

Preliminary Studies

During 1997 and 1998, the author was involved in developing a remedial spelling programme for senior students at a decile 9 school, after teachers expressed concern about the poor spelling skills of a number of year 6, 7 and 8 students. The author undertook an analysis of the spelling skills of all year 5 to 8 students in order to determine the nature of spelling errors made by students at these levels. The remedial programme was designed to teach the relevant skills and knowledge that were identified from this analysis, to children with severe spelling problems.

Study 1

Analysis of Spelling Errors

Method

Spelling errors in writing samples from all children (126) from year 5, 6, 7 and 8 classes were analysed in the following way, to determine the nature of errors made.

Children were given a common story starter, (for example *The first thing I saw when I opened the door was....*) which was written on the board and they were asked to write for 15 minutes. At the end of that time, they were asked to total the words written, then to re-read their writing and correct any spelling errors they could find. They were not allowed to use dictionaries or other kinds of assistance. Each child's writing sample was analysed using a Writing Analysis

Sheet (Appendix A) which was developed with reference to the spelling analysis sheet in "Spelling is not a Health Hazard" (Traill & Symes, 1995). The Traill and Symes analysis sheet required the error words to be written next to the correct spelling for each word and the nature of the errors to be determined according to a range of choices provided on the analysis sheet. The Writing Analysis Sheet developed by the author required a similar analysis of errors but errors were classified in the following way:

1. Errors associated with sound analysis skills - vowels, consonants, blends or incorrect number of sounds represented in a word. (back for black; het for hit; invesation for investigation)
2. Lack of knowledge of spelling patterns. (orful for awful; lite for light)
3. Lack of knowledge of spelling rules and conventions. (hiting for hitting; hopeing for hoping)
4. Proofreading errors. (th for the; off spelled of and off)
5. Other (pronunciation - persific for specific; homonym confusion - ware for wear; exception or irregular words - butiful for beautiful).

The author's Writing Analysis Sheet also records the total words written, the percentage of spelling errors made in the writing sample and the number of errors from the core vocabulary lists in Spell Write (Croft & Mapa, 1998).

Results and Discussion

Percentage of spelling errors in writing.

Group 1: Children who made less than 5% errors (41 children, 32.5% of total).

The errors made by children in this group related almost exclusively to homonym confusion, incorrect spelling of irregular or exception words, and proofreading errors (minor slips - of for off; omission of one letter in a word when it was correct elsewhere - bik for bike.)

Group 2: Children who made between 5% and 10% errors (46 children, 36.5% of total).

These children made errors related to orthographic structures (Spelling patterns, for example: lite for light or bight for bite) and morphological structures (Spelling rules and conventions, for example: invention for invention, married for married) in words, but they also confused homonyms, showed a lack of knowledge of irregular and exception words and made proofreading errors.

Group 3: Children who made more than 10% errors (39 children, 31% of total).

The children in this group fell into the two categories of poor spellers described by Frith (1980). One sub-group made errors related to incorrect analysis of sounds associated with consonants, vowels and blends. For example, drink might be written jink, plug might be written plaq, black might be written back. Sounds were often incorrectly sequenced in words. Children in this sub-group also made incorrect choices of spelling patterns to accompany sounds, sequenced letter patterns incorrectly, showed a lack of knowledge of

rules and morphological structures in words, and made proofreading errors. These children appeared to have a poor grasp of the structure of the English language, both phonologically and orthographically.

The second sub-group of children in this group did not make errors with sound analysis. They appeared to have difficulties using orthographic and morphological information to make correct choices for spelling patterns in words. For example, they might spell all words containing the 'or' sound with an or - tork, pork, chork, por, dor and so forth. They may not understand when to change the 'y' to an 'i' before adding an ending in words such as cried (cryed), happiest (happyest) and so forth.

For many children in group 3, particularly those in the second sub-group, the quantity and quality of their written language was below what could be expected of them, when compared with their reading and oral language skills.

The nature of students' errors.

The 15 minute writing samples were administered again in 1998 to students from years 6 to 8. A total of 187 samples from 1997 and 1998 were analysed to identify the nature of spelling errors commonly made by students. There were 1352 errors in total. Spelling errors were classified in the following way.

Incorrect Vowels: Students confused vowel sounds particularly 'a' and 'u', (scrab for scrub) and 'e' and 'i' (het for hit).

Consonant confusion: Sounds were represented with incorrect consonants - tagil for table, leef for leave.

Blends: Students made incorrect spellings for blends. Usually they omitted the second or third letter of a blend - bame for blame, spat for splat.

Spelling patterns: Students were unable to use letter clusters accurately to represent sounds in words. For example; they might not use an appropriate spelling for a long vowel sound (two vowels together or a silent 'e' to represent the long vowel)- fell for feel, tran for train. Sometimes students used appropriate, but inaccurate letter clusters to represent a sound. For example: orful for awful.

Spelling rules: The most common rules that were not known were: Contractions, adding endings to words, past tense spellings, suffixes, possessive apostrophes.

Contractions: Students were unable to place the apostrophe in the correct place in contractions, or they added extra letters; coulden't for couldn't, did'nt for didn't.

Adding endings: *Silent 'e' and doubling the consonant rules:* Students did not know the rules for adding endings to words. They did not drop the 'e' before adding an ending (smileing for smiling) and/or they did not double the consonant after a short vowel sound at the end of a word (stoping for stopping).

Changing 'y' to 'i' when adding endings to words: Students were unable to accurately use the rule of changing 'y' to 'i' when adding endings to words ending in 'y'. They spelled happily, happyly or flying, fliing.

Past tense - 'ed' endings: Some students did not demonstrate

knowledge of the use of 'ed' to depict past tense. Many of them omitted to use 'ed' at all or they spelled it with a 'd' or a 't', e.g., Yesterday I play with my friend, I jumpt over the hedge.

Word stem plus suffix: Students were not aware of rules associated with adding suffixes to word stems - they spelled finally, finaly and gradually, gradualy instead of adding the suffix (ly) to the whole word stem (final + ly = finally, gradual + ly = gradually).

Possessive Apostrophes: Students were unable to use apostrophes to determine possession appropriately. They often used apostrophes with plurals, or with the wrong word in a sentence, e.g., The dog's and cat's got wet, The horses ears' were quivering.

Proofreading: Students made errors which they did not pick up when proofreading - 'off' spelled of; 'the' spelled th; the same word spelled two or three ways in the same piece of writing with one being correct.

Homonyms: Students used the wrong spelling for a word with the same sound but a different meaning - bear for bare, which for witch.

Exception or irregular words: Students showed a lack of knowledge for words that either originated from another language or were exceptions to a commonly known spelling rule. For example: beautiful (butiful), they (thay).

Pronunciation: Students spelled words as they spoke them - persific for specific.

Presented in Table 1, are the results of an analysis of the spelling errors in the 187 writing samples studied in 1997 and 1998. Errors are categorised according to the headings explained above and the incidence of each type of error is equated as a percentage of the overall errors made.

Table 1

Incidence of Spelling Errors as a measure of Type, Number and Percentage, in 15 Minute Writing Samples, for Students in Years 6, 7 and 8.(1997, 1998).

Type of Errors	Number of errors	Percentage of Errors
	(<u>n</u> = 1352)	
Spelling Patterns (Orthographic)	319	23.59%
Proofreading (Orthographic)	250	18.49%
Consonant Confusion (Sound Analysis)	132	9.76%
Homonyms (Morphological)	128	9.46%
Exception Words (Morphological)	107	7.91%
Adding Endings to Words (Morphological)	79	5.84%

Contractions (Morphological)	77	5.69%
Pronunciation (Sound Analysis)	63	4.65%
Incorrect Vowels (Sound Analysis)	60	4.43%
Past Tense - 'ed' Endings (Morphological)	56	4.14%
Adding Suffixes (Morphological)	38	2.81%
Apostrophes (Morphological)	28	2.07%
Blends (Sound Analysis)	15	1.1%

There were 37.9% morphological errors, 23.59% orthographic errors, 19.94% sound analysis errors and 18.49% proofreading errors. The distribution of errors seems to suggest that the students lacked knowledge about the rules and conventions of the English language (morphological structure) and that they also had difficulties using appropriate spelling patterns to represent sounds (orthographic structure). Poor sound analysis skills (poor pronunciation, inaccurate sound-to-letter knowledge for consonants and vowels) and poor proofreading skills made up the rest of the errors.

Brann and Hattie's (1995) survey of spelling programmes in 110 Auckland schools suggests that the focus was on learning word lists, with little time spent on acquiring orthographic and morphological knowledge. In their research they emphasise the importance of teaching these. Perfetti (1992) also suggests that knowledge of letter sequences

(orthographic knowledge) is necessary because of the many ways of mapping phoneme-to-grapheme sequences in the spelling of words. He sees the development of lexical representations as fundamental to the development of rapid word recognition skills in reading and spelling.

The morphological structure of the English language also affects spelling skills. Many children appear to 'pick up' this structure through reading, but those who do not may be disadvantaged in that they have less knowledge to use when trying to spell unknown or irregular words. Lack of knowledge of morphological structures accounted for the largest number of spelling errors in the analysis of spelling errors of the children in the author's study in 1997/98.

These skills are developed as exposure to the English language increases and it is therefore logical to assume that many of them will not be acquired until the final years of primary school or early in the secondary school years. The complexity of morphological structures varies however, and even young children have been shown to possess various levels of morphological awareness. Treiman and Cassar (1996) demonstrated this in their research (see chapter 2).

Proofreading errors were also noticeable in the analysis of spelling errors of year 5 to 8 students. The National Education Monitoring Project report (Crooks & Flockton, 1999) also highlights a lack of skill in this area (see Chapter 2). The English language is a morphologically and orthographically complex alphabetical system, with one-to-many possibilities in both phoneme-to-grapheme alternatives

(/k/ sound = ch - school, k - kitten, qu - queue, ck - sick, c - carry) and grapheme-to phoneme alternatives (ch may sound as 'ch' as in cherries, /k/ as in school, /sh/ as in machine) (Ehri and Wilce, 1987; Treiman, 1993). Instruction programmes that fail to provide children with strategies and knowledge about orthographic and morphological structures in words will fail to provide developing spellers and readers with knowledge that will help them make correct choices for writing and reading words.

Study 2

Remedial Spelling Programme for Year 6 and 7 Students

Method

Twenty year 6, 7 and 8 students (aged between 10 and 13 years) were identified by their teachers because of their poor spelling skills. They generally scored poorly in classroom and standardised spelling tests, made frequent errors in words from core vocabulary lists (Croft & Mapa, 1998) and made many errors in their draft writing. They had difficulties proofreading for spelling errors and teachers commented that many of them wrote using much simpler language and ideas than they demonstrated in oral presentations.

The Daniels and Diack (Peters, 1975) spelling test is one standardised test in common use in New Zealand schools. This is a list of 67 words of increasing complexity, which produces a raw score that can be translated into an approximate spelling age. Students were administered this

test at the beginning and end of this study.

Programme Content.

The content of the programme was developed to teach orthographic (spelling patterns - for example; aw, au, or, le, tion and so forth), and morphological (rules and conventions - for example; doubling the consonant after a short vowel, 'ed' endings to depict past tense) structures, using the "Letterland" resource.

The spelling programme aimed to:

1. Highlight the many skills and strategies the students already had. This was done by analysing writing samples from each student, to identify skills and strategies they already demonstrated in their spelling attempts.
2. Evaluate the nature of the student's spelling errors to determine phonological (difficulties with sound-to-letter analysis), orthographic (difficulties with selection of spelling patterns to represent sounds) and morphological (lack of knowledge of rules and conventions of the English language) knowledge and proofreading difficulties.
3. Encourage the students to develop metacognitive strategies. To understand how they learn, what they need to do to remember information and to understand the relationship between effort, knowledge, strategy use and success. This was done by highlighting the factors that made information memorable, by teaching questioning techniques to recall information already learned, and by providing constant feedback about reasons for success and failure throughout the

programme.

4. Teach rules and strategies that were based on developing phonological, orthographic and morphological knowledge to provide a logical framework to the English language.

5. Provide classroom follow-up to ensure the skills and strategies learned in the programme were transferred to the student's writing. Students were encouraged to use the following questions when attempting unknown words or when trying to fix spelling errors.

What do I know about this word? (For example: Is it a past tense word - do I have an /ed/ on the end?)

What sounds can I hear in this word? (break it into syllables and then into phonemes).

What letters could go with the sounds? (For example: What letter patterns could spell the /or/ sound?)

Does the spelling look right? If not, what could I change it to? (For example: does orful look right? How else could I write /or/ ? If I don't know, how will I find out?)

Procedure.

Students worked in two groups of 10 (only 19 completed the trial as one student left the school). They met for two, 45 minute sessions per week, for nine weeks in term one.

During term two, they met for one, 15 minute session per week for ten weeks and each student received approximately 10 minutes per week individual support during writing time in the classroom. This was used to proofread draft writing in order to identify spelling errors and to use knowledge gained

from the spelling programme to correct errors. The programme was based around teaching rules and spelling patterns through the use of the "Letterland" resource using the story and picture mnemonics inherent in it. A variety of practice activities and spelling games were used to encourage participation and recall of material. For example, blend or digraph Bingo, miming, team competitions for recall of previously taught material and weekly practice activities both in the group and for homework.

Results and Discussion

Changes in spelling age.

Children were administered the Daniels and Diack (Peters,1975) spelling test at the beginning (May) and end (September) of the trial. Tables 2, 3 and 4 demonstrate the changes that occurred in the spelling ages recorded in May and September. Unfortunately, the student's exact ages were not recorded and they are therefore presented as approximate ages for their year level.

Table 2

Spelling Age in Years, of Year 8 Students as a function of Student and Time of Testing.

Student	Chronological Ages (Years)	Spelling Ages (Years)			
		Pretest (May)		Posttest (Septemer)	
		Raw score	Spelling Age	Raw score	Spelling Age
A	12-13	37	10.5	45	12.8
B	12-13	40	12.3	47	13.0
C	12-13	40	12.3	44	12.7
D	12-13	39	11.5	44	12.7
E	12-13	36	10.2	39	11.5
F	12-13	37	10.5	43	12.6
G	12-13	37	10.5	48	13.1
H	12-13	37	10.5	43	12.6

Table 3

Spelling Age in Years, of Year 7 Students as a function of Student and Time of Testing.

Student	Chronological Ages (Years)	Spelling Ages (Years)			
		Pretest (May)		Posttest (Septemer)	
		Raw score	Spelling Age	Raw score	Spelling Age
A	11-12	37	10.5	45	12.8
B	11-12	36	10.2	42	12.5
C	11-12	34	9.5	39	11.5
D	11-12	31	8.7	33	9.2
E	11-12	29	8.3	37	10.5
F	11-12	31	8.7	34	9.5

Table 4

Spelling Age in Years, of Year 6 Students as a function of Student and Time of Testing.

Student	Chronological Ages (Years)	Spelling Ages (Years)			
		Pretest (May)		Posttest (September)	
		Raw score	Spelling Age	Raw score	Spelling Age
A	10-11	24	7.7	34	9.5
B	10-11	27	8.1	38	11.0
C	10-11	16	6.7	27	8.1
D	10-11	33	9.2	39	11.5
E	10-11	29	8.3	36	10.2

Changes in writing.

As shown in Tables 2, 3 and 4, all children in the programme showed an improvement of between .5 and 2.9 years over a four month period. Teachers commented on improvements, not only in the nature of spelling errors in the students' draft-writing, but on the quantity of writing and the quality of words used. For example, children who had struggled to write a page were writing more than one page and many were continuing stories over a series of days. They were also tackling more complex words - writing difficult instead of hard, gigantic instead of big and so forth.

At the beginning of the programme, most students were unable to identify errors in their writing and they could not fix them readily, even if someone else underlined them. At the

end of the four month period, students were able to fix most errors when they knew the rule to apply. Identifying the errors was still a problem for many students but if they were given a proof-reading target (search for all words with an /ed/ or /ing/ ending and check the rule for doubling the consonant), they were able to locate and fix errors associated with that rule, without assistance.

Discussion.

This programme was not conducted as a research study as there was no comparison group of students who did not receive the programme. It would have been useful to have obtained more detailed assessments of the quantity and quality of each student's writing, detailed measures of proofreading skills, more diagnostic spelling assessments and the exact ages of all students before the programme began. However, the improvements in spelling ages did appear to reflect a change in the students' spelling skills. Teachers noted changes in attitudes to writing and gains in confidence in tackling unknown words. Many students began to use more advanced vocabulary, despite making errors in their spelling. For example, instead of writing He had no friends because he was bad, a child might write He had no friends because he was meen and narsty. They were prepared to 'have a go' and ask for help afterwards, because they knew there were strategies they could use to find out how to correct errors.

The programme was implemented using as many spelling games

and practice activities as possible. The students were very enthusiastic about the programme and in a revision session at the end of the programme, they demonstrated excellent recall of much of the information they had learned. Spelling rules and letter patterns were taught using stories to make them memorable. The most difficult part of the programme was helping the students to learn how to use the information in spelling attempts in their writing. They needed instruction about *how* and *when* to apply their knowledge. This difficulty in developing effective and efficient strategies for learning and knowing when and how to use knowledge and strategies that have been acquired, is described by Reid (1988) and is typical of many children with learning difficulties.

Implications for Teaching Practice

Research by Nuthall and Alton-Lee (1994) suggests that pupils need to meet a concept or idea on four separate occasions if they are to learn and remember it and that these occasions should not be separated by more than two days. The results of this trial remedial spelling programme suggest that the students benefited from learning specific spelling skills but this benefit was significantly enhanced by the follow-up support they received in the classroom which enabled them to learn how to apply their new knowledge to writing.

Remedial programmes are generally provided in a withdrawal situation and are often taught by someone other than the

classroom teacher. This makes it difficult to link the new learning to classroom-based learning and often restricts its application to other areas. It is a costly exercise to provide withdrawal tuition and if it is to be applied to classroom activities, some sort of in-class support is also required. The best option is for the classroom teacher to provide the spelling instruction and follow-up support, as part of the regular classroom programme.

Brann and Hattie's (1995) research into spelling tuition in primary schools found that senior class teachers tended to operate spelling programmes based on learning individual words spelled incorrectly, or on interest word lists. Very few teachers analysed children's spelling to discover the meaning and significance of the errors. Rarely were correct strategies identified - the focus tended to be on identifying errors and then requiring children to learn the incorrectly spelled words.

Our trial remedial programme, based on teaching skills and strategies associated with learning phonological, orthographic and morphological structures in words, produced good results in poor spellers in the senior school. Treiman and Cassar (1997) state that:

Young children also have some budding knowledge about the orthographic regularities of the written language and about the role of morphology in spelling. Children begin to use this knowledge earlier than they are given

credit for in existing theories. (pp. 64, 65)

This raises the possibility that making the orthographic and morphological structure of the English language overt when children are learning to read and write, may improve spelling skills at an earlier age. This budding knowledge may be strengthened in children who are already developing a sensitivity to it and may be highlighted for those children who are not yet able to use analogy to make the connections themselves.

Nunes, Bryant and Bindman (1997) suggest that developing spellers are heavily dependent on their phonological awareness skills. As they encounter a wider range of words and spelling patterns, they begin to learn that there are other factors that affect spelling. They then begin to use common spelling patterns without regard for their grammatical correctness and later still they begin to understand that there is a correct grammatical usage. For example, developing spellers may learn the spelling pattern for the sound /or/. As their knowledge of the English language increases they will discover that there are several other spelling patterns for this one sound and will begin to develop an awareness of the appropriateness of each pattern according to grammatical conventions. Research by Nunes et al. (1997) suggests that there is a strong link between children's grammatical awareness and their spelling development. They say:

... we need intervention studies: we need to strengthen

children's grammatical awareness and see how this affects their spelling. ... What should we teach our children about grammar? We have no ready answer to this question, and we think that the answer must wait for research on how to increase children's awareness of grammatical distinctions. That should be the needed [sic] move. (p.169)

Current research suggests that knowledge of the orthographic and morphological structures of the English language, contributes to the development of young children's spelling skills (Backman, Bruck, Herbert & Seidenberg, 1984; Goswami, 1993; Bowey, & Hansen, 1994; Brann & Hattie, 1995; Landerl, Frith & Wimmer, 1996; Cassar & Treiman, 1997; Muter & Snowling, 1997; Nunes, Bindman & Bryant, 1997; Bowey, Vaughn & Hansen, 1998). Spelling skills have a direct impact on written language skills (Brann, 1997; Mosely, 1993).

Chapman and Tunmer (1996b) have demonstrated that children's reading self-concept develops in their first year at school, as they are learning to read. It is very likely that young children's writing self-concept also develops early, as they are learning to write. Chapman (1998) highlights the importance of avoiding the development of a negative academic self-concept because of its effects on motivation and achievement outcomes.

It seems that knowledge and strategies about spelling may have significant impact on the acquisition of written

language skills, which will affect a variety of curriculum areas. Success with written language contributes to children's developing academic self-concepts and to achievement outcomes. If young children need to use these strategies from the time they begin to read and spell, it seems logical that they should be taught at the same time. The results of the pilot study suggest that if a progressive, developmental spelling programme was introduced from year 1, there might not be a need to run remedial programmes for students in year 5 and beyond.

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