Journal Home Page:
http://perlinguam.journals.ac.za

# Per Linguam

A Journal for Language Learning
Tydskrif vir Taalaanleer

# IMPROVING THE SPELLING ABILITY OF GRADE 3 LEARNERS THROUGH VISUAL IMAGING TEACHING STRATEGIES

Annalene van Staden
University of the Free State

*This paper discusses two key cognitive theories underlying spelling acquisition, i.e. the developmental stage theory and the overlapping waves theory. Within the developmental stage framework, learning to spell is viewed as a process of moving from spelling that represents sound to spelling that represents meaning, following a sequence of qualitatively distinct stages in a linear fashion. In contrast, proponents of the overlapping waves theory emphasise the use of different instructional approaches at any given time. This model is process-orientated and stresses the adaptation of strategies to meet the needs of the task. Other researchers maintain that spelling is a natural process and emphasise the importance of invented spelling practices and creative writing embedded in whole-language programmes. There is, however, a lack of research validating the efficacy of an exclusively naturalistic approach to spelling. In general, research findings support a combination of incidental learning and direct instruction as most beneficial for learners with spelling problems. Thus, this study was undertaken to develop a visual imagery programme for Grade 3 learners by compromising between direct instruction in specific spelling skills (i.e. visual imaging strategies) whilst also immersing learners in meaningful authentic reading activities. It was hypothesised that the spelling abilities of Afrikaans-speaking Grade 3 learners can be improved significantly by exposing them to a spelling programme that focuses on visual imaging, immediate feedback and self-correcting strategies. Researchers opposed to visual teaching methods for spelling moreover postulate, among other things, that learners with auditory preferences will not benefit from a visual approach to the teaching of spelling. In this empirical study the possible relation between preferential learning styles and spelling performance was also investigated.*

**Keywords: spelling abilities; developmental stage theory; overlapping waves theory; whole-language programmes; direct instruction; visual imagery programme; preferential learning styles**

## INTRODUCTION

Spelling is a complex written language skill that draws upon a number of language abilities and knowledge. Phonological skills appear to be critical, in addition to orthographic knowledge, memory for word images (mental orthographic images), awareness of morphological structures and semantic relationships (i.e. knowledge of word parts and related words), as well as knowledge of spelling rules (Keuning & Verhoeven, 2008:459). Spelling has traditionally been viewed as an integral part of the reading process as suggested by moderate to high correlations between scores on reading and spelling tests (Frith, 1980:495-

515). Whilst reading and spelling skills do interrelate, research findings suggest that there may be separate mechanisms for each activity and that spelling involves two processing systems – phonological and lexical (Brown, 1990:368). Moreover, researchers contend that the mastery of spelling presents a greater challenge for learners than learning to read (Holmes & Carruthers, 1998:264). According to Westwood (1999:16), spelling differs from reading in that it requires accurate retrieval and reproduction of sequences of letters which cannot be guessed from the text (textual cues) or from sentence construction (syntactical cues).

The literature overview of spelling instruction reveals a continual cycle of debate among educational theorists, dividing them into two separate camps, namely the behaviourist theorists who advocate for 'bottom-up' processes, as opposed to the psycholinguistic theorists who favour 'top-down' processes in reading and spelling acquisition (Sawyer & Joyce, 2006:74). Bottom-up processes emphasise the phonics approach, i.e. letter-sound correspondence, as well as the application of spelling rules. Top-down approaches focus on the learner's knowledge about the world as each learner interacts with the orthography in order to communicate through print (Sawyer & Joyce, 2006:74). Most empirical investigations that focus on the benefits of direct spelling instruction (i.e. bottom-up processes) have compared visual and auditory instructional approaches, with the kinaesthetic sense playing only a tertiary role (Van Staden, 2003:2). Research findings demonstrate that spelling curricula that use explicit instruction in phonetic awareness to teach high-frequency regular words have been successful in numerous studies. In a meta-analysis that reviewed 1,962 research articles on phonemic awareness, the National Reading Panel (NRP) reported 'strong and significant' effects on learners' reading and spelling skills (Simonsen & Gunter, 2001:98). Unfortunately, not all words in English and Afrikaans can be spelled correctly using letter-sound correspondence. According to Darch and Simpson (199067), learners with low spelling ability have difficulty spelling both regular and irregular words and poor spellers tend mainly to sound out words using a 'letter-by-letter' phonetic strategy (Radebaugh, 1985:532). Furthermore, several studies, such as that by Henley, Ramsey and Alqozzine (2002:156), have demonstrated that improving one's knowledge of spelling rules has no real impact on spelling behaviour. Research results further indicate that learners with spelling problems experience more problems than normal spellers with the process of segmenting words into phonemes and morphemes, and rejoining them to create words (Bosman, Huygevoort & Verhoeven, 2006:345-346; Henley *et al*., 2002:156; Radebaugh, 1985:532-536). Unlike poor spellers, good spellers reported 'breaking down' the words in larger units and using visual imagery techniques (Bosman *et al.*, 2006:345). Experimental studies further demonstrated that teaching learners to generate visual images whilst reading a list of words, sentences and paragraphs produces higher levels of recall, compared to students who were not instructed to do so (Snowman & Biehler, 2006:245; Sears & Johnson, 1986:230-233).

In stark contrast, proponents of whole-language paradigms believe that it impedes learners' spontaneous and creative writing abilities if learners and educators are overly concerned with the correct spelling of words. They argue that spelling knowledge is acquired incidentally through the act of reading and writing; a natural learning process without direct instruction (Konza, 2006:115; Sawyer & Joyce, 2006:88). However, although popular and widely applied, its effectiveness remains unclear. Limited scientific evidence is available to suggest that whole-language programmes facilitate learners' reading and writing abilities to a greater degree than conventional, direct instructional methods (Graham, Harris & Fink Chorzempa, 2002:682; Graham, 2000:244-245; Butyniec-Thomas & Woloshyn, 1997:293-294). Graham (2000), after reviewing research on spelling instruction, cast further doubt on an exclusively naturalistic approach to spelling instruction as embedded in the whole-language approach. He

contended that many whole-language educators are 'reluctant to rely solely on a natural approach to spelling development' and concluded that a combination of incidental learning and direct spelling instruction seems to be most beneficial to learners in acquiring effective spelling abilities (Graham, 2000:244).

After reflecting on current spelling practices in South Africa, the author's opinion is that educators in many South African classrooms continue to focus on rote-learning activities, the drilling in of spelling rules and the use of spelling tests as regular classroom practices, instead of focusing on learners' strengths and adapting their teaching methods accordingly (Van Staden, 2003). Thus, from the discussion above, and acknowledging the need to improve learners' spelling abilities within a learner-centred, authentic literacy environment, the primary purpose of this study is to investigate the effectiveness of implementing direct, systematic visual imaging teaching strategies as part of a whole-language programme.

## THEORETICAL UNDERPINNINGS OF THE STUDY

Currently, the most comprehensive underlying cognition theory that can explain the relationship between visual imagery and verbal processes is Paivio's (1971) dual coding theory, which maintains that two separate and independent routes to storing and retrieving information are essential for spelling acquisition, i.e. the phonological route and the orthographic route (Schunk, 1996:187). Whilst the phonological route involves phonological and verbal systems for language (e.g. letter-sound correspondences, syllabification, etc.), the orthographic route involves direct access to lexical units (i.e. the non-verbal language systems that deal primarily with imagery and the storage of words in a 'mental dictionary') (Sawyer & Joyce, 2006:76). In practice, this theory implies that words originally accessed through the phonological route can, through enough exposure to learning, be accessed directly through the orthographic route, resulting in faster reading and more fluent spelling. Other researchers (e.g. Dietrich & Brady, 2001; Cunningham & Stanovich, 1990) hold the opinion that lexical and phonological systems interact, suggesting the pre-eminence of a single route for spelling (i.e. the connectionist theory).

Focusing on different linguistic processes involved in the acquisition of spelling skills, one popular conception of spelling development is rooted in the Piagetian theory, which holds that spelling skills and strategies that are acquired follow a sequence of qualitatively distinct stages in which different sources of knowledge are used (Templeton, 2002; Ehri, 2000, 1992; Henderson, 1985; Gentry, 1981; Frith, 1980). Stage development theorists (Ehri, 2000, 1992; Henderson, 1985) identified the following five stages: pre-communicative; semi-phonetic; phonetic; transitional and, finally, the independence stage where students learn about silent and sounded consonant patterns, vowel and consonant alternation patterns and Greek and Latin roots in spelling and meaning. In the final stage, learners demonstrate extensive knowledge of word structure and recognise misspellings because the words do not 'look right' (Keuning & Verhoeven, 2008:459). In contrast, other theorists (e.g. Siegler, 2000, 1996; Varnhagen, McCallum & Burstow, 1997) argue that a stage description of spelling development does not fully capture the complexity of learning to spell. Moreover, such a model assumes that learners progress sequentially through each stage without moving back and forth as they cope with unfamiliar words. The implications of this approach are that practitioners might 'slot' learners into specific stages and provide instruction for that stage only (McQuirter Scott, 2007:2-6). Thus, theorists who have criticised developmental stages of spelling acquisition (Siegler, 2000, 1996; Varnhagen *et al.*, 1997) have described spelling

development in terms of a 'general framework of overlapping waves', based upon three components, namely 'abundant variability, adaptive choice and finally, gradual change in the frequency of the use of particular strategies' (Keuning & Verhoeven, 2008:460).

According to social-constructivist theorists such as Vygotsky (1978), higher mental functioning of learners originates through communication and social interaction with more capable peers and adults. In the process of knowledge construction, educators can act as mediators who guide and encourage learners to formulate their own levels of understanding. By challenging learners to develop 'new ways of thinking' (i.e. teaching in what is known as Vygotsky's 'zone of proximal development'), learners can be 'lifted' to higher levels of mental functioning. Concurrent with Vygotsky's viewpoint, one of the aims of the current study is to make younger spellers aware that they do posses higher-level mental orthographic skills, such as visual imaging, that they can successfully use to enhance their spelling ability. In addition, the author also considered Gardner's (2004) 'theory of multiple intelligences' (i.e. the utilisation of learners' visual/spatial intelligences) in the development of a visual imagery programme. Gardner (2004) maintains that learners can become more successful in all subject areas, including the learning of basic skills, if they have the opportunity to learn through their strengths. Finally, in the present study, the author has extended Vygotsky's social-constructivist theory of cognitive development and proposes a conceptual framework for improving Grade 3 learners' spelling abilities on the basis of a 'diverse constructivist orientation within a responsive teaching curriculum' (Au, 1998; Kaste, 2004; Mahoney, Perales, Wiggers & Herman, 2006). The instructional methods proposed by diverse constructivist orientations are those methods that include authentic literacy activities and emphasise explicit systematic instruction whereby learners are actively involved in the learning process (Kaste, 2004:34). Within a responsive teaching environment, learners are encouraged to develop and use foundational strategies for developmental learning such as problem solving, joint attention, conversation, trust, cooperation, persistence and feelings of competence (Mahoney *et al*., 2006:18-19).

## PROBLEM STATEMENT AND RESEARCH QUESTIONS

Although spelling is an important skill for learners to master at school, it is often neglected by many educators. Perhaps the importance of teaching learners to spell correctly has been lost in this age of computers and spell-checkers (Simonsen & Gunter, 2001:97). Other educators view spelling as a by-product of reading and are of the opinion that engaging in 'casual' reading and writing activities will automatically transfer into adequate spelling abilities; this, despite research results demonstrating that learners' spelling performance can be enhanced by providing them with direct instruction (Graham *et al*., 2002, 2000; Sears & Johnson, 1986). However, where direct and systematic instruction is provided, educators seem to have conflicting viewpoints with regard to effective spelling intervention strategies for learners with spelling problems. The two strategies that elicit the strongest reaction are the phonetic approach, in contrast with the visual approach (Sawyer & Joyce, 2006; Konza, 2006; Snowman & Biehler, 2006; Graham *et al*., 2002; Treiman & Bourassa, 2000; Shurren, Maher & Heilman, 1996; Sears & Johnson, 1986). Moreover, proponents of phonetic training still have doubts about the value of visual imaging as an instructional strategy. They maintain that only learners with visual preferences are able to make effective use of visual imaging and that learners with auditory preferences derive no benefit from this approach (visual imagery). Thus, the purpose of this study was to investigate whether the spelling performance of Afrikaans-speaking, Grade 3 learners who experience problems with spelling, would improve

significantly after applying visual imaging techniques in order to master spelling of words. With this goal in mind, the following research questions guided this research:

- Can the spelling performance of Afrikaans-speaking Grade 3 learners be significantly improved by exposing them to a visual imagery programme, compared to the spelling performance of Grade 3 learners in the control group?

- Is there a significant difference in terms of spelling performance between learners with visual and auditory preferential learning styles respectively, as identified by the Visual Auditory Digit Span Test (VADS), after exposure to a visual imagery programme?

## METHODOLOGY

### Experimental design

In this empirical study, a quasi-experimental, pre-test/post-test design with matched experimental and control groups was used. The control group was formed in such a way that the dependent variables resembled those of the experimental group as closely as possible before the experimental intervention (Huysamen, 1997:129).

### Sample

A purposive sampling design was applied in the present study, as the researcher selected Grade 3 learners who experienced spelling problems from one primary school in the Motheo district in the Free State province. This primary school population comprises learners who come from families with a low socio-economic status within the larger community population. Recruiting learners from the same demographic area of the city allowed greater control over variables such as socio-economic status, educational environment, cultural experience and language abilities.

The Grade 3 Afrikaans-speaking learners who experienced spelling problems and were participants in this study met the following criteria: (a) their ages ranged between 8.0 years and 9.11 years; (b) their home language was Afrikaans; (c) they revealed average intellectual ability (IQ: 95 to 110); (d) the learners had no additional impairments, e.g. Attention-Deficit Hyperactivity Disorder (ADHD), or any other Conduct Disorders; (e) they were identified as having spelling problems and qualified for support teaching; (f) and there was a discrepancy of at least two years between the learner's chronological age and his/her spelling age. General education teachers (Grade 3) assisted with the identification of the participants. The selection of learners involved administering measuring instruments used by the Motheo District Support team, namely tests for spelling from the University of Cape Town (UCT). The intellectual ability of the participants was determined by using the Raven Progressive Matrices and the preferential learning styles of learners were determined by means of the Visual Auditory Digit Span Test (VADS). These tests were used because they are regarded as reliable and valid; they can be applied for both the first assessment and re-assessment after six months. Specific spelling problems can be identified and the tests have diagnostic value as well. Of the 40 learners who were identified and received forms for permission to participate, 34 learners returned the forms and participated in the pre-testing. The study population comprised all the Grade 3 learners at the school, and the sample consisted of learners with spelling problems.

All the tests were administered and scored according to procedures outlined in the test manuals. The tests were marked and the results were verified by an independent marker. Out of the 34 learners who participated in the pre-tests, 24 met the above-mentioned criteria and were included in the final sample. An attempt was made to match the experimental ($N = 12$) and control groups ($N = 12$) by pairing the learners according to age, gender and pre-test scores (spelling). To achieve a gender balance, seven boys and five girls were assigned to the experimental group, and six boys and six girls to the control group. The average chronological age of learners in the experimental group ($N = 12$) was 8.75 years ($SD = 0.47$) and in the control group ($N = 12$) 8.56 years ($SD = 0.55$). Group comparison using non-parametric tests (Mann-Whitney $U$-test) revealed no significant differences between groups with respect to chronological age ($U = 48.0$, $p = 0.50$), intellectual abilities ($U = 68.5$, $p = 0.50$) and spelling performance ($U = 185.5$, $p = 0.43$). The critical value for all outcomes was 42.

The experimental group of 12 learners was divided into two groups of six learners each. The preferential learning styles of these learners were determined via the VADS test. Six learners with visual preferences and six learners with auditory preferences were randomly assigned to the two experimental groups. Each experimental group (group 1 and group 2) consisted of three learners with visual preferences and three learners with auditory preferences. Both experimental groups were exposed to the same visual imagery programme and received assistance from two support teachers working at the specific school.

**The intervention programme**

With reference to the formulated goal, an empirical study was carried out which focused on the following important aspects:

- the development and application of a visual imagery spelling programme, and
- the collection of scholastic data (spelling scores) to determine the effect of the visual imagery spelling programme on the spelling performance of Afrikaans-speaking Grade 3 learners.

It is worth mentioning that foundation phase educators at the sample school followed a whole-language approach to literacy development (prior to the implementation of the intervention programme). 'Problem words' encountered by readers in the reading text were reinforced via sounding-out strategies and word attack skills such as syllabification, without direct and explicit spelling instruction. Research findings, however, suggest that learners who experience reading and spelling problems do not acquire a variety of cognitive and meta-cognitive strategies and skills unless detailed and explicit instruction is provided (Sawyer & Joyce, 2006; Graham, 2000, 1983) Thus, the researcher, in developing this visual imagery programme, considered the following aspects as part of the instructional approach: spelling *words from memory* yields higher spelling gains; practising the *entire word* rather than the ambiguous phoneme-grapheme part is also more effective; the added value of using *bodily kinematics*, whether handwritten, typed or traced; *over learning* – that is, learning until the correct visual image of the words is stored in memory; the important role of *immediate feedback* as opposed to delayed feedback and, finally, *self-correction*, appear to be important factors in learning to spell (Bosman *et al*., 2006:342).

In accordance with the intervention programme, the learners in the experimental groups received small-group instruction (two separate groups) from two support teachers who were

thoroughly trained by the programme designer (author) before implementing the visual imagery programme. The intervention was completed over a six-month period (from April to October), with learners receiving 45 minutes of intervention twice each week. At the same time, learners in the control group received spelling instruction (small groups) in the general classroom from their respective classroom educators twice a week, for the same time and period of six months. The support sessions of learners in the control group focused mainly on the development of their spelling skills via the application of the phonetic approach/auditory imaging and the drilling in of spelling rules. The major features of the visual imagery programme are encouragement and systematic guidance in order to utilise their visual/spatial abilities so as to create visual images of high frequency words that were compiled from the Grade 3 reader series of the specific school. Both groups were exposed to the same reading series (i.e. *'Ster Stories'*) – the only difference was that the control group did not have access to the visual imagery programme, but followed the reading curriculum (teaching methods) that was used prior to the onset of this study.

Since the relevant literature indicates that persons with spelling problems do not make use of visual imaging (Van Staden, 2003:14), the two support teachers, during the introductory phase of the programme that lasted for two weeks, helped learners to become aware of the fact that they indeed had the ability to recall images ('pictures') of concrete and semi-concrete objects. In other words, learners were directly and systematically assisted in mastering the technique of visual imaging. These introductory exercises prepared learners for the task of recalling visual images of high frequency words, something that would eventually be expected of them.

With reference to the imagery programme developed by Swart (1991:490-496), the following concrete objects were identified to be used during the introductory phase for the purposes of imaging exercises:

- Picture: black and white cat (two-dimensional)
- Guinea-fowl feather (three-dimensional and multi-sensory)
- Flower: a red rose (three-dimensional and multi-sensory)
- Fruit: apple, banana and orange (three-dimensional and multi-sensory)
- Balloon (transformational and imaging control)
- Guiding fantasy (imagination and interactive associations)

Learners were requested to look at the object(s) to be used for image creation in a specific session, for 15 to 20 seconds. Then the learners closed their eyes and conjured up a visual image of the picture (for 30 to 50 seconds). Whilst, "looking" at this picture ("in their minds' eye"), learners were encouraged, via guiding questions, to concentrate on certain details of the pictures or objects concerned. They were also encouraged to verbalise their imaging experiences. Each learner had the opportunity to share his/her experiences with other group members.

From the third week of the programme, imaging of spelling words was introduced. Three to five words were used for imaging during each session and were written on white flash cards and pasted against a white screen. Learners received the following instructions:

Step 1:

- Use your eyes like a 'camera' and take a photograph of the word.

- Close your eyes and 'see' the word in your mind's eye.
- Make the letters in the word 'fatter', and stretch the word 'bigger' until it takes up the whole screen.
- Say the word out loud.
- Trace the word on your desks from left to right.

Step 2:

(Having practised step 1, the word on the white screen was covered with coloured paper before learners were instructed to open their eyes).

- Open your eyes and write down the word in your spelling journals (from memory).
- Those learners who experienced difficulties in reproducing the correct version of the word were encouraged to close their eyes again and conjure up the visual image of the word.
- Then the coloured paper was removed and learners had to compare their written word with the word on the white screen.
- If the word was misspelled, the above-mentioned steps were repeated (immediate feedback and self-correction).

For reinforcement, learners had to practise each week's words (at home) by using the 'look, cover, write, compare' strategy (worksheets developed by the programme designer). This strategy improved learners' visual recall of words and entailed the following:

- Look at the word
- Say the word
- Cover the word
- See the word in your mind's eye (conjure up a visual image of the word)
- Write down the word
- Compare the word with the example.

## ETHICAL CONSIDERATIONS

As part of the process of informed consent, the Free State Department of Education, the principal and educators of the school and all parents of participants were advised of the purpose of the study and when the intervention programme would be conducted. Participation was on a voluntary basis and only learners whose parents had signed consent forms were included in this empirical study.

## RESEARCH HYPOTHESES

### Research hypothesis 1

The spelling performance of Grade 3 learners who were exposed to visual imaging as a spelling instruction strategy were better than that of learners who were not exposed to the programme.

In statistical terms, this research hypothesis may be represented as follows:

$H_o$:     $\mu_1 = \mu_2$
$H_1$:     $\mu_1 > \mu_2$

where: $\mu_1$     =     average spelling score of the population of Grade 3 learners
                          in the experimental group

       $\mu_2$     =     average spelling score of the population of Grade 3 learners
                          in the control group

A directional alternative hypothesis was formulated since it was expected that the spelling performance of learners who completed the programme (experimental groups), would be better than the performance of those learners who were not involved in the programme, based on the re-assessments.

**Research hypothesis 2**

There is a difference between the spelling performance of learners with visual preferential learning styles and the spelling performance of those with auditory preferential learning styles, after exposure to a visual imagery programme.

In statistical terms, this research hypothesis may be represented as follows:

$H_o$:     $\mu_1 = \mu_2$
$H_1$:     $\mu_1 \neq \mu_2$

where: $\mu_1$     =     average spelling score of the population of Grade 3 learners
                          with visual preferential learning styles

       $\mu_2$     =     average spelling score of the population of Grade 3 learners
                          with auditory preferential learning styles

A non-directional alternative hypothesis was formulated since educators are not in agreement about the influence of preferential learning styles on learners when a visual imagery programme is applied.

**STATISTICAL PROCEDURES**

Since the sample was relatively small ($N = 24$), some doubt existed about the assumption of normality and the Mann-Whitney test was used to test hypotheses 1 and 2. The Mann-Whitney test is the non-parametrical counterpart of the *t*-test for independent groups.

The Mann-Whitney test determines whether the null hypothesis, which states that the distributions of two non-related populations, including their central values, are identical in all respects, is true (Huysamen, 1997:129). In contrast, the alternative hypothesis states that the two populations are not identical. In order to investigate the results, the 5% level ($\alpha = 0.05$) of significance was used. The alternative hypothesis to Hypothesis 1 is directional; accordingly a one-tailed test was used. In this case, the decision rule is as follows:

If $U \leq U_{0.05}$, for $n_{EXPERIMENTAL \, and} \, n_{CONTROL}$, reject $H_0$.

The alternative hypothesis to Hypothesis 2 is non-directional; accordingly, a two-tailed test was used. In this case, the decision rule is as follows:

If $U \leq U_{0.05/2}$, for $n_{VISUAL \, PREFERENCE \, and} \, n_{AUDITORY \, PREFERENCE}$, reject $H_0$.

This means that, if we reject the null hypothesis, a significant difference exists between the averages of the two groups with regard to spelling performance.


## HYPOTHESIS TESTING AND RESULTS

### Hypothesis 1

In order to determine whether the experimental and control groups were reasonably similar with regard to the dependent variable before the beginning of the investigation, the two groups were compared with respect to the pre-scores attained in the spelling test. The results are reflected in Table 1.


**Table 1: Average spelling scores (pre-scores) and standard deviations for the experimental and control groups**

|  | Spelling scores (Pre-scores) | |
| --- | --- | --- |
|  | $\overline{X}$ | $S$ |
| Experimental | 14.91 | 4.20 |
| Control | 15.08 | 4.66 |
| $U$-value | 70.5 | |

*Critical value = 42

Table 1 indicates that the average spelling scores (pre-scores) of the experimental and control groups were very similar. In order to determine whether a significant difference existed between the average spelling scores, the Mann-Whitney $U$-test was used. The 5% level of significance was used. For the given group sizes, the critical value in this case (one-tailed test) was 42. Since the calculated $U$-value was equal to 70.5, the null hypothesis could not be rejected (70.5 > 42). This means there was no significant statistical difference between the average spelling scores (pre-scores) of the experimental and control group before the intervention. Therefore, the average post-scores of the two groups were compared. These results are presented in Table 2.

**Table 2: Average spelling scores (post-scores) and standard deviations for the experimental and control groups**

|  | Spelling scores (Pre-scores) | |
| --- | --- | --- |
|  | $X$ | $S$ |
| Experimental | 30.50 | 6.58 |

| Control | 19.16 | 6.07 |
|---|---|---|
| *U*-value | 12 | |

*Critical value = 42

Table 2 indicates a noticeable difference between the average spelling scores (post-scores) of the experimental and the control group. The 5% level of significance was used and for the given group sizes, the critical value in this case (one-tailed test) was 42. Since the calculated *U*-value was 12, the null hypothesis could be rejected in favour of the alternative hypothesis (12 < 42). This means that there was a significant statistical difference between the average spelling scores (post-scores) of the experimental and the control groups. It is evident that the average post-scores of the experimental group were much higher than those of the control group. Hence, it can be concluded that the spelling performance of Grade 3 learners who were exposed to the visual imagery programme was significantly better than that of learners who did not participate in the programme.

**Hypothesis 2**

In order to test hypothesis 2, the Mann-Whitney *U*-test was used. Since the alternative hypothesis is non-directional, a two-tailed test was used. To investigate the results, the 5% level ($\alpha$ = 0.05) of significance was used. The average pre-scores of the two groups were compared, and the results are set out in Table 3.

**Table 3: Average spelling performance (pre-scores), standard deviations and *U*-values for the visual and auditory preference groups**

| | Visual preference group Pre-scores | Auditory preference group Pre-scores |
|---|---|---|
| Average spelling performance | 14 | 15.8 |
| Standard deviation(s) | 4.89 | 3.60 |
| U-values | 15 | 15 |

*Critical value = 7

Table 3 indicates that the average spelling scores (pre-scores) of learners with visual and auditory preferential learning styles were very similar. The 5% level of significance was used and for the given group sizes, the critical value in this case (two-tailed test) was 7. Since the calculated *U*-value with regard to the pre-scores was 15, the null hypothesis could not be rejected (15 > 7). This means that there was no significant statistical difference between the pre-scores of learners with visual and auditory preferences respectively and the average post-scores therefore were compared. The results are presented in Table 4.

**Table 4: Average spelling performance (post-scores), standard deviations and**
***U*-values for the visual and auditory preference groups**

|  | Visual preference group | Auditory preference group |
|---|---|---|
|  | Pre-scores | Pre-scores |
| Average spelling performance | 30.3 | 30.6 |
| Standard deviation(s) | 7.60 | 6.12 |
| *U*-values | 15 | 15 |

*Critical value = 7

Table 4 indicates that there was no significant difference between the average post-scores of learners with visual and auditory preferential learning styles respectively. Since the calculated *U*-value with regard to the pre-scores was 15, the null hypothesis could not be rejected (15 > 7). The conclusion that could be drawn is that there was no significant statistical difference between the post-scores of learners with visual and auditory preferences; it seemed that learners with different preferential learning styles benefited equally from the visual imagery programme.

**DISCUSSION OF FINDINGS**

It was evident from the literature review that a strict 'stage theory approach to spelling development' is somewhat controversial and does not explain why learners, even from the onset of their experience with print, use multiple strategies and different types of knowledge whilst engaging in spelling tasks (Treiman & Bourassa, 2000). Thus, stage theories have been criticised and reconceptualised to some extent by proponents of the 'overlapping waves theory' who maintain that spelling stages do not develop in a linear fashion. In the current study the author attempted to provide a more complete theoretical paradigm for spelling development by discussing both cognitive theories that may account for spelling development (i.e. stage and overlapping waves theories), as well as including other theoretical perspectives such as social-constructivism and the theories of multiple intelligences and responsive teaching. Thus, in the current study, Grade 3 learners were firstly encouraged to reflect on their use of familiar spelling strategies and, secondly, were systematically guided and encouraged to use visual imaging as an alternative spelling strategy to improve their spelling ability.

The results of this quasi-experimental study corroborate the importance of considering visual imaging teaching strategies to improve the spelling ability of learners with spelling problems. Moreover, the gains obtained in spelling scores (especially with regard to concrete high-frequency words) lend further support to Paivio's dual coding theory, which states that concrete words that are encoded both as images and as verbal labels make retrieval easier because twice-coded items/words provide more potential retrieval cues, compared to words/information that exist only in the verbal form (Snowman & Biehler, 2006:245). Furthermore, the effective application of visual imaging strategies in the present investigation (by younger learners), indicates that it is an oversimplification to label young learners as 'sound-based spellers'. The results of the current study have demonstrated that Grade 3 learners possess good visual/spatial abilities, thus contradicting educationists and stage

theorists who claim that sound-based spellers (i.e. phonetic stage), are not capable of using higher mental orthographic skills such as visual imaging successfully. Therefore, one can conclude that younger spellers do not have to reach the final stages of spelling development (i.e. the transitional and independence stages), as suggested by stage developmental theorists (e.g. Ehri, 2000 & Henderson, 1985), before being exposed to visual imaging as a spelling strategy. In addition, these results lend further support to Siegler's (2000, 1996) overlapping waves theory, which suggests that spelling development is not unidirectional; that children possess a range of strategies in their spelling repertoires; and that they are able to oscillate between more or less sophisticated strategies depending on the spelling tasks at hand.

Although the positive results of the visual imagery programme cannot be generalised for all learners with spelling impairments (due to the small sample sizes), the researcher succeeded in demonstrating that visual imaging strategies can play an extremely important role in improving the spelling skills of Afrikaans-speaking Grade 3 learners with spelling problems. In support of Hypothesis 1, the spelling ability of Grade 3 learners who participated in this investigation (experimental group) showed a statistically significant improvement following the application of the visual imagery programme. Moreover, these results have demonstrated that the spelling performance of learners with visual and auditory preferential learning styles (experimental groups) can be significantly improved by their participation in a visual imagery programme. In practice, this implies that preferential learning styles identified in this investigation did not play a role in the improvement of the spelling performance of learners with spelling impairments.

**CONCLUSION**

For the last 25 years there has been vigorous debate about the importance and role of spelling instruction. Incorrect spelling is known to affect both writing and reading capabilities, as well as overall academic performance. Moreover, it is also true that within the wider community, literacy skills are still largely judged by a person's ability to spell correctly. Many people who have completed their schooling in the last 20 years, during the period when the explicit teaching of spelling was not emphasised, continue to have difficulty spelling familiar words and do not possess a repertoire of spelling strategies with which they can approach more challenging words (Konza, 2006:115). In contrast, recent intervention studies have shown that explicit and systematic teaching improves reading and writing skills. Concurrent with other researchers (Konza, 2006:116), the author contends that good spelling frees up memory (attention) and proficient spellers, because they do not have to focus on the technical aspects of writing, are able to write more quickly, confidently and with greater accuracy. Thus, by compromising between direct instruction in specific skills and a reliance on modelling and immersion in authentic literacy activities, reading and spelling skills can be acquired through formal and incidental, spontaneous context-based instruction (Sawyer & Joyce, 2006:89). Therefore, it is important that learners should be encouraged to reflect on their use of spelling strategies which provide them with effective scaffolding as they develop increasingly sophisticated orthographic knowledge. With reference to the current study, the author has demonstrated the importance of creating opportunities for younger spellers to utilise alternative strategies, such as visual imaging (mental imagery) to improve their spelling abilities and writing skills. Thus, classroom educators can effectively use visual imaging techniques for learners with spelling impairments.

It is important, however, to emphasise that the effectiveness of a spelling programme is also

dependent upon learners' attitudes and motivation. Learners in this study enjoyed creating visual images of words; therefore keeping up motivation and interest is an important prerequisite for any subject that learners need to master (Bosman *et al*., 2006:359). Furthermore, researchers (Sawyer & Joyce, 2006:104; Graham *et al*., 2002:683; 1983:563) contend that spelling consciousness can be stimulated by limiting instruction to relevant and critical skills; emphasising learners' progress; studying those words most likely to occur in learners' present and near-future writing endeavours (focusing on words learners are unable to spell correctly); providing learners with personally meaningful tasks; and encouraging them to apply emerging skills and concepts to activities that are an integral part of their daily lives. This may, for example, be achieved through exercises such as creative writing; structuring tasks so that learners can succeed; demonstrating the importance of correct spelling in practical and social situations; providing opportunities for immediate feedback and self-correction under the guidance of the educator; and through opportunities for transferring knowledge to other language arts.

Recommendations for future research include continued experimental intervention studies for learners with spelling problems in all mother-tongues, as well as the possible contribution of visual imaging to alleviate the spelling problems of learners with other impairments; for example, learners who are mentally impaired and learners who experience hearing loss. In conclusion, this study does not negate the importance of informal and incidental methods in learning to spell; however, it does support other investigations which demonstrate that primary grade learners benefit from direct, guided spelling instruction. Simply dealing incidentally with spelling as a minor aspect of the writing process in the whole-language approach is not enough for learners who experience spelling problems.

## REFERENCES

AU, KH. 1998. Social constructivism and the school literacy learning of students from diverse backgrounds. *Journal of Literacy Research*, 30:297-319.

BOSMAN, AMT, M VAN HUYGEVOORT & L VERHOEVEN. 2006. Spelling feedback in an ICT-learning environment: Issues of proficiency, training efficiency and transfer. *International Journal of Educational Research*, 45:341-361.

BROWN, AS. 1990. A review of recent spelling research. *Educational Psychology Review*, 2(4):365-397.

BUTYNIEC-THOMAS, J & VE WOLOSHYN. 1997. The effects of explicit-strategy and whole-language instruction on students' spelling ability. *Journal of Experimental Education*, 65(4):293-302.

CUNNINGHAM, A & K STANOVICH. 1990. Assessing print exposure and orthographic processing skills in children: A quick measure of reading. *Journal of Educational Psychology*, 82(4):733-740.

DARCH, C & RG SIMPSON. 1990. Effectiveness of visual imagery versus rule-based strategies in teaching spelling to learning disabled students. *Research in Rural Education*, 7(1):61-70.

DIETRICH, JA & SA BRADY. 2001. Phonological representations of adult poor readers: An investigation of specificity and stability. *Applied Psycholinguistics*, 22:383-418.

EHRI, L. 2000. Learning to read and learning to spell: Two sides of a coin. *Topics on Language Disorders*, 20(3):19-36.

EHRI, L. 1992. Review and commentary: Stages of spelling development. In Templeton, S & DR Bear (Eds), *Development of orthographic knowledge and the foundations of literacy: A memorial festschrift for Edmund H Henderson*. Hillsdale, NJ: Erlbaum. 307-332.

FRITH, U. 1980. Unexpected spelling problems. In Frith, U (Ed), *Cognitive processes in spelling*. London: Academic Press. 495-515.

GARDNER, H. 2004. *Frames of mind: The theory of multiple intelligences*. New York: Basic Books. New Editions.

GENTRY, JR. 1981. Learning to spell developmentally. *The Reading Teacher*, 34(4):378-381

GRAHAM, S. 2000. Should the natural learning approach replace spelling instruction? *Journal of Educational Psychology*, 92(2):235-247.

GRAHAM, S. 1983. Effective spelling instruction. *The Elementary School Journal*, 83(5):560-567.

GRAHAM, S, KR HARRIS & B FINK CHORZEMPA. 2002. Contribution of spelling instruction to the spelling, writing and reading of poor spellers. *Journal of Educational Psychology*, 94(4):669-686.

HENDERSON, E. 1985. *Teaching spelling*. Boston: Houghton Mifflin.

HENLEY, M, RS RAMSEY & RF ALQOZZINE. 2002. *Characteristics of and strategies for teaching students with mild disabilities.* Boston: Allyn & Bacon.

HOLMES, VM & J CARRUTHERS. 1998. The relationship between reading and spelling in skilled adult learners. *Journal of Memory and Language*, 39:264-289.

HUYSAMEN, GK. 1997. *Inferensiële statistiek en navorsingsontwerp*. Pretoria: Academica.

KASTE, JA. 2004. Scaffolding through cases: diverse constructivist teaching in the literacy method course. *Teaching and Teacher Education*, 20:31-45.

KEUNING J & L VERHOEVEN. 2008. Spelling development throughout elementary grades: The Dutch case. *Learning and Individual Differences*, 18:459-470.

KONZA, D. 2006. *Teaching children with reading difficulties*. South Melbourne: Thomson Social Sciences Press.

MAHONEY, G, F PERALES, B WIGGERS & BB HERMAN. 2006. Responsive Teaching: Early intervention for children with Down syndrome and other disabilities. *Down Syndrome Research and Practice*, 11(1):18-28.

McQUIRTER SCOTT, R. 2007. Spelling research: Classroom implications. *Encyclopaedia of language and literacy development.* [Online]. Available: http://www.literacyencyclopedia.ca/pdfs/topic.php?topId=230 [2008, 1 December].

PAIVIO, A. 1971. *Imagery and verbal processes*. New York: Holt, Rhinehart & Winston.

RADEBAUGH, MR. 1985. Children's perceptions of their spelling strategies. *Reading Teacher*, 38(6):532-536.

SEARS, NC & DM JOHNSON. 1986. The effects of visual imagery on spelling performance and retention among elementary students. *Journal of Educational Research*, 79(4):230-233.

SAWYER, DJ & MR JOYCE. 2006. Research in Spelling: Implications for Adult Basic Education. In Comings, J, B Garner & C Smith (Eds), *Review of Adult Learning and Literacy, Volume 6*. United States: Lawrence Erlbaum. 71-152.

SCHUNK, DH. 1996. *Learning theories* (2nd edition). Englewood Cliffs: Merrill.

SHURREN, JE, LM MAHER & KM HEILMAN. 1996. The role of visual imagery in spelling. *Brain & Language*, 52(2):365-372.

SIEGLER, RS. 2000. The rebirth of children's learning. *Child development*, 71:26-35.

SIEGLER, RS. 1996. *Emerging Minds: The process of change in children's thinking*. New York: Oxford University Press.

SIMONSEN, F & L GUNTER. 2001. Best practices in spelling instruction: A research summary. *Journal of Direct Instruction*, 1(2):97-105.

SNOWMAN, J & R BIEHLER. 2006. *Psychology applied to teaching*. New York: Houghton Mifflin.

SWART, GJJ. 1991. Visuele beelding as kritiese faktor by die aanleer van spelling. Unpublished doctoral dissertation. Stellenbosch: University of Stellenbosch.

TEMPLETON, S. 2002. Spelling, logical, learnable – and critical. *ASHA Leader*, 7(3):4-7.

TREIMAN, R & DC BOURASSA. 2000. The development of spelling skill. *Topics in Language Disorders*, 20:1-18.

VAN STADEN, A. 2003. Visuele beelding as spellingonderrigstrategie vir Afrikaanssprekende, graad 3-leerders, met spellingprobleme. Unpublished M.Ed. dissertation. Bloemfontein: Free State University.

VARNHAGEN, CK, M McCALLUM & M BURSTOW. 1997. Is children's spelling naturally stage-like? *Reading and Writing: an Interdisciplinary Journal*, 9:451-481.

VYGOTSKY, LS. 1978. *Mind and Society: The development of higher mental processes*. Cambridge, MA: Harvard University Press.

WESTWOOD, P. 1999. *Spelling: Approaches to teaching and assessment*. Victoria: The Australian Council for Educational Research.

**BIOGRAPHICAL NOTE**

Annalene van Staden is a senior lecturer in the Department of Psychology of Education at the University of the Free State. Her areas of interest and specialisation are learning problems and learners with special educational needs, including learners experiencing emotional and behavioural problems. Email: vanstadena@ufs.ac.za