4)\) up to the age of 10 years. For example, a 7-year old, on average,
can recall an 11-word sentence. If a child cannot recall a sentence length equal to \((\text{age in years} + 3)\) i.e., a 7-year old cannot recall a 10-word sentence (~20% of that age group), they are at high risk for literacy underachievement and being considered inattentive in class. Beyond 10 years the improvement in sentence length recall increases one word each 2 years (on average). The average adult can recall 15-16 word sentences accurately and can recall 5 digits accurately. It was thought that children developed this capacity much sooner, so that by the age of 8 years they could recall ‘adult-length’ sentences. However, recent data indicates that this is not reached (on average) until upper primary or early secondary school. This, therefore, has major implications for classroom communication.

This assessment is available in a kit that contains 2 CD’s and a booklet (Rowe, Pollard & Rowe, 2006).
- The first CD is for children from school entry to 4th year of schooling, or for use with older children with significant problems.
- The second CD is for children from 4th year to 10th year of schooling.

Allow 5-7 minutes per student to administer the assessment.

Each CD should be viewed on a computer and contains:
- Recorded sentences and digits for children that can be played using a CD player (or from the computer);
- Score sheets to print off;
- Instructions for administering the assessment;
- Video clip examples;
- Norms from more than 12,000 students, and indicators for children at risk;
- Classroom tips – implications and practical strategies for classroom management; and
- Research findings to support the use of the kit (see Rowe, Pollard & Rowe, 2005).

Further information can be obtained from: www.auditoryprocessingkit.com.au
References


References


References


References


References


References


References


References


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Rowe, K.J., & Rowe, K.S. (2000). Literacy and behavior: Preventing the shift from what should be an ‘educational issue’ to what has become a major ‘health issue’. *International Journal of Behavioral Medicine, 7* (Supp. 1), 81-82.


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