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Education Assistants to Help Pave the Road to Literacy: Supporting Oral Language, Letter-Sound Knowledge and Phonemic Awareness in the Pre-Primary Year.

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Abstract

Children with weak oral language skills are at risk of experiencing difficulty with early literacy acquisition. Intensive small group intervention during the pre-primary¹ year has the potential to improve children's success in developing emergent literacy skills. Education assistants are a potentially powerful resource for supporting students at educational risk. In this study, education assistants at four schools were trained to provide a daily half-hour emergent literacy program to pre-primary¹ students with low oral language skills. The program focused on developing phonological awareness, letter-sound knowledge and vocabulary using both explicit and in-context (embedded) learning activities. The students undertaking the program made significant gains on early language and literacy measures. Case studies are presented which illustrate the strengths and limitations of the intervention for children and schools.

Keywords: literacy, early intervention, pre-primary, education assistants, oral language, vocabulary

Learning to communicate through reading and writing can be a formidable task for some children. Once students have begun to experience difficulties in their literacy learning they are vulnerable to falling behind their peers, with a disparity in rate of progress apparent even before Year One (Chatterji, 2006; Loudon, Rohl, & Hopkins, 2008). Children who have a slow or difficult start to literacy development are prone to less successful school and life outcomes (Archer, Gleason, & Vachon, 2003; Hindson, Byrne, Fielding-Barnsley, Newman, & Hine, 2005; National Inquiry into the Teaching of Literacy, 2005). For this reason, serious attention to avoiding early literacy problems is of paramount importance. The first years of school provide the ideal opportunity for this support (de Lemos, 2005; Lonigan, 2006) and education assistants are ideally placed to help provide it.

The motivation to read and write provides a significant impetus for developing literacy, and can be stimulated by early learning experiences which promote curiosity about the world, enjoyment of books, and an understanding of the value of text. Excellent early childhood classrooms provide just such a rich learning context (e.g., Hill, 2004). However this motivation is insufficient in itself to ensure a successful transition to literacy. It is clear from the research that there are some important prerequisite skills and understandings that anchor the steps to early reading and writing. These skills include well-developed oral language competence, emergent phonemic awareness, and knowledge of letters and the sounds they represent (Lonigan, 2006; Scarborough, 2005; Snow, Burns, & Griffin, 1998). Providing the necessary early intervention to improve these skills in children at educational risk is critical (Simmons et al., 2007).

Committed classroom teachers recognise the importance of ensuring that students at educational risk receive early support (e.g., Rohl, 2000). Teachers appear to be developing a greater understanding that focused early intervention is the most effective means of improving students' chances of a successful transition to early literacy (e.g., Galbraith, 2008; Picker, 2006). However, the practicalities involved in providing regular individual or small group assistance can often belie teachers' good intentions. One practical and effective solution for supporting students at educational

¹ In Western Australia, Pre-primary constitutes the first full-time year of schooling, and is equivalent to Reception, Kindergarten or Prep in other Australian states. Students typically enter pre-primary aged between four-and-a-half and five-and-a-half years of age.

risk to improve their emergent literacy skills is to make optimal use of the expertise and professionalism of classroom-based education assistants. Education assistants (otherwise known as teacher assistants, teacher's aides or special needs assistants) are a valuable part of most preprimary classrooms and with appropriate support and training can provide effective early intervention for students at risk (Woolley & Hay, 2007).

Students at Risk

If sound oral language competence, phonemic awareness skills and letter sound knowledge are crucial prerequisites for effective literacy acquisition, it is incumbent on educators to identify groups of students who would benefit from careful monitoring and early additional support to develop these skills. There are three pervasive risk factors for low prerequisite literacy skills: low socio-economic background, specific language impairment or developmental disability, and a family history of literacy difficulties.

Students from low socio-economic status (SES) backgrounds have a greater risk of developing literacy difficulties than students from middle-class backgrounds, a pattern that holds true both in Australia and overseas (Duncan & Seymour, 2000; Hay & Fielding-Barnsley, 2009; Lokan, Greenwood & Cresswell, 2001). The reasons for this relative disadvantage are complex, but the most important contributing factor may be that students from low SES backgrounds have less-developed oral language skills than students from middle class backgrounds (Beck & McKeown, 2007a; Hay & Fielding-Barnsley, 2009). Certainly children from middle class backgrounds tend to engage in more sophisticated topics and styles of discourse with caregivers than those from lower SES backgrounds (Duncan & Seymour, 2000; Hill, 2004). Parents from low SES backgrounds are more likely to have lower levels of education, to have reading difficulties, to own fewer books (Neuman, 2006), or to come from minority or non-English speaking backgrounds (McGee & Richgels, 2003). In a recent Australian study, Hay and Fielding-Barnsley (2009) found that students from lower SES backgrounds enter school with significantly lower language and early literacy skill levels than those from higher SES homes. Notably, Aboriginal students may be at particular risk of literacy difficulty (Zubrick et al., 2006). Vocabulary levels in particular seem to be implicated in the poorer literacy outcomes of low SES students (Beck & McKeown, 2007a).

The second group of students at risk for poor literacy outcomes are those with specific language impairments (Catts, Fey, Tomblin, & Zhang, 2002; Flax et al., 2003). Specific language impairments (SLI) are associated with both genetic and idiopathic factors (Flax et al., 2003), and may be related to neurocognitive processing difficulties (e.g. Corriveau, Pasquimi, & Goswami, 2007; Leonard et al., 2007) rather than lack of appropriate linguistic stimulation. Students with SLI present with delayed or disordered expressive or receptive language skills without evidence of intellectual disability, pervasive developmental disorder, sensory impairment, or other obvious cause (Barrett & Hammond, 2008; Corriveau et al., 2007). SLI is generally confirmed after assessment by a speech pathologist, although many students with SLI may remain undiagnosed (Williams, 2006). Up to 7% of school aged children may experience specific language impairments (Tomblin et al., 1997). These students may have weaknesses in vocabulary knowledge, word and sentence structure, comprehension, narrative or discourse. Many will also have difficulties with phonology or articulation; that is, with learning and using the correct pronunciations of words (Barrett & Hammond, 2008). Students with specific language impairments are significantly more likely than other students to experience difficulty in acquiring normal literacy skills, with between half and two-thirds of students with SLI also presenting with a literacy disability (Catts et al., 2002; McArthur, Hogben, Edwards, Heath, & Mengler, 2000).

Irrespective of whether children's oral language impairments are the result of biological or environmental factors, children with weak oral language skills remain at risk for academic and social difficulties. It is clear that children with oral language deficits in more than one area (e.g., phonology, syntax, or vocabulary) are at greater risk not only for decoding deficits during early reading instruction, but for comprehension difficulties later (Bishop & Adams, 1990; Nation, Snowling & Clarke, 2007; Simkin & Conti-Ramsden, 2006).

A wide range of language skills are important for effective reading (Hay, Elias, Fielding-Barnsley, Homel, & Frieberg, 2007; Scarborough, 2005). Vocabulary, in particular, has been found to be important in both decoding and comprehension (Beck & McKeown, 2007b; Ouellette, 2006; Wise, Sevcik, Morris, Lovett, & Wolf, 2007). Vocabulary size has a moderate but robust predictive effect on decoding and reading comprehension both in lower primary school (Roth, Speece, & Cooper, 2002; Vellutino, Tunmer, Jaccard, & Chen, 2006) and later (Senechal, Ouellette, & Rodney, 2006). McGuinness (2005) has suggested that students may be at real risk of literacy difficulty if they have vocabularies in the lowest 5-6 % of the population. Recent research has suggested an important role for vocabulary acquisition in the development of phonological representations of words, a process that may support the development of phonemic awareness (Senechal et al., 2006; Walley, Metsala, & Garlock, 2003).

A third group of students at risk for literacy difficulties are those who have a family history of reading problems. In particular, difficulty with acquiring phonemic awareness—the ability to isolate and manipulate the individual phonemes in words—puts students at risk in transitioning to literacy. The tendency to experience difficulty with phonemic awareness has a significant genetic component which manifests itself in intergenerational susceptibility (Flax et al., 2003). Many students with oral language difficulties will also have problems with phonological awareness (Carroll & Snowling, 2004) although not all children with phonological awareness problems have oral language difficulties (Samuelson et al., 2005; Scarborough, 2005). While a possible common underlying mechanism for oral language impairments and phonological processing impairments has been posited (Snowling, 2005) there is only a partial overlap, and the relationship between these two factors remains unclear (Flax et al., 2003; Gilger & Wise, 2004). In either case, students with poor oral language, poor phonological processing, or both, are at risk of literacy difficulties and can be found in virtually every classroom.

Essential Skills and Knowledge for Successful Early Literacy

Gough and Tunmer (1986) have made the case for the Simple View of reading, arguing that there are two distinct and essential components that contribute to early literacy development: oral language comprehension and effective decoding skills. According to the Simple View, these are the two necessary, and sufficient, conditions for appropriate reading development. If either oral language comprehension or decoding is impaired, reading will be ineffective. If both skills are strong, reading success is assured (Figure 1). The Simple View of reading has been supported by analyses of the oral language and phonological awareness skills of students with comprehension and decoding difficulties (e.g. Catts, Adlof, & Weismer, 2006; Joshi & Aaron, 2000; Vellutino et al., 2006).

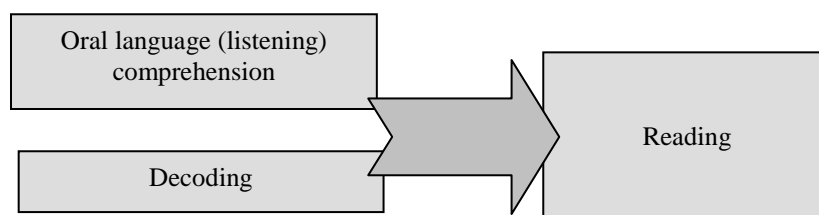


Figure 1. The Simple View of reading (Gough & Tunmer, 1986)

Children with oral language impairments may have limited skills in both listening comprehension and decoding and may therefore be at significant risk of experiencing reading difficulties. An instructional model which maximises students' emerging decoding skills while also addressing their oral language skills is therefore logical from the perspective of the Simple View of reading, and offers a practical and powerful model for intervention (Roberts & Scott, 2006).

Supporting Oral Language Skills

One effective approach to supporting students' oral language comprehension is through structured, child-centred interaction. One example of this type of approach is *dialogic reading*, a

technique described by Whitehurst and colleagues. In dialogic reading, the roles of the adult and the child are incrementally reversed, with the child taking the role of story-teller and the adult providing scaffolds, support and encouragement for the child's attempts. Questions and comments from the adult are designed to extend and focus the student's contributions (Whitehurst & Lonigan, 1998). Child talk and adult scaffolding are therefore maximised, providing a fertile context for language development. This technique has been effectively used and adapted in home, day-care and classroom contexts, resulting in sustained improvements in children's language skills (Fielding-Barnsley, 2000; Whitehurst & Lonigan, 1998).

While the *breadth* of children's vocabulary appears to be related to their phonological awareness and decoding ability, the *depth* of their vocabulary knowledge may be a more significant predictor of reading comprehension (Ouellette, 2006). Children not only need to recall words, they also need to have a rich understanding of their meanings in relation to other words through the activation and development of semantic schema. However, as Beck and McKeown (2007b) have established, teaching vocabulary is not easy. New vocabulary can not be efficiently taught merely by exposing students to new words through conversation or by reading books aloud. Students with language impairments find it harder to learn the meanings of new words than their peers. They need a greater number of exposures to the words, and they need them to be explained more explicitly (Coyne, McCoach, & Kapp, 2007). Therefore both explicit and embedded-but-focussed learning contexts for the development of target vocabulary and semantic associations are desirable (Beck & McKeown, 2007a).

Supporting Decoding Skills

The second element of the Simple View's reading equation is the decoding component. Word decoding relies on both phonemic awareness and knowledge of the relationship between letters and the phonemes they represent. According to some theorists, phonemic awareness is not a *prerequisite* but a *co-requisite* for emergent literacy: as children learn to read and spell, their phoneme manipulation skills improve (Ehri et al., 2001; McGuinness, 2005). Thus, there is a reciprocal relationship between learning how words are written and learning how the spoken sounds in those words fit together.

Although students can learn to blend and segment phonemes orally without the assistance of letter prompts (e.g., Muter, Hulme, Snowling, & Stevenson, 2004), it is more efficient for phoneme awareness and letter-sound knowledge to develop together (McGuinness, 2004). Traditionally, learning to blend phonemes as an aid to decoding words was not attempted until students had "learnt" all the letters of the alphabet. However, recent research has highlighted the superior efficacy and efficiency of teaching students to blend sounds into words as soon as a few letter-sound correspondences are known (Johnston & Watson, 2004). This approach, known as synthetic phonics, effectively combines phonemic awareness skills with letter sound correspondences so that children can use sounding out to read and spell increasingly complex words. Teaching early at-risk readers synthetic phonics skills in a systematic progression has been found to be a highly effective approach to improving early literacy outcomes (Hatcher et al., 2006).

Having identified the two essential pre-requisite skills required for effective literacy, namely oral language comprehension and decoding, it is important to consider the pedagogical approaches which might best be utilised to achieve improvements in these skills.

Effective Pedagogical Approaches

Explicit and Embedded Instruction

Many early childhood educators are experts at providing children with rich, engaging classroom contexts in which to communicate, explore, and develop socially and emotionally. Best practice demands that excellent early childhood education should also provide fertile grounds for literacy development. With this in mind, there are three particularly effective and appropriate principles for supporting students at educational risk within inclusive early childhood classrooms: the

use of a combination of embedded and explicit learning experiences, the development of a systematic learning plan with clearly sequenced teaching foci, and the use of small group learning contexts.

In the recent *Teaching for Growth* report commissioned by the Department of Education and Training in Western Australia, Loudon, Rohl and Hopkins (2008) analysed the practices of Pre-primary and Year One teachers who had been effective in achieving higher than average improvements in their children's early literacy development. They noted that the most effective teachers displayed high levels of responsiveness, inclusiveness, and challenge. These teachers were also more likely to provide explicit explanations, undertake regular assessment, and encourage independence. In terms of literacy teaching practices, the researchers found that:

The more effective teachers of Pre-primary and Year1 childrentook a highly structured systematic approach to the explicit teaching of word-level knowledge and skills that included phonological awareness, phonics and spelling. These teachers identified a sequence of what needed to be taught, taught it explicitly, persistently reinforced what was being learnt and provided many opportunities for guided and independent practice....Another feature of these teachers was that they often embedded their teaching of word level concepts and skills within a broad theme of work so that children were able to see a purpose and use skills and knowledge in meaningful ways (p. 60).

Also of importance were the researchers' findings about how the most highly effective teachers focused on explicit and embedded oral language activities, in particular when teaching vocabulary and semantic associations:

The development of oral language was part of an overall sequence of learning for the more effective teachers. For those located at the upper end of the scale oral language tasks were frequently integrated into a theme, with a specific focus on developing related discourses that included content-specific vocabulary. These more effective teachers engaged children in extended discussions where children were scaffolded in extended, thoughtful conversations with other children as well as with the teacher. Sometimes these conversations took the form of a game, where children were required to provide clues, ask questions, or make informed answers. (Louden et al., 2000, p. 38)

This focus on a careful combination of explicit and embedded activities is also supported by other researchers who have investigated ways to support students at risk of literacy difficulty. Justice and Kaderavek (2004) have argued that effective early intervention programs for students at risk need to encompass a combination of explicit and embedded learning experiences. Embedded learning experiences provide children with crucial opportunities to engage in meaningful and purposeful literacy practices and to make links between different aspects of explicit teaching. Explicit learning experiences allow teachers to plan for intensive, focused learning about crucial skills and concepts in literacy development and to scaffold and support those learning experiences to maximise student learning.

A systematic approach with clearly identified and sequenced teaching points is crucial to ensure that instructional activities are of optimal efficiency. Students who are at highest risk benefit the most from systematic and intensive learning experiences (McGuinness, 2004; Simmons et al., 2007). These focused learning activities can be provided in the context of a rich and multifaceted early childhood environment. Systematic approaches to literacy instruction have been recommended in the United States by the *National Reading Panel* (National Institute of Child Health and Human Development, 2000), in the United Kingdom by the *Independent Review of the Teaching of Early Reading* (Rose, 2006) and in Australia by the *National Inquiry into the Teaching of Literacy* (NITL, 2005) based on comprehensive meta-analyses of literacy research and investigations into current teaching and learning practices. As Wyse and Goswami (2008) emphasise, systematic instruction does not preclude embedded learning contexts; indeed, both discrete and contextualised teaching approaches provide effective and valuable avenues for improving students' word decoding skills.

The third important consideration is the size of the instructional group. While it might be assumed that one-on-one tutoring would result in optimal outcomes, there is evidence that this is not always the case. A meta-analysis of reading instruction programs for the *National Reading Panel* indicated that small group instruction was more effective overall than either individual or whole class instruction (Ehri et al., 2001), and is certainly more efficient in terms of time and staff resources

(Hatcher et al., 2006). Vaughn and colleagues have argued that, in general, smaller groups provided a better context for effective instruction than larger groups. They observed that small group instruction is superior, based on effect sizes, for both students with learning disabilities and normally developing children (Vaughn, Hughes, Moody, & Elbaum, 2001). Small group instruction provides opportunities for multiple interactions between teacher and students and between the students themselves, allowing for frequent modelling and prompt feedback. Vaughn et al. have suggested that teacher-led small groups of three to six children are ideal. This group size corresponds well with the expected number of students at risk for academic difficulties in a class of 20-30 students.

The Use of Education Assistants as Tutors

The effectiveness of any intervention will depend on how well it is implemented. For students already at risk, making the most of opportunities is crucial. Otherwise, not only might students fail to make gains, they might miss out on benefits they would have received by undertaking the regular alternative classroom program during the intervention sessions. It is therefore important to consider whether education assistants, who may not have had formal training, are able to provide effective learning experiences for students.

Several programs have effectively used education assistants to tutor students with emergent literacy difficulties (Allor, Gansle, & Denny, 2006). For example, the *Early Literacy Support* program from the United Kingdom achieved significant improvements in early literacy skills using education assistants as tutors for small groups of six-year-old children requiring additional support (Hatcher et al., 2006). In a related study, Bowyer-Crane et al. (2008) reported successful interventions in both oral language and phonology for five-year-olds using education assistants as tutors. Duff et al. (2008) reported that trained education assistants successfully implemented a vocabulary-focused intervention to improve reading outcomes for difficult to remediate eight-year olds. Given adequate acknowledgement, support, and mutual understanding of expectations, many education assistants value being assigned particular instructional responsibilities (Giangreco, Edelman, & Broer, 2001).

Woolley and Hay (2007) reviewed the research on tutoring of students by parents and education assistants. They found that with sufficient training, tutors could be more effective in helping students than could untrained classroom teachers. However, they also found that the most benefit was obtained when the program was explicit and structured, and when tutors received training and feedback about how to implement programs. They reported that the relationship between the tutor and the person training them was very important, and that effectiveness was affected by the tutors' sense of competency and sense of efficacy.

Trialling the Early Intervention Model

The early intervention model trialled in this study involved four 30 minute sessions per week over 15 weeks, implemented by education assistants working with small groups of preprimary children in a quiet area within or adjacent to their regular classrooms. The schools selected to take part in this study were located in rural areas in the south west of Western Australia. In each school, pre-primary classes were identified for the study and appropriate permissions and ethics clearances were obtained. In each class, the teacher was able to allocate a daily half-hour timeslot during which the education assistant could work with a small group of students to help develop their language and literacy skills. A total of seven classes from four schools participated in the study.

The children who were selected to take part in the study had below average oral language skills which were assumed to put them at risk for literacy difficulties. Students were selected from a pool of potential candidates based on a teacher screening checklist devised for the purpose by the researcher and were then assessed on two well-established oral language measures: the Peabody Picture Vocabulary Test, 3rd edition (PPVT-III; Dunn & Dunn, 1997) and the Core Language subtests of the Clinical Evaluation of Language Fundamentals Pre-school-2 (CELF P-2, Australian ed.; Wiig, Secord, & Semel, 2006). Students with scores that were at least one standard deviation below the mean on either of these measures were considered eligible for participation in the study. Groups of between three and five students from each class who met the criteria were selected. The limited number of students who fit the criteria precluded the establishment of control groups.

Participating students were assessed using the Test of Preschool Early Literacy (TOPEL; Lonigan, Wagner, & Torgesen, 2007) to determine their baseline emergent literacy skills in the areas of expressive vocabulary, print knowledge (alphabet knowledge and text conventions), and phonological awareness. This test is standardised and age-controlled, allowing pre- and post-test scores to be meaningfully compared. Lonigan and colleagues have reported high internal consistency (96), test-retest reliability (91) and inter-scorer agreement (98) for the composite index of the TOPEL. The construct validity of the TOPEL is supported by reports in the test manual of large to very large (.59 – .77) correlations with common assessments of early language and literacy, including the Test of Early Reading Ability-Third Edition (TERA-3; Reid, Hresko, & Hammill, 2001), the Expressive One-Word Picture Vocabulary Test (EOWPVT; Brownell, 2000) and the Comprehensive Test of Phonological Processing (Wagner, Torgesen, & Rashotte, 1999).

A number of other measures of phonemic awareness (initial sound segmentation and blending) and letter-sound knowledge were also taken for each student, including onset awareness measures adapted from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2002) and initial sound and print awareness measures drawn from the Phonological and Literacy Screening Pre-K (PALS; Invernizzi, Sullivan, Meier, & Swank, 2004). The reliability and validity of the DIBELS measures have been determined statistically through correlations with other established measures and through comparison of alternative forms (Hintze, Ryan & Stoner, 2003). The Initial Sound Fluency measure was found to correlate with the Phonological Awareness composite of the CTOPP at .60. There are 20 alternative forms for the DIBELS Initial Sounds assessment, with a reported correlation of 0.72 as determined over six assessment points throughout a school year.

The reliability of the PALS measure is reported in the test manual in terms of internal consistency (.93 and .75 for the initial sound and print awareness subtests respectively) and inter-rater reliability (.99 for the initial sound task). No inter-rater reliability estimates have been provided for the print awareness subtest. The validity of the PALS measure has been determined through correlational analyses with a number of existing measures, including the TERA-3 (.67), the Test of Language Segments (.41) and the Child Observation Record (.71). As such, the assessment tools used in this study have been demonstrated to be valid and reliable measures of students' oral language and literacy skills. The students were assessed on these measures before the program began and then at the end of the fifteen-week intervention period.

Some of the education assistants participating in this study were experienced in supporting students with specific literacy interventions. Others routinely provided general support with learning activities in the classroom, but had limited experience in providing small group support for students at educational risk. Each of the education assistants expressed a willingness to take part in the project, and a desire to support outcomes for the students identified in the screening. The education assistants were provided with an initial training session and weekly half hour visits during the 15 weeks of the program. During these sessions, they were able to observe the researcher demonstrating activities to the students. They then presented activities themselves, received feedback about implementation, and asked questions about specific aspects of the program.

The intervention model, which was referred to as the *Words and Letters* program, included both embedded and explicit learning experiences. The sequence of presentation of target skills and knowledge was planned through the development of a scope and sequence chart (see Appendix). Based on this outline, links to embedded activities were developed. The activities were systematically structured and sequenced. They involved motivating contexts, including book reading and a range of focused activities and games. Such an approach can be distinguished from a child-centred or whole language approach, in which the graphophonic links, phonemic awareness activities or vocabulary items emerge from text or discussion rather than being specified beforehand.

The intervention program was designed to employ supportive instructional techniques as described by Kaderavek and Justice (2004). These included the use of intermediate targets (those achievable by children with intensive adult support), context manipulation (achievement of targets in a range of modalities and contexts), dynamic assessment (whereby achievement of intermediate targets is assessed regularly using measures that allow quantification of progress), and cycled targets (whereby new targets are continuously introduced while old targets are revised and updated). The

Words and Letters program followed a number of additional instructional guidelines as recommended by Santi, Menchetti and Edwards (2004). For example, the program provided the instructors with clear examples, provided all necessary stimulus resources, incorporated modelling and feedback as instructional tools, included frequent opportunities for practice and review, clearly sequenced activities by difficulty, and provided for adaptations to increase or decrease difficulty. While the education assistants were provided with session scripts to use as guidelines, they were encouraged to be flexible and responsive to the students as they become confident and familiar with the techniques. They were able to make adjustments in terms of asking questions, providing scaffolds, and modifying activities as required, while maintaining the planned learning sequence and targets. They could omit activities if the sessions went overtime, or change the games used to achieve specific outcomes based on student preferences or attention levels. The three components of each 30 minute session were

1. Shared reading of a picture book
2. Phonemic awareness/Decoding activities
3. Vocabulary games

Each session began with a shared book, which was used throughout the week. Each book was selected based on its appeal to students and on the opportunities it provided for promoting student dialogue, illustrating print concepts and introducing specific and relevant vocabulary. The shared book reading involved the dialogic reading technique described above in which children are encouraged to take active roles in discussions and storytelling. The education assistants were trained through modeling and feedback to respond to students' needs by adjusting levels of scaffolding and providing them with linguistic and emotional support. They were taught to use a balance of comments and a variety of different question types and levels based on the CROWD acronym: Completion, Recall, Open questions, "Wh" questions and Distancing (Fielding-Barnsley, 2000). They were shown how to draw children's attention to print concepts and vocabulary during reading and re-telling of the story.

The decoding activities included modelling, individual and choral student responses, and explicit feedback. Activities were designed to be focused and fast-paced and to ensure maximal student attention and participation. Students were explicitly taught to recognise, recall and reproduce the letter-sound correspondences associated with *m, s, f, a, t, b, g, w, d, n, o, i, and p*; to identify initial sounds in words; and to blend letters to decode simple CVC (consonant-vowel-consonant) words such as *man*. Most activities involved a game format which was intrinsically motivating, but verbal praise, tokens, and sticker rewards were also employed as appropriate. Pre-primary students find guessing games highly motivating and engaging, and these were used liberally during the program. Other traditional games such as Snap and Concentration were modified to match the attention levels and reinforcement schedules appropriate for four and five year old children. Brief letter formation activities (hand-writing) were included for most groups during one or two sessions per week.

Vocabulary targets were developed which matched with relevant early childhood "themes" (such as foods, transport, animals, floating and sinking) and expanded on the vocabulary items found in the shared books. The selected items included nouns, verbs, prepositions and adjectives. Activities included both receptive and expressive vocabulary tasks, and were usually in the form of guessing and matching games. Students were encouraged to select, name and describe pictured items. They listened to — and provided clues about — the pictured objects, actions or attributes. Classification tasks were also included and required students to group, label and distinguish between items based on attributes, for example, *animals that are furry* or *machines that can fly*. The education assistants were asked to keep brief checklist records of the students' engagement with the tasks and achievement of the learning targets for each session.

Results

TOPEL and Monitoring Data

Prior to the beginning of the intervention program, 25 students were assessed using the TOPEL. By the end of the program, 19 of these students were still in the age range covered by the TOPEL and were retested. Table 1 summarises the students' results on pre-intervention and post-intervention assessments on the TOPEL subtests and the composite Early Literacy Index (ELI). The intervention group's mean ELI score prior to the intervention was 82, and the mean post-intervention ELI was 92. A repeated measures two-tailed t-test indicated that the difference in means was

significant, $t(17) = 6.34$, $p < .05$. Repeated measures t-tests for each of the subtests also revealed statistically significant changes; however, the assumptions for normality of the distribution are less robust. Table 2 summarises the t-test statistics.

The TOPEL standard scores are age-controlled, so any increase in the subtest or ELI scores indicates a change that is beyond the improvement that would be expected as a result of typical learning at home or in the classroom. While it is important to stress that such a comparison is not a substitute for a control group, gains made by individual students provide an indication of meaningful progress. As can be seen from the data in Table 1, all except three students showed an improvement on his or her ELI standard score of more than three points (the standard error) over the course of the intervention, and all students made progress in at least one area. The group's average Early Literacy Index score changed from 'Below Average' to 'Average', representing a change in the standard score of 10 points. This is a moderately large effect size ($d = .79$) in statistical terms, and is also of practical significance for students attempting to engage with the literacy curriculum of the classroom. At the beginning of the intervention, 87% of students could have been considered to have been at risk for early literacy failure based on the descriptor cut-off of a standard TOPEL ELI score of 90. At the end of the program, 42% would still be considered at risk according to the same criterion (Figure 2). The mean score for the *Words and Letters* group on each subtest before and after the intervention is illustrated in Figure 3.

Table 1. Pre-and Post-Test Early Literacy Scores for the Words and Letters Group

Student	TOPEL subtest and ELI scores									
	Pre-Program					Post-Program				
	PK	DV	PA	ELI	Descriptor	PK	DV	PA	ELI	Descriptor
Wayne*	71	81	73	68	Very Poor					
Sky	87	105	93	93	Average	104	111	104	107	Average
Jennifer	73	93	93	82	Below Average	74	104	104	92	Average
Brodie	91	87	88	84	Below Average	92	94	83	86	Below Average
Raelene	92	55	88	72	Poor					†
Chief	70	101	76	77	Poor	87	109	65	83	Below Average
Birdie	74	84	84	75	Poor	70	91	95	81	Below Average
John	71	101	90	84	Below Average	79	102	98	91	Average
Chris	86	63	55	59	Very Poor					†
Donald	71	87	55	63	Very Poor	71	96	84	79	Poor
George	86	83	73	75	Poor					†
Rhianna	82	87	104	88	Below Average					†
Seth	66	94	86	77	Poor	75	100	79	80	Below Average
Ben	84	98	84	86	Below Average	89	101	82	92	Average
Ebony	73	93	93	82	Below Average	79	96	101	89	Below Average
Tom	87	93	80	83	Below Average	109	98	91	99	Average
Billie	74	68	59	58	Very Poor	75	73	64	62	Very Poor
Claire	94	91	107	96	Average	114	104	117	114	Above Average
Belle	94	106	124	110	Average	101	113	119	113	Above Average
Rick	96	100	79	89	Below Average	94	105	93	96	Average
James	82	87	83	79	Poor	92	90	98	91	Average
Tammy	79	87	79	76	Poor	91	105	101	98	Average
Mannie	106	102	98	102	Average					†
Trent	71	73	71	64	Very Poor	73	88	81	75	Poor
Maggie	89	103	79	87	Below Average	110	111	110	113	Above Average
<i>n = 25</i>	82	89	85	81	<i>Below Average</i>	88	100	93	92	<i>Average</i>

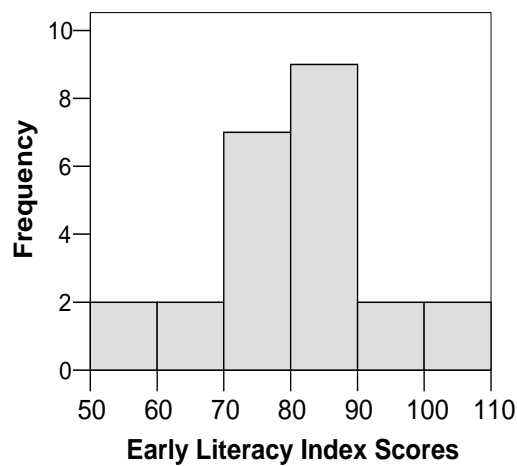
Note. †=Unable to recalculate scores due to age over 6;0. *= Did not complete intervention; left school.

PK = Print Knowledge, DV = Definitional Vocabulary, PA = Phonological Awareness, ELI= Early Literacy Index. All student names are pseudonyms.

Table 2. Repeated measures t-tests for pre- and post-test TOPEL scores

Subtest or ELI	n	Pre-intervention		Post-intervention		Difference	t	p
		M	SD	M	SD			
Print Awareness	19	80.32	9.65	88.37	14.21	8.05	-4.30	<.001
Definitional Vocabulary	19	92.16	10.16	99.53	9.72	7.37	-7.41	<.001
Phonological Awareness	18	86.00	13.94	93.61	15.62	7.61	-3.07	<.01
Early Literacy Index	18	82.33	11.48	92.33	13.87	10.00	-6.21	<.001

Pre-intervention TOPEL ELI scores



Post-intervention TOPEL ELI scores

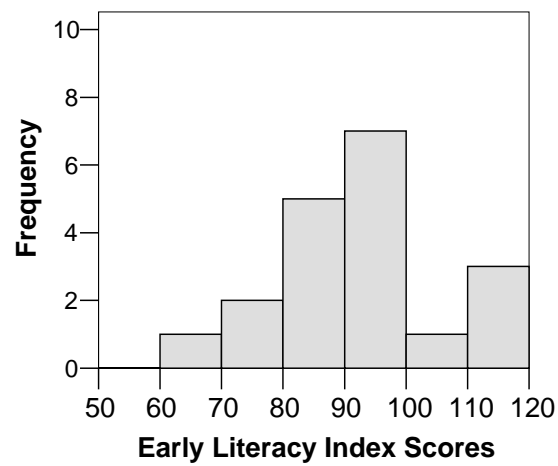


Figure 2. Pre- and post-intervention histograms showing the shift in distribution of scores

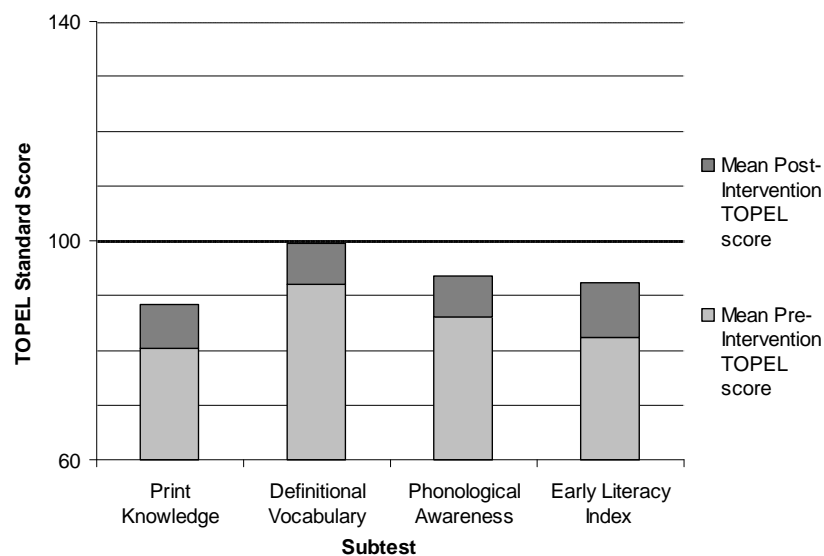


Figure 3. Changes in the intervention group's scores on the Test of Preschool Early Literacy.

Case Studies

A case study of one student and one school will be presented to provide a brief insight into the impact of the program. However, it should be noted that there was considerable variation between students in their progress profiles over the course of the program, so there was no ‘typical’ child to select for the case study. James, for example, made significant progress in some areas and less in others. Other students had contrasting profiles of development, although all improved in one or more areas. Likewise, the different schools experienced varying benefits and challenges from the intervention. All school, student and staff names are pseudonyms.

James

James attended Marri Park Primary school. The parent survey conducted prior to the program indicated that while James had been referred for speech pathology assessment, he was still on a waiting list. His mother reported that he had some speech problems and had difficulty staying on topic. She also noted difficulty with “using good long sentences”, and with having conversations, concentrating and following rules.

James’s teacher reported the following areas of concern with respect to his oral language skills prior to the intervention: the need to have instructions simplified or repeated, limited use of full and grammatically correct sentences, and some difficulty in providing explanations, in using specific vocabulary and in providing relevant responses to questions.

James achieved a receptive vocabulary score of 80 (moderately low) on the PPVT-III and a CELF P-2 CLS score of 78, consistent with a mild to moderate language disorder. James’s score was in the low range on two CELF P-2 subtests (Sentence Structure and Expressive Vocabulary) suggesting difficulties with both vocabulary and syntax. Teacher and parent observations, combined with the particularly low scores on the sentence structure sub-test of the CELF P-2, suggest that James may have had an undiagnosed specific language impairment. Pre-program TOPEL scores were 82 for Print Knowledge, 87 for Definitional Vocabulary and 83 for Phonological Awareness (in the below average range in each case). James’s *PALS Word and Print Awareness* score was below the normal developmental range at the beginning of the program, indicating that this skill required attention, although his *Beginning Sound Awareness* score was within the normal range.

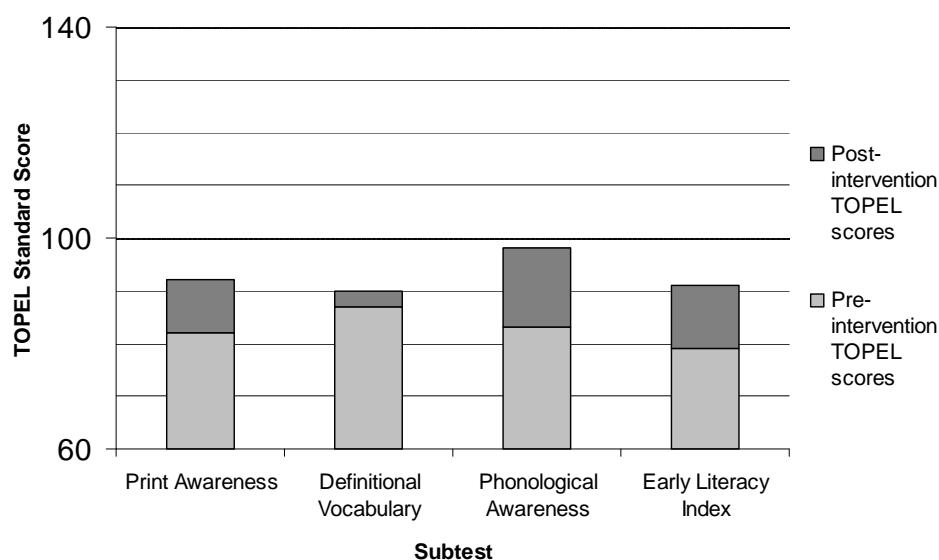


Figure 4. Changes in James’s scores on the Test of Preschool Early Literacy

James undertook the *Words and Letters* program as part of a group of three students. Donna, the education assistant working with this group, sought feedback to ensure that effective program implementation and fidelity to activities and scripts was high. James attended most sessions, but his levels of engagement and achievement varied from week to week.

James appeared to enjoy the opportunity for interaction during stories and activities. While irrelevant or tangential comments typified James's responses during shared book reading at the beginning of the program, the researcher and education assistant noted an improved ability to provide appropriate responses to questions and comments during stories. This observation was not quantified, however, because discourse-level comprehension skills were not formally assessed. Nonetheless, James made minimal progress in expressive vocabulary as measured by the TOPEL (see Figure 4). Thus while James's engagement in focused dialogue appeared to have improved, he still demonstrated word finding difficulties and syntactic immaturity.

James made steady progress on the emergent literacy measures of letter-sound naming and initial sound isolation, as can be seen in Figure 5. His improved phonological awareness and print awareness scores on the TOPEL provide additional evidence of this growth (Figure 4). At the end of the program, James was successful with activities requiring him to blend three-letter words using the letters presented in the program. At this stage, his teacher decided he could join in with the home reading books that other students in the class were taking home. He had made moderate gains of 12 points on the TOPEL ELI over the course of the program (the average gain was 11 points). His score changed from 79 (poor) to 91 (average) with notable gains in the areas of Print and Word Knowledge and Phonological Awareness.

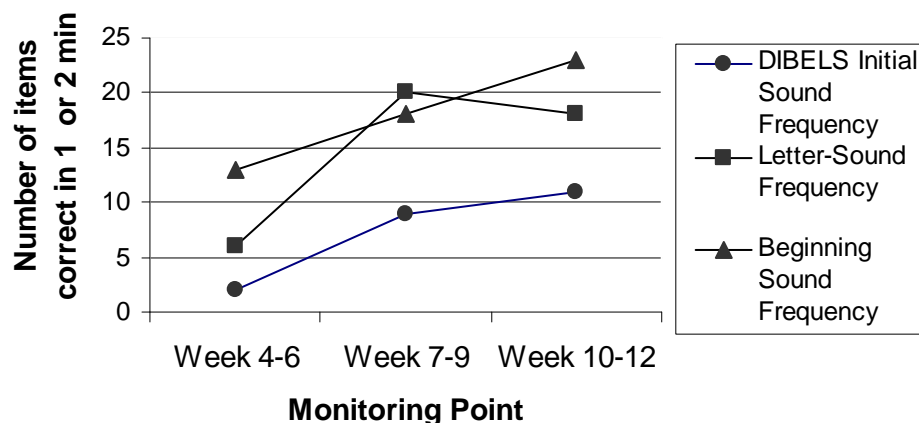


Figure 5. Monitoring data for James showing growth in emergent literacy skills.

Thus it would appear that the context and activities provided by the *Words and Letters* program had a beneficial effect on James's emergent literacy skills, although it seems likely that James will continue to require additional support, especially in light of his below average oral language skills in a number of areas. James was one of twelve students undertaking the *Words and Letters* program at Marri Park. As at other schools, the staff members involved were keen to explore new approaches for supporting their students at educational risk, and gave their time and commitment to the project with enthusiasm and professionalism. The outcomes of the program at this school will be considered next.

Marri Park

Marri Park is a large primary school with approximately 80 pre-primary students, distributed between three classes. The pre-primary teachers, who were experienced classroom practitioners, regularly worked together on planning and development activities and were keen to ensure that their students developed appropriate emergent literacy skills. The intervention program proposal was presented to a team meeting and the teaching team decided that they would undertake the program with their pre-primary students, and were supported by the school principal. They involved themselves in the project by adopting it as the centrepiece of their own school-based professional learning project. As a result, they required background research information about the rationale and structure of the program, which was provided during professional development workshops presented by the researcher at the teachers' request. These sessions focused on: the development of oral language skills in students with language impairments, the risk factors for early literacy difficulties,

the rationale for the embedded-explicit approach, and the different components of the *Words and Letters* program.

The teachers worked together to find ways to deal with some of the practical requirements of the program, such as finding the necessary space to complete the intervention. The teachers altered the rotation schedules for their playground and classroom activity times, in order to ensure that there was always a free room available for the small groups to use and to ensure that the education assistants would have the necessary time to implement the program. The teachers all took the time to observe the intervention sessions and to liaise with the education assistants about the students' progress. During the course of the intervention, they hosted a network meeting with other teachers from the district to share their experiences of the program, and presented a report to the Marri Park school staff about the intervention and the students' progress.

The implementation of the *Words and Letters* program at Marri Park was not free from challenges. Some students presented with difficult behaviours and other special needs. Timetabling difficulties required sessions to be re-arranged. Staff changes meant that two education assistants had to share the intervention for one group, and illness meant that another education assistant was unable to present the last weeks of the program. Nonetheless, the intervention was completed, and as a group the Marri Park students demonstrated significant gains on the TOPEL Early Literacy Index.

The teachers and education assistants at Marri Park expressed satisfaction with the outcomes of the program for their students and were keen to provide a similar intervention for their next group of students the following year. However, there was some concern that staff changeovers would mean that some of the education assistants who had been trained in the program would be moving on to other classes, and new staff would not have the same opportunity to become familiar with the methods and materials used in the program. Fortunately, the classroom teachers and at least one education assistant would remain, and should therefore be able to share information about the embedded-explicit small group approach with new staff. However, this concern points to the importance of ensuring that all schools have access to literacy specialist teachers conversant with appropriate pedagogical approaches for early literacy intervention.

Overall, the intervention project at Marri Park proved to be a practical, effective and efficient means of supporting the emergent literacy skills of students with oral language impairments. The children enjoyed the games and stories and looked forward to the sessions. The teachers and education assistants took ownership of the intervention and improved their own knowledge and skills. As a result, they are likely to retain the support of the school administration to continue to provide effective early intervention for pre-primary students at educational risk.

Discussion

Children from low socio-economic backgrounds or those with specific language impairments may not have the requisite oral language competencies to allow them to gain maximum benefit from the early literacy curriculum of the classroom. A number of large scale studies have demonstrated the efficacy of appropriate early intervention in supporting the literacy development of students at educational risk during the first year of school (e.g., Bowyer-Crane et al., 2008; Hatcher et al., 2006; Simmons et al., 2007). The study reported here assessed the efficacy of an intervention program implemented by education assistants working with small groups of pre-primary students with low oral language skills in Western Australia.

Children who fail to benefit from instruction that is effective for most students will always require the most rigorous of research endeavours. While this study was a tentative attempt to explore the effectiveness of a small-group implicit-explicit approach using education assistants as tutors, it should be noted that further controlled studies are required before assumptions can confidently be made about the benefits of this intervention over others. Although the program elements were derived from evidence-based approaches for at-risk emergent literacy learners, there is no evidence that the materials or techniques presented during this intervention provide a better combination of activities than any contrasting approach. Ongoing research which compares different models of early intervention using the resources and skills available in typical school settings is warranted. Ideally, such research might be undertaken with larger groups of students in a wider range of schools and

might compare the relative efficacy of different components of an intervention. Comparison groups including a no-intervention control group would allow the relative merits of a range of approaches to be contrasted. In this case, more rigorous measures of program fidelity would need to be employed.

The study described here was designed to test the feasibility of one model of intervention in a small number of schools. While this study was limited in size and scope, and undertaken without a corresponding control group, the outcomes are consistent with existing evidence that a targeted adjunct intervention program can deliver a time- and resource-effective boost to emergent literacy skills at a critical point in students' journeys towards literacy. The results have also illustrated that, with very little additional burden on school resources, classroom education assistants can be supported to assist those students for whom literacy acquisition may be a challenge.

The emergent literacy development program used in this intervention (*Words and Letters*) integrated explicit and embedded literacy activities. Shared book-reading, phonics activities and vocabulary enrichment games were used together in a flexibly structured program designed to improve both decoding and oral comprehension skills. The group of students undertaking the program demonstrated a significant improvement in emergent literacy skills in three critical components of emergent literacy: vocabulary knowledge, phonological awareness and alphabet knowledge. Most students also demonstrated clear improvement in the target skills of initial sound isolation, letter-sound knowledge, and blending and segmenting of CVC words. A brief intervention of around 30 hours of instruction during the pre-primary year appears to have improved the ability of students at educational risk to benefit from the early literacy experiences of the mainstream classroom.

Schools undertaking the Words and Letters program with their students were provided with a self-contained intervention package that included training sessions for education assistants, scripted lesson outlines, books for shared reading, and resources for games and activities. This approach allowed classroom teachers and education assistants to implement the intervention without the need for possibly prohibitive additional planning and preparation time. Provision of these resources also allowed both classroom teachers and education assistants to develop familiarity with the approach and the program components through multiple worked examples. Because of the need to maintain consistency across sites, the focus topics were presented in the same order in each classroom. Nonetheless, focus topics for a pre-primary intervention program should ideally be linked to classroom themes or learning projects.

Pre-primary teachers who have become familiar with the components of effective literacy development entailed in the Simple View of reading (Gough & Tunmer, 1986) and are conversant with the embedded-explicit approach advocated by Justice and Kaderavek (2004) might wish to develop their own materials. Books for dialogic reading (see Whitehurst & Lonigan, 1998) could then be selected to complement class themes. Focus vocabulary used within the program could be incorporated more fully into the rich, embedded learning contexts of stories, play centres and class discussions (see Beck, McKeown & Kucan, 2008). Relevant picture cards could be developed to be used in explicit vocabulary games and activities during the small group context.

The materials for the decoding component of an early support intervention could either be developed by pre-primary teachers or drawn from appropriate published materials. There are a number of resources available for developing early decoding skills using a systematic synthetic phonics approach which would be suitable for use with pre-primary students in a small group context. Inexpensive Australian resources are available (e.g., Rigg, 2007), as are well-known commercial programs such as *Jolly Phonics* (Lloyd, 1994) and *Sounds Abound* (Catts & Vertainen, 1993). In selecting appropriate resources, it is important to ensure a clear learning sequence that systematically and explicitly teaches phonemic awareness, including segmenting and blending of phonemes in words, alongside letter-sound correspondences.

The education assistants in this study were committed to reflective practice. They had established warm and supportive relationships with students, and were thus in an ideal position to help these young children to engage positively with early literacy experiences. With appropriate modelling, guided practice, and feedback, the education assistants developed effective tutoring skills which enabled them to implement a successful intervention program. It is encouraging that children can undertake a time-limited, inherently enjoyable learning program under the guidance of an adult they

trust and emerge more confident and better able to benefit from the rich literacy learning contexts of early childhood classrooms.

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Appendix.
Words and Letters Program: Scope and Sequence Chart.

Weekly Focus	Week									
	1	2	3	4	5	6	7	8	9	10
Book	Marvella and the Moon	A House for Hickory	A very important face	Tails	How to get to the giant's house	Grandma's letter	Zoo looking	Floating and sinking	Everyone knows about cars	The funny old man and the funny old woman
Print Concepts	Text directionality Letter 'm'	Text direction Letters 'f' and 'm'. Look for mouse, find, first, made, fell, found, magnificent	Letters in the text: f, s, m. Count letters in the words a, very & important	Isolation of words, finding a given word from visual match (tail). Read ' fat '	Identifying long and short words; counting words and letters	Counting letters in words. Title on the front cover.	Word matching – signs (in pictures) and text	Isolation of single words (count the words) f & s. Words: float, sink, feather, some	Look for 'd' and the word did in text on each page	Look for the word funny. Find long words and count letters. Find short words; if, is, it, & decode
Vocabulary	helicopter, hang-glider, aeroplane, hot-air-balloon, robot, rocket, engine, pilot (machines)	nest, shell, hive, hole, spider-web, cave, branch, puddle (homes)	eyes, skin cheeks, mouth chin lips, teeth eyebrows (body, face)	stumpy, curly, feathered, scaly, wide, large, hairy, rough	under, over, by, through, around, behind, along, into	letter envelope stamp, card writing address posting postman (postie)	lion, tiger bear crocodile zebra monkey parrot koala (animals)	heavy, light, sink, float, full, empty, shallow, deep. (opposites)	wheels engine petrol door gears mirror key/lock driving	wheel-barrow, saw, axe, shovel, ladder, tub, (tools) shed, barn (places)
Phoneme	/m/, /s/	/f/, /m/, /s/	/b/, /m/, /s/, /f/	/t/, /m/, s	/a/, /s/, /f/, /b/	/g/, /m/, /f/, /s/	m,s,f,b,t,g	/w/, /a/, /g/, /b/	/d/, /w/, /a/, /g/	/i/, /d/, /w/
Phonemic Awareness	Kinaesthetic and visual awareness of articulation points. Isolation of initial phoneme with exaggerated articulation.	KVA of articulation points. Isolation of initial phoneme (exaggerated articulation). Blending CVC with initial continuous sound	KVA for /b/, /m/ distinction. Isolation of initial phoneme after cue but not model. Blending CVC with i.	Isolation of initial phoneme after cue. Recognition of word with a initial phoneme (something beginning with....). Blending cvc into words.	Isolation of initial sound.	Isolation of initial sound. Blending vc and cvc.	Isolation of initial sound. Blending vc and cvc.	Isolation of initial sound. Blending vc and cvc.	Initial sound isolation. Identifying the final sound in a word given the initial and medial sounds: What's the missing sound for this picture?	Initial sound isolation. Blending vc and cvc words with medial /i/
Phonics Words	man, mop, mat, mud	fun, fat, fan, fig	bed, bin, bag, bat	tag, tub, tin, tap	gap, got, gun, gum	at, am, sat, mat, sad, bat	bag, bat, tag, big, mat, Sam	wig, wag, win, bag, big, fig	wag, bag, bat, sad, sat, dad, fat, mad	if, it, is, in, dig, big, fig, sad,
Letter	m, s	m, s, f	s, f, b	s t, b	s, t, a	m, t, a	g, M,	w,F,S	B, w, d	d, i

Words and Letters Program: Scope and Sequence Chart (continued).

Weekly Focus	Week					
	11	12	13	14	15	16
Book	What do you like to eat?	Little Mouse's Trail Tale	The enormous turnip	Animals we call pets	I am hot	Some machines are enormous
Print Concepts	Look for: Bear, Seal, Koala, Lion, Hippo, Monkey Look for a W at the start of each page.	Look for the capital O and decode the word on p. 11. Look for next, night, new, note.	Look at the title. Count the words and letters. Note that they are capitals. Ask ch to find M,S,T	On page 5, 7,9,and 11 ask children to identify food, water. Words with g,w,f	Find and read the word Dad and find words beginning with g, w, s, b	Match the upper and lower case letters on the title & headings. Look for all the text on each page.
Vocab-ulary	Popcorn Pancakes Cabbage Banana Grapes Beans Carrots Pear (fruit, vegetables)	Kitchen Bedroom Cupboard Fridge Bed Wardrobe Stove Drawers (furniture)	Pulling Pushing Planting Growing Digging Climbing Calling helping	Budgie Parrot Rabbit Guinea Pig Possum Bandicoot Squirrel eagle (wild/pet)	T-shirt Sunhat Swimsuit Shorts Sandals Trousers Jumper Shirt (clothes)	Tractor Harvester Loader Crane Bulldozer Truck Machine Enormous (machines)
Phoneme	/o/,/d/,/f/	/n/, /o/, /d/	All 12 phonemes, revision and consolidation			
Phonemic Awareness	Initial sound isolation Blending vc & cvc words with medial /a/, /i/, & /o/.	Initial sound isolation Blending vc & cvc words with medial /a/, /i/, & /o/.	Identifying the final sound in a word given the initial and medial sounds	Blending CVC words using all 12 phonemes	Identifying the medial short vowel sound in CVC words	Blending Cvc words using all 12 phonemes
Phonics Words	dot, dog, dig, wig, fig, got,	bin, win, tin, fan, man, not	Bob, Tom, bin, big, fan, fat, sad, Sam	Dad, Dan, At, Am tag, sit, fin, bit,	God, fog, bog, dot, sit, wig, tin, big, dam, bad, mad, sat	All words from previous weeks, Nan, In, Is, It, If
Letter	i, o, W	O, n	B, T	A, D	G, b	N, I