Chapter

Training Reading, Writing and Spelling Fluency: Centre-Periphery Dissemination through Interactive Multimedia

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Abstract

This chapter focuses on a reading, writing and spelling programme based on Luria's theories of automaticity, which uses repetitive paired reading and phonological referencing to develop fluency in reading, writing and spelling. All materials used in programme implementation are electronic and are currently delivered using email and cellphone technologies. The results have been promising, and the programme has a number of therapists, teachers, tutors parents and institutional users, both in South Africa and its neighbouring territories, as well as in the United Kingdom. Programme usage is supported via electronic manuals as well as an eight-module training course based on use of multimedia including email, cellphone and use of computer-based electronic material. The first half of the chapter describes the theoretical basis of the programme, and the methods used in its implementation. The second half focuses on the modular training course and its aims, and the centre-periphery model of development and evaluation used in disseminating the programme. The dissemination model is both evidence-based and interactive in its emphasis on assessment and evaluation and will increasingly involve the use of interactive website-based technologies as the programme grows in scale.

Keywords: reading fluency, writing and spelling fluency, phonological referencing, phonological recoding, automaticity, learning disabilities, centre-periphery dissemination, multimedia

1. Introduction

An estimated 20% of children have reading difficulties or have not learned to read fluently. This chapter describes a reading, writing and spelling programme based on a series of ebooks, which form part of a fluency-based intervention which is being used in work with children with reading difficulties by therapists, teachers and parents. The ebooks are based on the theories of the Russian neuropsychologist Luria [1–3], who proposed that automaticity is necessary for any acts (including reading, writing and spelling) to become fluent. Fluent acts then form the basis for higher level processing.

Following Luria, the ebooks are designed to be used with a form of oral impress procedure based on paired reading. This is simple to implement and differs from

the type of paired reading procedures documented in the literature, as the method involves additional repetition to develop phonic associations, rapid naming ability and automaticity in reading. The ebooks are set in large print with wide spaces between words to circumvent and provide maximal visual cues and also to prevent crowding, which has emerged in recent literature as a factor affecting reading in dyslexic children. The oral impress procedure also builds in visual tracking to maintain visual attention.

Once observable differences in reading fluency are noted, methods involving use of these materials for repetitive paired reading are combined with phonological referencing methods based on print-to-sound recoding, as the basis for developing fluency in writing and spelling. The results have been promising and indicate that the combined use of methods is effective in developing automaticity in reading, while at the same time building skills in print-to-sound translation, which can then be used both for improving word attack and for developing the working memory skills involved in writing and spelling both individual words, and words in sequence.

Gains in reading, spelling and sequential spelling scores indicate that combining paired reading with the teaching of phonics and with the teaching of phonological referencing leads to optimal results. Repetition is also necessary in implementation to enable the learner to acquire the phonic skills necessary for accurate visual word recognition, as well as the detailed orthographic representations necessary to write and spell individual words, and words in sequence. As these skills develop, this has effects on reading accuracy and rate of reading, as well as accuracy in writing and spelling. Reading comprehension also improves as the child's reading, writing and spelling become more fluent.

2. Developing automaticity in reading, writing and spelling

Luria [1–3] conceptualised higher mental processes as complex reflex activities, responsible for reflecting and working with the outside world. Following Vygotsky [4, 5, 67], Luria suggested that these reflex processes were social in origin, mediate in structure, and volunteer in mode of function ([1], p. 32).

In terms of Luria's conceptualisation of the development of higher mental processes, the development of automaticity in reading would be essential for its use in the hierarchical processing of information by the working brain. Following Luria [1], automaticity would be developed in reading, writing and spelling when there has been sufficient practice to enable these complex functional acts to become fluent enough to form the basis for higher mental processing.

Our fluency-based programme has been developed based on these principles. The processes of reading, writing, spelling and comprehension are conceptualised as linked on a functional level, with basic phonological and phonic skills initially being taught as a foundation for use in the processes of reading, writing, spelling and comprehension [61–63]. The use of repetitive paired reading is then combined with the teaching of phonics to provide the basis for developing reading fluency. Once observable difference in reading fluency is noted, the child is taught how to phonologically reference from print to sound to provide a metacognitive basis for developing fluency in writing and spelling.

In each case where this type of linked intervention across different areas and components has taken place, there has been steady and even progress. There has also been evidence of a backwash effect from application of the methods used in teaching phonological referencing skills into proficiency in one word reading ability as well as fluency in reading sequentially, as well as reciprocal effects from use of reading fluency methods into competencies in writing and spelling. The indications

would thus be that there is commonality of influence across the different areas of the fluency-based intervention programme described in this chapter.

3. Paired reading

One of the most successful methods for developing automaticity in reading has been what is called 'paired reading', which is based on the methods pioneered by Heckelman [6, 7] in the 1960s and the information processing model proposed by Laberge and Samuels [8, 9] in the 1970s. Based on positive results, paired reading has been widely used for developing reading ability (e.g. [10–17]) and forms the basis for developing reading fluency in our own programme.

The literature on paired reading reflects some differences in preferred methodology [18], as well as some differences between recommendations concerning the type of materials felt to be most appropriate for use in the process. Overall, however, there is consensus concerning the value of paired reading, with all of the studies indicating the potential of including parents as well as peer tutors as partners in the process of teaching children to read fluently.

Difficulty level of materials is an important variable to consider in developing paired reading programmes, but here there is a lack of consensus. Certain authorities suggest the value of fun reading materials, others the value of instructional level reading materials and others the value of reading material chosen to be at or near frustration level [18].

What is clear from the literature, however, is that the quality of scaffolding and support in paired reading is important, especially where difficult materials are chosen for use in paired reading programmes. How reading errors are corrected would appear to be less important, as the literature suggests that a wide variety of strategies have been used for doing so, particularly by teachers. It would, however, be important that the procedures used in paired reading are clear enough to be consistently used by parents, tutors and teachers, and that recommended procedures for correcting the errors made by children are also defined.

These principles have informed the development of our materials and methods for developing reading fluency, which are described in the section following.

4. Our reading fluency programme

Our programme for developing reading fluency involves use of a paired reading method called the 3 × 3 oral impress method, which involves the reading of paragraphs repetitively. The method is designed to be used with a series of phonically based, large-print books. The books are graded and are written in a way that builds repetition into the words used, as well as phrases used in sentences. They are also printed in a way that aims to avoid clutter [19–21].

Our materials thus aim to present the letters and letter strings associated with particular sounds and to present these visually in an uncluttered format. The 3 × 3 oral impress method is used to ensure that large-print phonically based material is presented to the child repeatedly. Repetitive oral reading is used to develop the association between the visual configuration of the letters within phonically regular words and their sounds as used in the written language the child sees, the spoken language the child hears and the words read by both adult and child.

Luria [1–3] suggests that cerebral organisation would be enhanced by this type of repetitive process, and this was also Heckelman's view when he pioneered the use of paired reading as a procedure. Heckelman [6, 7] reported that 24 students

involved in using what he called 'the neurological impress method' made exceptional gains in reading ability. The mean gain in reading comprehension was 1.9 grade levels after using the method daily for 15 minutes (a total of seven and a quarter hours) over a 6-week period. On the basis of these results, Heckelman suggested that paired reading is 'one of the most direct and fundamental systems of reading' involving a 'combination of reflexive neurological systems'.

Other subsequent researchers (e.g. [8–17, 22–25]) have reported positive effects of use of paired reading methods on reading ability. We have reported similar positive results [18, 26, 27] based on use of repetitive paired reading.

The results to date indicate gains in word reading, sentence reading, as well as gains in spelling and sequential spelling test scores when our 3 × 3 oral impress method has been used with large-print phonically based material and combined with the teaching of phonics as well as with the methods of phonological referencing described later in this chapter. Our work with children with reading, writing and spelling difficulties would support Heckelman's view that gains made are based on increasing neurological integrity [64].

Following Dehaene [28], what the 3 × 3 oral impress method does when used with our phonically based large-print reading fluency books is to present the visual word form area in the brain with strings of letters representing sounds repeatedly. This would have the effect of strengthening the connections between the visual areas in the brain and the areas of the brain involved in processing sounds and oral language, thus enabling the child first to read and then to read fluently.

The model for developing using the phonically based, large-print reading materials to develop reading fluency would be conceptualised as based on the coding and recoding of phonic associations and can be represented as in **Table 1**:

FUNCTIONAL LEVEL	CENTRAL PROCESSING LEVEL
Phonically Regular Reading Material	
↓	
Repetitive Paired Reading Methods	*Visual-Occipital and Parietal Processing Areas linked to Phonological and Language Processing Areas through Visual Word Form Area*
↓	↕
Rapid Naming Ability for Individual Words and for Words in Sequence	*Visual-Occipital and Parietal Processing Areas linked to Phonological and Language Processing Areas and Cortical Areas Involved in Phonological, Morphological and Semantic Working Memory*
↓	
Fluency based on Automaticity in Coding and Recoding	

Table 1.
Model for reading fluency development.

From the model presented in **Table 1**, it can be seen that use of our phonically based large-print materials for the development of reading fluency is based on repetitive paired reading with the aim of developing rapid and accurate naming of words, and words in sequence. On a central level, the repetitive paired reading methods would involve both forward and reverse processing from the visual and occipital areas of the cortex through the visual word form area to the areas of the cortex involved in phonological and language processing.

The procedures used in our programme are documented in a user's manual, which includes both theory and the methods used in programme implementation [29], as well as in a parent implementer's manual, which presents a step-by-step approach to implementation [30]. The theory is based on Luria [1–3] who conceptualised reading as a linguistic process in which repetition would be intrinsic to the development of automaticity in the recognition and naming of phonic associations. Following Luria, reading fluency would be developed through repeated stimulation of the areas of the cortex involved in phonological and language processing as well as the areas of the cortex involved in the phonological, morphological and semantic working memory used for reading individual words, and words in sequence.

The methods followed in our programme focus on developing accurate and rapid naming ability for individual words and words in sequence as an intrinsic part of the repetitive methods used to develop automaticity in reading. The procedures used involve initial work with phonically regular words and sentences and then on the rapid reading of a wider range of reading material.

Based on Luria's theories of automaticity [31], repetition would thus be intrinsic to the development of fluency in reading. The aim of our programme would to use repetitive paired reading to develop the coding, recoding and working memory abilities necessary for fluent and accurate reading and for self-teaching. Once observable differences in reading fluency have been noted and a child has attained a reading and spelling age at around the 8-year level (Note 1), work on developing writing and spelling fluency would be commenced using the phonological referencing and recoding procedures described in the next section.

5. Developing automaticity in writing and spelling

Fluency in writing and spelling is addressed in our programme through a variety of methods involving not only training in phonics and basic skills in writing and copying, but also by teaching the child phonological referencing skills. This involves teaching the child how to work from print to sound, how to analyse words based on phonic analysis of how words work and how to use the letters and letter combinations used to represent the vowels in words as the basis for remembering how words are spelled both individually and in sequence.

The aim is to build phonological, orthographic and morphological awareness through this process, which we call 'phonological referencing'. This is introduced through the Seven Vowel Phonic Analysis System, which is a procedure for teaching children through activities involving mapping the combinations of letters used in writing words to the sounds made when those words are spoken orally. It focuses in particular on developing skills in word attack as well as in spelling, through focusing on the letters and letter combinations used to represent the vowel sounds in words.

Following Luria [1–3], the Seven Vowel Phonic Analysis System is applied repetitively. This has effects in improving word attack in reading, as well as providing the phonic analysis skills and phonic associations on which spelling accuracy can be built. This is done by working from printed word to sound and from sound back to print. These phonological recoding skills provide the building blocks on which writing and spelling fluency can be developed.

FUNCTIONAL LEVEL	CENTRAL PROCESSING LEVEL
Copying of Phonically Regular Material	*Visual-Occipital and Parietal Processing Areas linked to Phonological and Language Processing Areas Involved in Reading and Writing of Individual Words and Words in Sequence*
Mapping Written Text to Sounds of Oral Language through Repetitive Phonological Referencing	*Visual-Occipital and Parietal Processing Areas linked to Phonological and Language Processing Areas Involved in Phonemic Analysis of Individual Words and Words in Sequence*
Use of Working Memory in Learning Letter Combinations Used in Words and Sequences of Words in Written Text	*Visual-Occipital and Parietal Processing Areas linked to Phonological and Language Processing Areas and Additional Cortical Areas Involved in Phonological, Morphological and Orthographic Memory for Individual Words and Words in Sequence*
Fluency based on Automaticity in Coding and Recoding	

Table 2.
Model for writing and spelling fluency development.

The model for using our phonically based, large-print materials for developing writing and spelling fluency would also be conceptualised as based on the coding and recoding of phonic associations and can be represented as in **Table 2**.

From the model presented in **Table 2**, it can be seen that use of our phonically based, large-print materials for the development of writing and spelling fluency is based on repetitive coding and recoding of phonic associations. As the recoding process involves both working from printed word to sound and from sound back to print, the use of our methods of phonological referencing would be based on widely distributed central processing. This would involve the visual and occipital areas of the cortex, the areas of the cortex involved in phonological and language processing and the areas of the cortex involved in phonological, morphological and orthographic working memory for words when written individually and for words when written in sequence.

Following Luria, repetition would be intrinsic to the development of automaticity in writing and spelling fluency. As with reading fluency, the aim would be to develop the coding, recoding and working memory abilities necessary for fluent and accurate writing and spelling and for self-teaching. This would be done through phonological referencing, using our Seven Vowel Phonic Analysis System.

6. What is phonological referencing?

The notion of phonological referencing has its basis in the 'self-teaching' model proposed by Jorm and Share [32–35]. According to this model, phonological

recoding (print-to-sound translation) performs a self-teaching function enabling the learner to acquire the detailed orthographic representations necessary for fast, efficient visual word recognition.

As Share [36] suggests, at p. 96:

> *'Although direct whole-word instruction and contextual guessing have also been proposed as options for developing orthographic knowledge, both theoretical and practical considerations suggest that only phonological recoding offers a viable route to printed word learning (see [34]). According to the self-teaching hypothesis, each successful identification decoding) of a new word in the course of a child's independent reading of text is assumed to provide an opportunity to acquire the word-specific orthographic information on which skilled visual word recognition is founded. Relatively few exposures appear to be sufficient for acquiring orthographic representations, both for skilled readers [37] and for young children [38–41]. In this way, phonological recoding acts as a self-teaching device or built-in teacher enabling a child to independently develop the word-specific orthographic representations essential to skilled reading and spelling'.*

Shahar-Yames and Share [42] suggest that spelling fulfils a self-teaching function in the acquisition of orthographic knowledge because, like decoding in reading, accurate spelling requires close attention to letter order and identity as well as to word-specific spelling-sound mapping. This highlights an additional dimension of reading-writing reciprocity in the compilation of word-specific orthographic representations.

Following the theories proposed by Share and his colleagues, our methods focus on teaching the child to map the associations between the letters and letter strings used in the printed word, and the sounds used in speaking the word orally. Our methods then focus on teaching the child to recode these phonic associations back into the writing and typing of both individual words and words in sequence. Working memory is then invoked in teaching and testing spelling, using revisualisation techniques.

The Seven Vowel Phonic Analysis System is used for this purpose, and the procedures used are documented in a user's manual, which includes both theory and the methods used in programme implementation [43], as well as in a parent implementer's manual, which presents a step-by-step approach to implementation [44]. The theory is based on the evidence of a common linguistic awareness manifesting in phonological, orthographic and morphological awareness as suggested by Berninger et al. (2010), and of a universal phonic principle manifesting across different orthographies as suggested by Perfetti et al. (1992). Following McCutchen (1988), it aims to develop linguistic awareness through the metacognitive strategies involved in phonological referencing.

The methods used are based on the research of Share and his colleagues [32, 34, 35] and Perfetti and his colleagues [45], which indicates that the coding and recoding of phonic associations is involved in both reading and spelling. They are also based on the insights of Sister Mary Caroline [46] concerning the value of including the /y/ and /w/ as vowels in phonic analysis, as well as the research of Ellis and Hooper [47] and Spencer and Hanley [48] on the comparative ease of decoding Welsh orthography using systems of phonic analysis and association based on seven vowels, as opposed to systems of phonic association based on five vowels.

In summary, the Seven Vowel Phonic Analysis System focuses on teaching the child to phonologically reference the letters and letter combinations used to represent the vowel sounds from print to sound and from sound back to print. This is done initially by referencing the letters used to represent the vowel sounds in written words back to the sounds made when the words are spoken orally. The letters used to represent the vowel sounds are then analysed and colour-coded, as a basis for improving both word attack ability and for developing and memorising the phonic associations on which writing and spelling fluency can be built.

The logic of mapping phonological associations is outlined in the following sections, while the use of seven vowels as opposed to five vowels is linked to the research on which it is based.

7. Teaching the child to map phonological associations

As certain children battle to establish the relationships between sounds and letters, what we call 'phonological referencing' is designed to teach the child how to map the associations between the letters used in written words, and the sounds made when the words are spoken orally. The process is designed to work on a metacognitive level (McCutchen, 1988).

Like many other programmes based on current research in the field, the methods used in the Seven Vowel Phonic Analysis System are based on the evidence from the work of the National Reading Panel in the United States that English should be phonically taught (Ehri, 2004), and that the teaching of phonics should be systematic (i.e. planned and taught in a particular order). The Seven Vowel Phonic Analysis System is thus introduced at a particular stage in the child's learning of phonic associations and rules. It is then accompanied by ongoing systematic phonics instruction, based on the errors made in the child's writing and spelling.

The Seven Vowel Phonic Analysis System teaches the child to map the correspondence between the letters and letter combinations used to represent the vowel sounds in written words and the sounds made when the words are spoken orally. The reason for focusing on this is that there is convergent evidence indicating that children, no matter what language they speak or how it is written, go through a process where they attempt to match the sounds they hear in the spoken word to the letters or symbols they see when the language is written.

The research of Perfetti and his colleagues (Perfetti et al., 2003; [45]), for example, indicates that Chinese children will attempt at the earliest stage possible to relate the pictographs in their written language to the language they speak, and the sounds on which their spoken language is based. Similar results are found in children learning those languages in which letters (as opposed to pictures) are used to map the sounds in spoken language into writing.

8. Transparent versus opaque written languages

A number of studies have indicated that children find it easiest to learn to read and spell when the system of mapping the sounds they hear in the spoken word to the letters or symbols they see in written language is transparent and easy to understand and use, as opposed to opaque and more difficult to understand and use [49–52].

In Wales in the United Kingdom, there are schools in which reading is taught in Welsh (an orthographically transparent language), as well as schools in which reading is taught in English (an orthographically opaque language). A study conducted by Ellis and Hooper [47] in Northern Wales, for example, demonstrated that the consistency of spelling-to-sound patterns in Welsh allowed children to rapidly learn the Welsh alphabetic code, leading to rapid reading acquisition based on a strategy of letter-sound decoding. Conversely, children learned the more ambiguous English orthographic code more slowly, and it failed to generalise well to other words. Similar results were reported by Spencer and Hanley [48], working with Northern Welsh children.

South Africa is also a country in which both transparent and opaque orthographies are taught in schools. There are schools in which children are taught to read in Afrikaans (an orthographically transparent language) and schools in which reading is taught in English (an orthographically opaque language). De Sousa et al. [53]

reported that bilingual English- and Afrikaans-speaking children showed greater spelling accuracy in the spelling of Afrikaans words and non-words compared to their spelling of English words and non-words. The bilingual children's ability to spell in Afrikaans and English was correlated, signifying a cross-language relationship for spelling both languages, but with language background and orthographic depth exerting an influence on the nature and development of spelling strategies used to spell in an orthographically different first language and second language.

These results would support Perfetti and Zhang's claim [54] that learning to read is learning how one's writing system encodes one's language. As Perfetti and Dunlap [45] suggest, children need to work out how the graphic forms work and how these map on to spoken language. This is the departure point of the Seven Vowel Phonic Analysis System.

The Seven Vowel Phonic Analysis System focuses on the mapping of phonic associations and on the particular letters and combinations used to represent the vowel sounds in English. It attempts to make the task of mapping the sounds children hear in words on to the letters used when the words are written clear, logical, consistent and easy. This is done by teaching the child how to phonologically reference the letters and letter combinations used in written words back to the sounds made when the words are spoken orally.

Use of the Seven Vowel Phonic Analysis System does not need changes in the way words are spelled. It is a system for enabling the way in which words are written and spelled in English to become more transparent, easier to map, and easier to learn and remember. Following Luria [1–3], the system is applied repetitively, working from print to sound, and from sound back to print, as the basis for developing fluency in writing and spelling.

9. The logic of the Seven Vowel Phonic Analysis System

The logic of the Seven Vowel Phonic Analysis System is based on research, which indicates that ease in learning to write and spell is associated with the phonic complexity of words in English [55–57]. In terms of this evidence, a system of phonic analysis that makes written English more transparent for children, and therefore easier to understand and use, makes sense logically.

It has also made sense empirically with the children and parents with whom I have worked, who have found the Seven Vowel Phonic Analysis System logical, easy to understand, and easy to apply and use. Used repetitively, it has effects on word attack, thus increasing fluency in reading. It can also form the basis for developing fluent writing and spelling.

These conclusions are based on clinical evidence, both from initial case studies and from subsequent implementation of the Seven Vowel Phonic Analysis System with a number of children with reading, writing and spelling difficulties. These results are outlined in the previous publications in the programme [58–60], as well as in the section following.

In summary, the Seven Vowel Phonic Analysis System works on the assumption that understanding of phonic associations can be enhanced by working back from the printed word to the sounds made when the word is spoken orally. This is done through a process of phonological referencing, in which the child is taught how to map these associations.

Once these associations have been mapped from print to sound, they can then be used as the basis for recoding from sound back to print. As the child becomes more rapid and accurate in the phonological referencing and recoding processes involved, the process of usage can become automatic. And once usage has become automatic, it can then be used as the basis for self-teaching involving the process of phonological recoding referred to by Share and his colleagues [32, 34, 35, 42].

10. Results

Phonological referencing in our programme is a taught process, which is not implemented at the outset, but is introduced after the child has established phonological and phonemic awareness, and has also been involved in foundation level programmes in which the child has been introduced to reading, writing and spelling through systematic phonics teaching. Once a basic level of competence has been established in reading and spelling phonically based material, the child is then taught how to map the associations between the letters and letter combinations used in printed words and the sounds in spoken language.

Following Jorm and Share (1985), not all children would need to be taught phonological referencing, as certain children would develop phonological recoding as well as the working memory associations for letters and strings of letters without

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Child 1

Pretest date: March 2014	Pretest age scores			
Grade at school: 3 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest : 8 yrs 4 mths	7 yrs 0 mth	7 yrs 7 mth	7 yrs 5 mth	7 yrs 0 mth
Post-test date: June 2016	Post-test age scores			
Grade at school	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 10 yrs 8 mths	10 yrs 1 mth	9 yrs 10 mth	9 yrs 7 mth	8 yrs 10 mth

Number of therapy sessions: 84
Number of reading fluency books covered: 11
Number of writing/spelling fluency paragraphs covered: 18

Child 2

Pretest date: July 2015	Pretest age scores			
Grade at SCHOOL: 4 Gender female	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest 9 yrs 9 mths	**9 yrs 2 mth**	**9 yrs 10 mth**	**9 yrs 8 mth**	**7 yrs 0 mth**
Post-test date: November 2015	Post-test age scores			
Grade at school: 4	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test 10 yrs 2 mths	**10 yrs 10 mth**	**11 yrs 10 mth**	**9 yrs 9 mth**	**13 yrs 1 mth**

Number of therapy sessions: 22
Number of reading fluency books covered: 5
Number of writing/spelling fluency paragraphs covered: 10

Child 3

Pretest date: November 2014	Pretest age scores			
Grade at school: 3 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest : 7 yrs 7 mth	**7 yrs 4 mth**	**7 yrs 3 mth**	**7 yrs 0 mth**	**< 6 yrs 0 mth**
Post-test date: November 2016	Post-test age scores			
Grade at school	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test : 9 yrs 7 mth	**10 yrs 8 mth**	**9 yrs 10 mth**	**9 yrs 4 mths**	**9 yrs 6 mth**

Number of therapy sessions: 73
Number of reading fluency books covered: 8
Number of writing/spelling fluency paragraphs covered: 10

Child 4

Pretest date: November 2015	Pretest age scores			
Grade at school: 5 gender female	One word reading	Sentence reading	One word spelling	Sequential Spelling
Age at pretest : 11 yrs 5 mth	**10 yrs 8 mth**	**9 yrs 5 mth**	**10 yrs 9 mth**	**9 yrs 6 mth**
Post-test date: July 2016	Post-test age scores			
Grade at school: 6	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test 12 yrs 1 mth	**12 yrs 9 mth**	**12 yrs 1 mth**	**11 yrs 1 mth**	**10 yrs 9 mth**

Number of therapy sessions: 30
Number of reading fluency books covered: 6
Number of writing/spelling fluency paragraphs covered: 11

Child 5

Pretest date: April 2014	Pretest age scores			
Grade at school: 7 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest : 14 yrs 0 mth	**8 yrs 2 mth**	**8 yrs 6 mth**	**6 yrs 8 mth**	**6 yrs 9 mth**
Post-test date: November 2016	Post-test age scores			
Grade at school: 9	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 16 yrs 7 mth	**12 yrs 4 mth**	**11 yrs 0 mth**	**8 yrs 8 mth**	**8 yrs 8 mth**

Number of therapy sessions: 121
Number of reading fluency books covered: 9
Number of writing/spelling fluency paragraphs covered: 31

Child 6

Pretest date: November 2015	Pretest age scores			
Grade at school: 3 gender female	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest : 9 yrs 7 mth	**7 yrs 9 mth**	**8 yrs 3 mth**	**8 yrs 4 mth**	**7 yrs 0 mth**
Post-test date: November 2016	Post-test age scores			
Grade at school: 4	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test : 10 yrs 7 mth	**10 yrs 9 mth**	**9 yrs 5 mth**	**8 yrs 7 mth**	**8 yrs 0 mth**

Number of therapy sessions: 42
Number of reading fluency books covered: 5
Number of writing/spelling fluency paragraphs covered: 15

Child 7

Pretest date October 2015	Pretest age scores			
Grade at school: 2 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest : 8 yrs 11 mth	7 yrs 7 mth	8 yrs 3 mth	7 yrs 3 mth	7 yrs 3 mth
Post-test date: August 2016	Post-test age scores			
Grade at school: 3	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 9 yrs 6 mths	9 yrs 5 mth	9 yrs 10 mth	8 yrs 8 mth	8 yrs 6 mth

Number of therapy sessions: 34
Number of reading fluency books covered: 2
Number of writing/spelling fluency paragraphs covered: 4

Child 8

Pretest date: June 2014	Pretest age scores			
Grade at school: 3 gender female	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest : 9 yrs 1 mth	**6 yr 10 mth**	**7 yrs 2 mth**	**5 yrs 6 mth**	**< 6 yrs 0 mth**
Post-test date: November 2016	Post-test age scores			
Grade at school: 5	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 11 yrs 7 mth	**8 yrs 11 mth**	**8 yrs 0 mth**	**7 yrs 7 mth**	**7 yrs 11 mth**

Number of therapy sessions: 78
Number of reading fluency books covered: 9
Number of writing/spelling fluency paragraphs covered: 11

Child 9

Pretest date: March 2016	Pretest age scores			
Grade at school: 4 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest" 10 yrs 6 mth	**7 yrs 10 mth**	**8 yrs 6 mth**	**7 yrs 4 mth**	**6 yrs 9 mth**
Post-test date: November 2016	Post-test age scores			
Grade at school: 4	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 11 yrs 3 mth	**10 yrs 0 mth**	**8 yrs 11 mth**	**8 yrs 2 mth**	**7 yrs 11 mth**

Number of therapy sessions: 27
Number of reading fluency books covered: 6
Number of writing/spelling fluency paragraphs covered: 8

Child 10

Pretest date: August 2016	Pretest age scores			
Grade at school: 2 gender female	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest: 8 yrs 10 mth	**8 yrs 5 mth**	**7 yrs 7 mth**	**7 yrs 6 mth**	**< 6 yrs 0 mth**
Post-test date: November 2016	Post-test age scores			
Grade at school: 2	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 9 yrs 1 mth	**9 yrs 3 mth**	**9 yrs 2 mth**	**8 yrs 1 mth**	**8 yrs 6 mth**

Number of therapy sessions: 17
Number of reading fluency books covered: 3
Number of writing/spelling fluency paragraphs covered: 6

Child 11

Pretest date: October 2015	Pretest age scores			
Grade at school: 1 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest: 7 yrs 4 mth	**6 yrs 10 mth**	**7 yrs 5 mth**	**6 yrs 6 mth**	**< 6 yrs 0 mth**
Post-test date: November 2016	Post-test age scores			
Grade at school: 2	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 8 yrs 4 mth	**8 yrs 4 mth**	**8 yrs 8 mth**	**7 yrs 9 mth**	**8 yrs 4 mth**

Number of therapy sessions: 29
Number of reading fluency books covered: 4
Number of writing/spelling fluency paragraphs covered: 12

Child 12

Pretest date: June 2016	Pretest age scores			
Grade at school: 5 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest: 10 yrs 8 mth	**8 yrs 5 mth**	**8 yrs 3 mth**	**6 yrs 9 mth**	**< 6 yrs 0 mth**
Post-test date: November 2016	Post-test age scores			
Grade at school: 5	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 11 yrs 4 mth	**10 yrs 1 mth**	**9 yrs 10 mth**	**9 yrs 6 mth**	**8 yrs 10 mth**

Number of therapy sessions: 25
Number of reading fluency books covered: 4
Number of writing/spelling fluency paragraphs covered: 2

Child 13

Pretest date: April 2016	Pretest age scores			
Grade at school: 5 gender female	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest: 8 yrs 10 mth	**8 yrs 6 mth**	**8 yrs 0 mth**	**6 yrs 6 mth**	**6 yrs 0 mth**
Post-test date: November 2016	Post-test age scores			
Grade at school: 5	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 9 yrs 1mth	**9 yrs 1 mth**	**9 yrs 5 mth**	**7 yrs 6 mth**	**7 yrs 0 mth**

Number of therapy sessions: 26
Number of reading fluency books covered: 9
Number of writing/spelling fluency paragraphs covered: 7

Child 14

Pretest date: October 2015	Pretest age scores			
Grade at school: 1 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest: 7 yrs 4 mth	**6 yrs 6 mth**	**6 yrs 9 mth**	**6 yrs 8 mth**	**< 6 yrs 0 mth**
Post-test date: November 2016	Post-test age scores			
Grade at school: 2	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 8 yrs 4 mth	**8 yrs 7 mth**	**9 yrs 2 mth**	**9 yrs 7 mth**	**8 yrs 6 mth**

Number of therapy sessions: 29
Number of reading fluency books covered: 4
Number of writing/spelling fluency paragraphs covered: 17

Child 15

Pretest date: June 2017	Pretest age scores			
Grade at school: 4 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest: 10 yrs 2 mth	**10 yrs 9 mth**	**9 yrs 2 mth**	**9 yrs 0 mth**	**8 yrs 0 mth**
Post-test date: December 2018	Post-test age scores			
Grade at school: 5	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 11 yrs 8 mth	**>12 yrs 6 mth**	**12 yrs 9 mth**	**10 yrs 3 mth**	**12 yrs 0 mth**

Number of therapy sessions: 58
Number of reading fluency books covered: 2
Number of writing/spelling fluency paragraphs covered: 18

Child 16

Pretest date: April 2018	Pretest age scores			
Grade at school: 3 gender female	One word reading	Sentence reading	One Word spelling	Sequential spelling
Age at pretest: 8 yrs 8 mth	**8 yrs 10 mth**	**8 yrs 8 mth**	**7 yrs 9 mth**	**6 yrs 11 mth**
Post-test date: December 2018	Post-test age scores			
Grade at school: 3	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 9 yrs 4 mth	**12 yrs 0 mth**	**10 yrs 1 mth**	**9 yrs 2 mth**	**8 yrs 6 mth**

Number of therapy sessions: 28
Number of reading fluency books covered: 2
Number of writing/spelling fluency paragraphs covered: 12

Child 17

Pretest date: May 2018	Pretest age scores			
Grade at school: 3 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest: 8 yrs 9 mth	**6 yrs 8 mth**	**6 yrs 9 mth**	**6 yrs 9 mth**	**No score**
Post-test date: December 2018	Post-test age scores			
Grade at school: 3	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 9 yrs 4 mth	**8 yrs 7 mth**	**8 yrs 3 mth**	**7 yrs 1 mth**	**< 6 yrs 0 mth**

Number of therapy sessions: 24
Number of reading fluency books covered: 5
Number of writing/spelling fluency paragraphs covered: 1

Child 18

Pretest date: March 2018	Pretest age scores			
Grade at school: 2 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest: 7 yrs 7 mth	**7 yrs 7 mth**	**7 yrs 10 mth**	**7 yrs 1 mth**	**< 6 yrs 0 mth**
Post-test date: November 2018	Post-test age scores			
Grade at school: 2	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 8 yrs 3 mth	**9 yrs 6 mth**	**9 yrs 7 mth**	**8 yrs 1 mth**	**8 yrs 7mth**

Number of therapy sessions: 32
Number of reading fluency books covered: 5
Number of writing/spelling fluency paragraphs covered: 12

Child 19

Pretest date: May 2018	Pretest age scores			
Grade at school: 2 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest: 8 yrs 4 mth	**7 yrs 6 mth**	**7 yrs 7 mth**	**7 yrs 4 mth**	**6 yrs 5 mth**
Post-test date: November 2018	Post-test age scores			
Grade at school: 2	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 8 yrs 8 mth	**8 yrs 0 mth**	**9 yrs 2 mth**	**8 yrs 5 mth**	**6 yrs 11 mth**

Number of therapy sessions: 21
Number of reading fluency books covered: 6
Number of writing/spelling fluency paragraphs covered: 1

Child 20

Pretest date: February 2018	Pretest age scores			
Grade at school: 4 gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pretest: 10 yrs 10 mth	**8 yrs 1 mth**	**8 yrs 11 mth**	**8 yrs 8 mth**	**7 yrs 6 mth**
Post-test date: December 2018	Post-test age scores			
Grade at school: 4	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 11 yrs 8 mth	**10 yrs 1 mth**	**9 yrs 7 mth**	**9 yrs 8 mth**	**8 yrs 6 mth**

Number of therapy sessions: 28
Number of reading fluency books covered: 3
Number of writing/spelling fluency paragraphs covered: 8

Note that in the above table, the pre- and post-test scores for each child have been highlighted and accentuated in larger font size to enable case-by-case visual inspection of the data for each type of assessment test used, as well as profile interpretation across different areas of the assessment. Case aggregation is possible, as all children have been diagnosed as learning disabled against the DSMIV criteria (the tests of basic reading, writing and spelling skills conducted falling well below would be expected in terms of age level as well as overall level of cognitive performance, enabling diagnosis of a reading disorder under DSM-IV code 315.00[13] and a disorder of written expression in terms of the diagnostic criteria for DSM-IV code 315.2.[14]). Case contrast is also possible, using the therapy and method indicators quoted for each child. All 20 children have been exposed to reading fluency materials and methods implemented with parent involvement. Child 17 and Child 19 have not yet been exposed to the writing and spelling fluency methods used in the programme, as each child commenced this side of the programme in November 2018.

Table 3.
Results of children who have worked on phonological and phonic skills, reading fluency, as well as writing and spelling fluency materials and methods.

being specifically taught these basic skills. However, the evidence from using the Seven Vowel Phonic Analysis System would suggest that a number of children have benefitted from being taught how to reference the letters and letter combinations involved in print-to-sound translation and then how to use working memory to recode these associations from sound back to print.

The results presented in **Table 3** have been drawn on a case-by-case basis from the files of children in my practice. All of the 20 children have had reading, writing and spelling difficulties, and in each of the 20 cases, reading fluency work has been

undertaken in conjunction with phonic instruction and also in conjunction with phonological referencing focused on developing fluency in writing and spelling.

The results presented in **Table 3** indicate that there has been a backwash effect from application of the methods used in teaching phonic analysis into both proficiency in one word reading ability and fluency in reading sequentially, as well as reciprocal effects from use of reading fluency methods into competencies in writing and spelling (and vice versa). The indications would thus be that there is commonality of influence across the different areas of the fluency-based intervention programme described in this chapter. These underpin the results presented in this chapter, as well as the individual case studies, aggregated case study results and case contrasts presented in previous chapters on the programme [18, 26, 27].

11. Discussion of results

Following Luria [1–3], the reason for commonality of influence across the different areas and components in our programme would be that the various language, reading, writing and spelling interventions are dependent on the mediation of speech processes. They would thus be dependent on the development of both phonological and phonic abilities, which would need to be the core skills taught in the language and reading comprehension, the reading fluency, as well as the writing and spelling fluency areas of intervention in the programme, as well as across different components within each of these areas, on a functional level.

In terms of more recent literature, commonality of influence could also be cited as evidence of a common linguistic awareness manifesting in phonological, orthographic and morphological awareness as suggested by Berninger et al. (2010), and of a universal phonic principle manifesting across different orthographies as suggested by Perfetti et al. (1992). Difficulties in developing linguistic awareness and the universal phonic principle would have been assisted, as suggested by McCutchen (1988), by introducing metacognitive strategies such as the Seven Vowel Phonic Analysis System.

The results to date indicate positive effects in children with whom both reading fluency and writing and spelling fluency methods have been implemented [18, 26, 27]. Following Berninger and McCutcheon's theories, greater metacognitive control as opposed to simply increasing encapsulated automaticity would account for the backwash effects from writing and spelling into reading, as well as the steady progress across different areas of the fluency-based programme observed by users of our programme.

12. Effectiveness of the programme

From first interventions using large-print phonically based materials in the 1990s to the present, positive results have been obtained using the programme described in this chapter [18, 26, 27]. Evidence has been drawn from the files of children in my practice with whom reading fluency work as well as writing and spelling fluency work has been conducted, and also from the files of children in the practice for whom there has been one or other systematic variation in the way in which the programme has been implemented.

Based on this evidence, three implementation variables are likely to affect the successful implementation of the programme. These variables are as follows:

- consistent and regular exposure to phonological and phonic instruction to provide a foundation of basic skills on which the fluency interventions in the programme can be built;

- consistent implementation of methods designed to improve both reading fluency and writing and spelling fluency to produce the greatest likelihood of positive effects; and

- consistent support from parents in programme implementation to produce the greatest likelihood of positive effects.

These conclusions are based on the aggregation of case studies conducted by the author over a number of years and are also supported by case contrast analysis [26, 27]. They are also supported by the experience and evaluations of an increasing number of users of the programme's methods and materials.

The development of the first series of books occurred over a 5-year period in the 1990s [66], while over the last 6 years since 2012, a large number of additional graded reading books have been written. These are about a set of animal characters with stories set in a variety of settings and have been workshopped and used with South African children of different ages, and from different cultural backgrounds, whose parents report that they find them enjoyable. They are also being used by children in England, as well as in other countries adjacent to South Africa, whose parents are reporting that their children are learning to read more fluently and at the same time enjoying the stories.

Similarly, the writing and spelling methods used in the programme have been developed and modified over time, have been implemented clinically for a number of years and have over the past 6 years been implemented with an increasing number of children of different ages and cultural backgrounds. There is evidence indicating that other therapists working with children diagnosed as having learning disabilities have used these methods successfully. There is also evidence from the network of parents, teachers, therapists, and schools currently using the materials that others are able to use these methods successfully at home, in their practices, in reading centres, as well as in the classroom.

The evidence on the programme to date is thus based on the work of an expanding network of users and would support Luria's view that, like any other skill, reading, writing and spelling need to become fluent to be of maximal use and that automaticity in reading, writing and spelling is a function of repetitive use. Following Dehaene [28], the use of the 3 × 3 oral impress method together with the large-print, phonically based materials in our reading fluency programme would be effective in stimulating the visual word form area in the left temporal cortex repeatedly and repetitively, thus developing the connections necessary to read fluently.

Once observable differences in reading fluency are noted, phonological referencing methods are introduced. Following Jorm and Share [32, 34, 35], the repetitive phonological referencing methods used in the Seven Vowel Phonic Analysis System would be based on the teaching of skills for phonological recoding (print-to-sound translation, as well as translation of sound back to print). Working memory for the phonic associations developed through phonological referencing would then enable the learner to acquire the detailed orthographic representations necessary for fast, efficient visual word recognition, as well as the detailed orthographic representations necessary to spell both individual words and words in sequence.

In essence, the methods used in our fluency-based programme are based on use of a combination of repetitive paired reading and repetitive phonological referencing. The evidence from aggregated case studies of children who have worked with a combination of these methods indicates that there are benefits in improvement in reading, spelling individual words and spelling words in sequence, with backwash effects occurring across these areas. Case contrasts indicate lessened effects from programme implementation where there has been systematic variation in either the

implementation of repetitive paired reading or repetitive phonological referencing using the methods described in this chapter and in previous chapters on the programme [18, 26, 27].

13. Linked delivery of materials and methods

At this stage in the development of the programme, there is a database of materials, a set of tried and tested methods that are theoretically based, experience in usage of both the reading fluency and the writing and spelling areas of the programme and promising results. Our phonically based, large-print materials are also being increasingly used by other therapists and teachers, who are reporting positive evaluations from parents as well as improved reading, writing and spelling results in children.

There is thus potential for wider usage of the programme and for implementation at greater scale than at present. The materials are in electronic form and provide a form of elearning, which can be used in contact, as well as at distance. The ebooks are designed to be used by parents and can also be used by therapists, teachers and schools to develop fluent reading. As the books are large-print and phonically based, they can also be used for developing writing and spelling fluency.

The programme can thus be described as a fluency-based intervention, which can be used to introduce children to reading as well as develop the reading, writing and spelling skills necessary to reading fluently, and writing and spelling fluently. As all materials in the database are electronic, the programme can be implemented through use of multimedia, including email, cellphone as well as computer-based access and delivery.

Assessment and evaluation are built into the programme's structure, linked to an awards system for children using the materials. The model is both evidence-based and interactive in its emphasis on assessment and evaluation.

14. Availability of materials in our database

Both the repetitive paired reading methods used for developing reading fluency and the methods of repetitive phonological referencing used for developing writing and spelling fluency are based on use of the resource of phonically regular, large-print materials in our database. These materials are used for the development of fluency, which is conceptualised as based on the coding and recoding of phonic associations.

There are over 80 phonically based large-print ebooks in our database. These are graded according to reading level and divided into different libraries of materials. The individual books as well as the libraries of materials are presented in a format in which they can be made available electronically at low cost to others.

There are also particular methods we have developed to implement both the reading fluency and the writing and spelling fluency areas of our fluency-based programme. These are presented in a number of manuals, which are also made available at low cost to those working with our materials.

15. Training of therapists, teacher and parents, and outreach to schools

The books in the 'The Tales of Jud the Rat' reading fluency programme were originally developed in a form in which they could be delivered by email and then downloaded and used by parents at home. As the reading fluency materials were designed to

complement the sessional work done in contact sessions in my practice, parents were provided with tutorial support by email, as well as questions and answers by cellphone.

The aim was to provide a large body reading fluency materials, which were appropriately graded, which were readily available and inexpensive and which could be used daily at home. As the materials were written to meet the needs of parents of children in my practice who had rate of work problems linked to reading fluency difficulties, parents became partners in the learning process through use of the materials in the practice's database.

As the programme evolved and other therapists, teachers and tutors who were working with the children also saw promising results [65], there were requests from outside my practice to use the materials and methods. This led to the development of a set of manuals to be used with the materials, to be used by those working with the materials either at home, or in reading centres, or in tutoring centres, or in schools.

This led to demand for more formal training to complement the informal support provided to users of the programme's materials and methods, and an implementer training course for therapists, teachers and parents.

16. The implementer training course

The implementer training course has eight modules, as follows:

a. *Module 1: Introductory module.* This focuses on course orientation and on the theory underpinning the programme.

b. *Module 2: Assessment.* This module focuses on work with the four core tests used in the programme to establish needs for fluency-based work, as well as assessment of pre-reading skills at the foundational level.

c. *Module 3: Reading fluency.* This module focuses on use of our 3 × 3 oral impress method to address reading fluency needs at basic and intermediate levels in the programme. A pdf library is also provided with the module, consisting of 12 reading fluency books (6 at basic and 6 at intermediate levels in the programme).

d. *Module 4: Foundational skills for reading, writing and spelling.* This focuses on work with children having difficulties establishing the basics of reading, as a basis for intervention using our foundational level materials. A pdf library is also provided with this module, consisting of 15 foundational level reading books and 6 activity books.

Participants who have completed Module 4 are awarded a certificate for successful completion of the reading fluency side of the implementer training course. At this point, participants are competent in working with the reading fluency area of our programme and also have a library of 27 reading books and 6 activity books with which to work at foundation, basic and intermediate reading levels. The methods and materials can then be used for learning support with individual children and groups of children, as well as for the development of classroom-based reading fluency programmes and reading clubs.

a. *Module 5: Assessment of phonic skills.* This focuses on assessment of phonic skills and phonic difficulties. The module focuses in particular on use of phonic inventories to establish needs for phonic instruction, as well as needs for work in the writing and spelling fluency area of the programme.

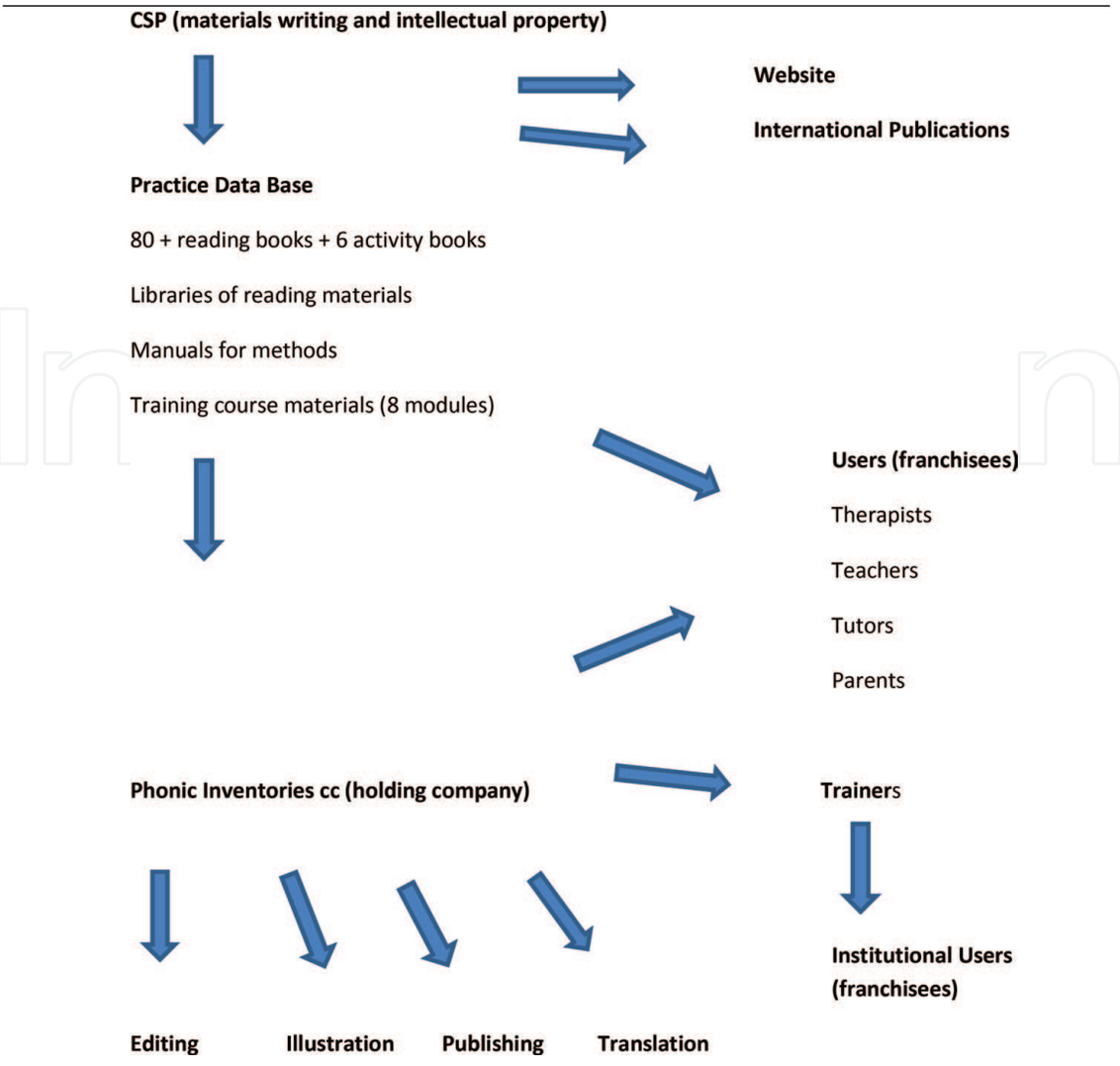

Table 4.
Operational model of Dr. Charles Potter's Reading Fluency Programme.

b. *Module 6: Writing and spelling fluency.* This focuses on work with writing and spelling fluency. The module focuses in particular on use of the Seven Vowel Phonic Analysis System, based on results that indicate that optimum results are achieved where work in reading fluency is accompanied by work using this method.

c. *Module 7: Sequentialisation and working memory for words in sequence.* This focuses on work with sequential spelling difficulties. The module focuses in particular on use of the Targeted Analysis, Revisualisation and Sequential Spelling Programme, which integrates the training of sequential memory skills into writing and spelling fluency work.

d. *Module 8: Language and reading comprehension:* This is the final course module. It focuses on ways in which fluency-based work can be contextualised in language and reading comprehension activities, as well as the types of language and reading comprehension work being done in the classroom at school.

After completing Module 8, participants are awarded a certificate for successful completion of the writing and spelling fluency side of the course. This is accompanied by a letter that states that at this point, participants have successfully completed all eight course assignments and are competent in working with

both the reading fluency area and the writing and spelling fluency area of our programme.

Assignments are completed with each of the eight modules, and these are designed so that after completing all eight modules, participants are competent to work with our materials in learning support work and in the integration of our methods and materials into the classroom. The methods and materials can then be used to support fluency-based work with individual children and groups of children, as well as to support classroom-based spelling, sequential spelling, language and reading comprehension programmes.

The course as a whole is implemented flexibly and is designed to fit in with the programme user's other commitments. This is done by negotiation of deadlines for each module, which are doable, within an agreed time framework.

17. Outreach to schools, reading centres and tutoring schemes

Outreach to schools, reading centres and tutoring schemes involves provision of a library of 27 reading fluency books and 6 activity books, which are leased from the programme. Training is then provided on how to use the materials and methods to optimal effect. This focuses on providing information about the potential uses of our materials and methods, as well as training key members of staff in use of our materials and methods.

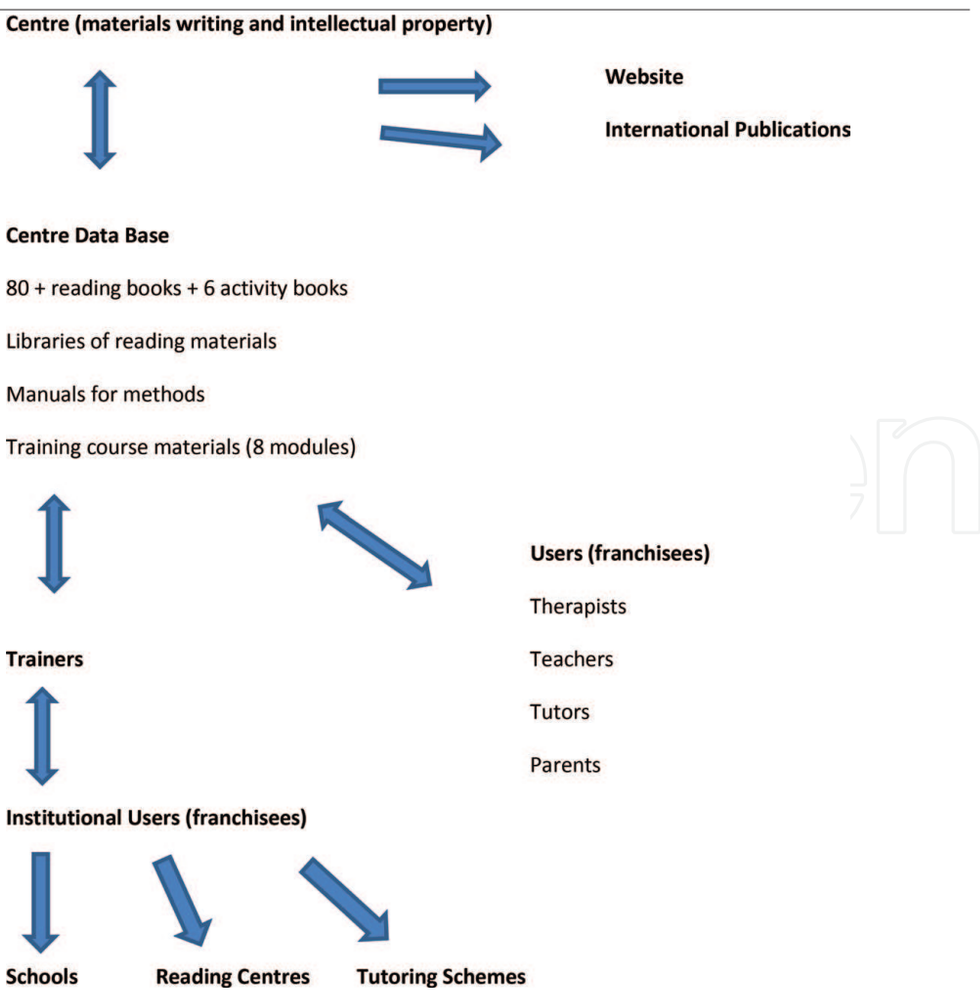

Table 5.
Centre-periphery model of Dr. Charles Potter's Reading Fluency Programme.

This is based on the following operational model involving provision of training courses for staff of schools, reading centres and tutoring schemes, combined with involvement of those members of staff with a learning support function in our eight-module implementer training course.

To date, the model in **Table 4** has been based on a centre-periphery approach to materials development and dissemination. In the operation of the programme, external demand for materials and methods developed centrally and implemented as part of my practice as an educational psychologist has been met through training. The training involves use of electronic materials supported by email and cellphone contact. This is supported by open-source publication of the theory behind the programme, the initial case studies on which the methods and materials were based, as well as its subsequent results in wider application.

This currently involves use of multiple forms of electronic media suited to working with users at distance. However, as demand grows, use of multimedia will become increasingly necessary as expansion of the programme takes place. In the process, the model will need to change. Delivery of the programme's materials and methods will need to become increasingly website-based, while at the same time involving use of interactive multimedia for evaluative purposes, as the programme grows in scale.

18. Use of multimedia in programme development and implementation

A feature of the programme's development to date has been the use of distance educational methods involving computer-based writing and delivery of materials, combined with email and cellphone interaction with programme users. This has enabled centre-periphery dissemination of materials and methods at small scale, and regular centre-periphery and periphery-centre contact as well as evaluative feedback.

This model has enabled publication of evidence in the form of case studies, as well as aggregated case studies [18, 26, 27]. It has also enabled usage of the programme's methods and materials by an increasing number of both individual users and institutional users.

The programme has reached a scale where the next stage in the programme's development will need to involve work with training partners. This will attempt to expand what is already taking place to larger scale, based on use of the programme's materials and methods in training both individual and institutional users. In the next stage, this will also need to be expanded to the training of trainers, based on the use of multimedia to carry the programme's central message outwards concerning its methods and electronic materials, and use of multimedia to carry evaluative evidence concerning usage.

19. Training in use of materials and methods

The programme is both research- and evidence-based. The central message from centre to periphery focuses on optimal use of methods and materials, based on theory drawn from the literature, as well as evidence concerning effective implementation.

This centre-periphery approach to carrying the message can be modelled as in **Table 5**.

It will be evident from the above that the model is evidence-based, in which the output of the media is developed on the basis of evidence drawn from published research, as well as evidence based on implementation. Both delivery and evaluative feedback are currently dependent on email and cellphone-based technologies. The challenges for work at greater scale will involve keeping channels of two-way evidence-based communication open, while at the same time increasing use of website-based delivery.

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20. Summary

This chapter has focused on a reading, writing and spelling programme, which has been developed for working with children with reading, writing and spelling difficulties. As all materials are electronic, the programme has been implemented via email and cellphone technologies. Based on promising results, a number of therapists, teachers, tutors and parents as well as institutions are currently using the methods and materials, both in South Africa and its neighbouring territories, as well as in the United Kingdom. There are also a number of therapists, teachers, tutors and parents involved in an eight-module training programme based on use of multimedia.

The first half of the chapter has described the theoretical basis of the programme, as well as the methods used in its implementation. The second half of this chapter has focused on the modular training course and its aims, as well as the centre-periphery model of development and evaluation used in disseminating the programme through use of multimedia, including email, cellphone and use of computer-based electronic material. The model is both evidence-based and interactive in its emphasis on assessment and evaluation. It is currently delivered by email supported by email and cellphone contact and will increasingly involve use of interactive website-based technologies as the programme grows in scale.

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