

THE EFFECT OF MULTIMODAL REMEDIAL TECHNIQUES ON THE SPELLING ABILITY OF LEARNING DISABLED CHILDREN

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The purpose of the study was to examine the effectiveness of three remedial techniques to improve the spelling ability of students with learning disability. The three techniques, namely, TAK/v, visual orthographic method and listen, speak, read and write (LSRW) method were administered to three experimental groups, each having 13 students with learning disability. The students in the three groups differed in the kind of errors they made in spelling. TAK/v, group, visual orthographic group and LSRW group comprised of dyseidetic spellers, dysphonetic spellers and spellers with mixed errors respectively. The students in the sample had at least average intelligence, manifested specified traits of learning disability, had significant deficits in spelling skills and had no sensorial problems. The results indicated that all the three remedial techniques were significantly effective in ameliorating spelling deficits among students.

Reading and spelling are both part of general language ability. Reading and spelling have been considered as inter-related processes with spelling receiving relatively little attention on its own right. Students with learning disabilities (LD) have been characterized as having severe and persistent writing problems (Graham & MacArthur, 1988). Writing and spelling difficulties have been called dysgraphia or literally abnormal writing.

Recht, Caldwell and Newby (1990) suggested that almost every child who has reading difficulties has similar or even greater problem with spelling. Spelling ability is a powerful characteristic to differentiate dyslexic children from normal learners (Deshler, Schumaker, Alley, Warner & Clark, 1982; Cronin, 1994).

Spelling difficulties among students with learning disabilities is a well documented problem. Historically, spelling has received much less attention in literature on learning disability as compared to reading instruction. In fact, spelling problem in students with learning disability may be more severe than reading disabilities and may have proved more difficult to remediate (Gerber & Hall, 1987; Gettinger, Bryant, & Fayne, 1982).

Initially, spelling is primarily a phonological skill and reading a visual one. By the age of seven and of eight years, the visual and phonological elements become fixed and the child uses both processes that is why at this stage spelling difficulties are noted. To spell correctly one must normally be able to hear a speech, to learn the written form, retain that in one's mind and then recall and reproduce it accurately. Each of these processes involve a number of stages and failure in any one of them will affect spelling performance. A beginning speller should be able to segment spoken words into syllables and phonemes in order to decide, which letters are needed and in which order (Bradley & Bryant, 1983; Maki, Voeten, Vauras & Poskiparta 2001; Schneider & Naslund, 1993; Graham 1999).

Spelling skills must be explicitly taught by considering the technical aspect of handwriting and letter formation, the spelling processes, as well as part of writing process (Graham, 1999). The choices concerning the content of spelling intervention, the application of a specific instructional method, and the learning environment must be interrelated. Methods and learning environment form alternative ways of dealing with the individual needs of a particular student and the content of spelling instruction. According to Graham teaching phonics to students with learning disability has been an understudied

aspect of spelling instruction.

Berninger, Abbott, Whitaker, Sylvester and Nolen (1995) evaluated the effectiveness on an instructional protocol that provided instruction in multi component writing skills. They administered 14 one hour individual tutorials to twenty four third and fourth graders having writing problems. The authors utilized strategy of PWRR (plan, write, review, revise) for handwriting, automaticity, spelling strategies and the composing process. 12 subjects received instruction practice in composing and the other 12 got special training in orthographic and phonological coding. Findings indicated that the treatment groups improved faster on some measures of handwriting, spelling and composition (fluency and quality) as compared to the control group.

Wanzek, Vaughn, Waxler, Smanson, Edmonds and Kin (2006) conducted a synthesis of spelling and reading intervention and their effects on the spelling outcomes of students with learning disability. Spelling outcomes consistently improved following intervention that included explicit instruction with multiple practice opportunities and immediate corrective feedback. Spelling intervention that employed assistive technology aimed at spelling in written composition indicated positive effect on spelling outcomes.

Following the treatment (which was computer based and focusing on learning to recognize and to make use of phonological and morphological structure of words) participant attained an average level of text reading and spelling. The attained level of reading words and reading text was found to be stable over a four year follow up period. Spelling showed a slight decline one year after the treatment, but remained stable thereafter (Tijms, Hocks, Paulussen-Hoogbeem & Smolenaars, 2003).

Boder (1971) studied reading-spelling patterns of children with developmental dyslexia. Boder identified three distinct spelling patterns (errors) dysphonetic, dyseidetic and dysphonetic-dyseidetic (mixed of both types). School teachers admit that children from lower classes have serious spelling errors which undermine reading, understanding and hence gaining knowledge tremendously.

Rationale

Spelling is one curriculum area in which neither creativity nor divergent thinking is encouraged, only one pattern of arrangement of letter is accepted as correct, there is no compromise or leeway. Proficiency of spelling is needed in all subjects in the school curriculum. Though the child may know the answer to a question properly yet due to poor spelling may not be able to convey a clear meaning. Since the problem of making mistakes in spelling pervades of all areas of school curriculum, due to errors he may not be able to communicate what he wants to, most of the time in the school. Hence remediating spelling errors for overall improvement is very important.

The purpose of this study was to investigate effectiveness of various techniques in remedying spelling problems. The study utilized three intervention techniques, viz TAK/v, Visual orthographic and LSRW (listen, speak, read and write).

Methodology

The following section deals with the design, tools, sample selection, procedure of data collection.

Design:

Tools & Techniques: A variety of tools were used in this study. Some of the tools were used to identify and select the required sample. These are DTLN (Diagnostic Test of Learning Disability, Mehta and Swarup, 1993), Intelligence Test (Raven, 1997), Teachers Referral Form and Diagnostic Spelling Test (Gupta & Narang, 2005). Classroom observations of children also used to observe behaviour of the children with learning disability. The intervention technique used were TAK/v, Visual orthographic and LSRW(listen, speak, read and write) method .

Sample: The sample included 41 learning disabled children, identified from 561 regular school going children of 4th standard, having average or above average intelligence, manifesting specified traits of learning disability (Traver & Hallahan, 1976) and significant deficits in their spelling skills as compared to their classmates, having a discrepancy in performance in English and Maths (above .6Z), having a score on a diagnostic test of LD above a cut off and having no sensorial problems.

By using these criteria, a total of 41 students were identified as learning disabled. Classification of

children into three groups was based on the kind of errors namely dysidetic (phonetic) dysphonetic (visual) and mixed group having both kinds of errors (Boder, 1971). The above process yielded following distribution of subjects Dyseidetic=13, Mixed=14, Dysphonetic=14. After two sessions, two children dropped out, one each from mixed and dysphonetic groups. This made all groups equal in size.

Procedure of Data Collection: Each child was taken individually for treatment. From the compiled list of words misspelled by a child, words were taken one by one for remediation. List of misspelled words for each child was different. On an average three words (selected from list of words misspelled by a child) per day were taken for remediation as advised (Bryant, Donahue, & Pearl 1981; Gordon, Vaughn & Schumm, 1993). Each child attended a session for 20 to 25 minutes daily for remediation as suggested by McNaughton, Huges and Clark. (1994). A word was considered learned when a child produced it correctly three times in a sequence. With some children, words had to be repeated next day, whereas others began with new list of words next day.

Techniques: The present study utilized three different remedial techniques, one each for Dyseidetic spellers, Dysphonetic spellers, and Mixed spellers. Each group of spellers underwent 35 sessions of remedial work.

(a) *TAK/v for Dyseidetic spellers (phonetic group):* Students with this problem read and spell-- primarily through phonic analysis. They have strength in phonic analysis (highly phonetic).

The researcher pasted sand paper cut outs of words on a piece of chart paper. Then she made subject's finger, trace it while saying each part of the word loudly, emphasizing phonemes in the word, with subject's eye closed.

Later, subject on his own, traced each part of the word with eyes closed while uttering the said word. After that subjects wrote the word on a piece of paper with eyes open. If attempt was found incorrect, then subjects were allowed to repeat the same technique. (Larger words were broken into syllables, which were read out to the subject for subject to repeat whole process. The child attempted the whole word at the time of recall).

Modalities used were auditory, tactual and kinesthetic. The visual modality was deflected at the learning stage.

(b) *Visual orthographic method for Dysphonetic speller (visual group):* This method evolved by avoiding phonics based instruction and emphasized orthographic (visual) leaning strategies (Recht , Caldwell & Newby, 1990). Self correction through modeling is an orthographic strategy (Gonschow, 1983).

Researcher prepared three sets of each alphabet in sand paper of 1" size and made flashcards of selected words. Then the subject visually noted the pattern of spelling of that word on the flashcard for approximately 25 seconds and the subject was required to locate the alphabets to make the word from a pile of letters.. After locating, the subjects arranged the letters to make the word shown on the flash card. The letters thus arranged were compared by the student with the word on the flash card shown once again. The subject was allowed to reattempt, when error existed.

Modalities used were visual and motor. The method was morphology based.

(c) *Listen, speak, read and write method (LSRW) for mixed group:* The subject carefully listened to the word called out by the researcher. Then the subject repeated the word, orally and the researcher showed the flash card bearing the word for the subject's silent reading. The subject wrote the word spelling, saying each letter of the word loudly. When the error existed the whole process was repeated.

Modalities used were auditory, visual, vocal and motor. The method utilized both morphological and phonological bases of spellings.

Phases of data collection:

A pre-test in spelling before the onset of experiment and a similar test at the end of the treatment period (post test) were administered to the subject . Two more sets of observations of delayed post tests were made (DPT1 and DPT2), 21 and 46 days after the post test respectively, to examine stability of

improvement, if any.

Results

Fig. 1 Pre-test and post test scores depict a major increase in scores from pre-test to post stage. Minimum score of subjects at post test stage is more than maximum score of subjects at pre-test stage, which implies improvement.

Mean score of post test and DPT1 of all P, V, M groups' shows stability of treatments. Mean scores of DPT1 and DPT2 shows that groups have not deteriorated their performance implying the stability. There is slight tendency of visual group to score more all through.

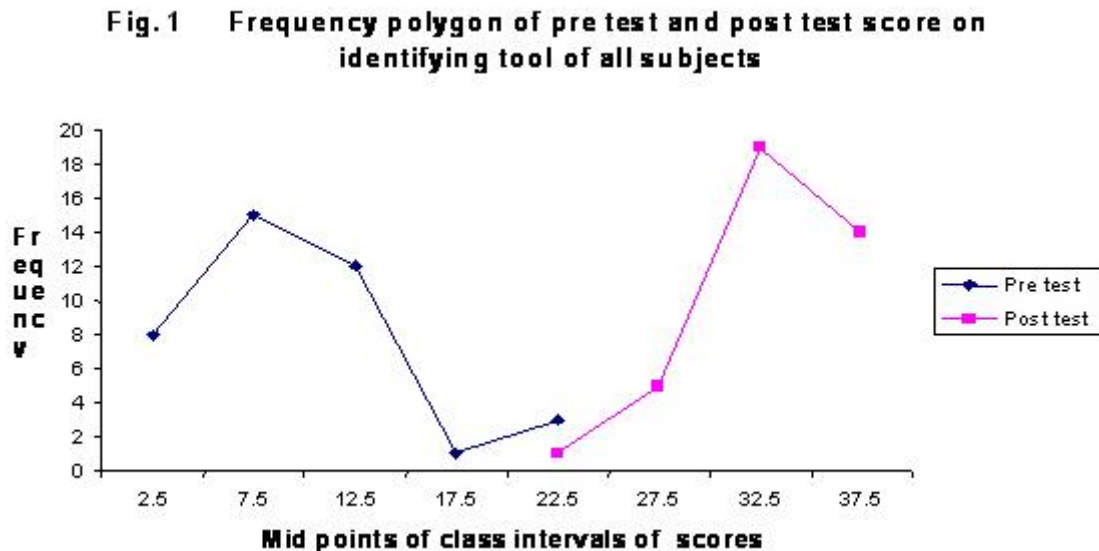


Figure 1: Frequency polygon of pre test and post test score on identifying tool of all subjects

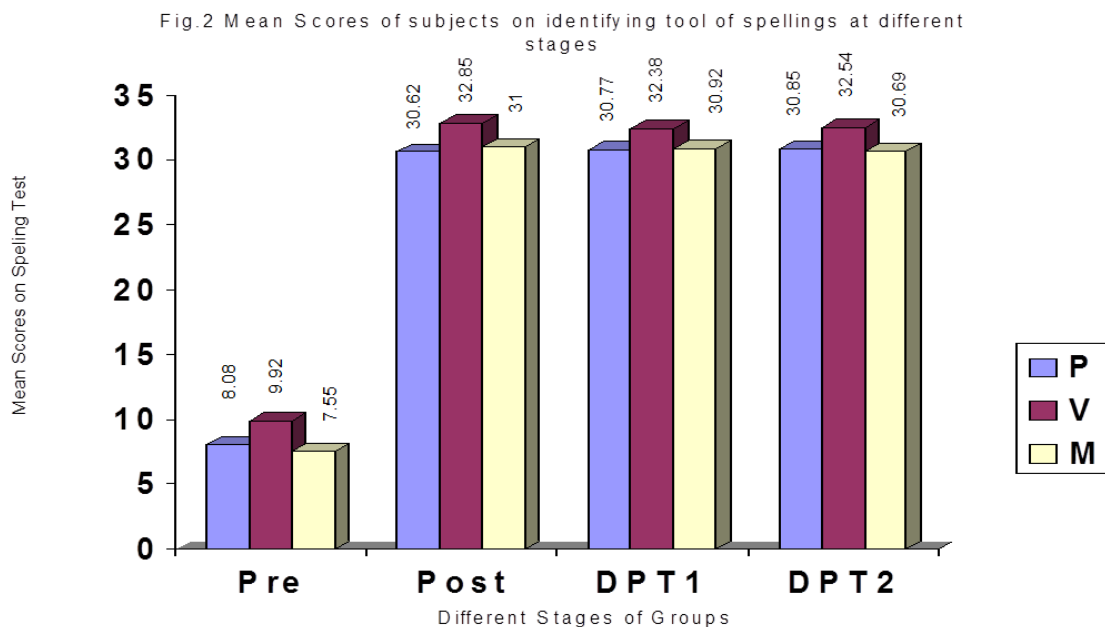


Figure 2. Mean Scores of Subjects on Identifying tool of spellings at different stage

ANOVA results of pre-test scores of three experimental group shows that F-ratio was not significant ($F_{2/36} = 0.80, P > 0.05$). This indicates that scores of three groups did not vary from each other significantly. This provides an ideal condition of equality before subjects enter into experimental

treatment for comparisons.

When ANOVA on all the data with 3x2 (groups & stages of testing) factorial design with repeated measures on second factor was employed, F-ratio obtained on treatment (groups) was found insignificant ($F_{2/36} = 1.91$, $P > .05$) Group as variable was not causing any significant variation. F ratio for stages of testing (pre to post) was found significant ($F_{1/36} = 267.49$; $P < 0.01$) which indicated all the groups improved significantly at post test. This is supported by the studies of Darch and Simpson (1990) and Darch (2002) who found significant improvement in spellings of LD children.

When ANOVA on gain scores in groups was conducted the F-ratio obtained was insignificant ($F_{2/36} = .11$; $P > 0.05$). This implies that the remediation in groups does not cause differential gains. They have gained equally and the three techniques have worked equally well, and were suited to the respective groups.

Phonetic group

The analysis of data revealed that phonetic group after treatment improved significantly ($t\text{-ratio} = 15.03$; $P < 0.01$). Strategy TAK/v given for dyseidetic spellers of phonetic group was useful for remediating spellings of learning disabled children.

Blau and Loveless (1982; Gupta and Pavri (2000) taught children with spelling disability while using TAK/v method. Both the studies found similar results. Research studies using emphasis on alphabetic phonetic multisensory instruction (Larsen & Hammill, 1986) analysis (Smith, 1998) and segmenting and blending for bad spellers (O'Conner & Sharon, 2000) found similar significant improvement in spellings. Syllabication (Diveta & Speece, 1990) leads to improvement in the spellings of dyseidetic group.

Phonemic awareness can be learned and children can benefit from direct instruction in phonemic awareness and systematic phonics (Armbruster, Lehr & Osborn, 2001). Similarly phonological awareness and phonological processing play a positive role in list memory and word reading (Gray, 2006).

Visual group

The $t\text{-ratio}$ ($t = 16.61$; $p < .01$) for visual group indicated that there was a significant difference between pre test and post test means of visual group. Visual group subjects benefited from the visual orthographic technique, which is corroborated by the findings of Curley and Reilly (1983); Lovett, Warren, Ransy and Dorden (1987) and Maver and Kamhi (1996). These studies made visual inputs available to learners. Gupta and Pavri (2000) showed improvement when subjects were exposed to visual inputs (VAKT group) though not as much as in TAK/v group. Bansal (2005) indicated visual modality benefited in developing strategic and visual thinking skills.

Mixed group

The $t\text{-ratio}$ ($t = 18.6$; $p < .01$) for a difference in pre-test and post test scores for mixed group was found to be significant. Mixed group has benefited from the LSRW treatment (non specific group). This result is in agreement with the findings of Thorpe and Borden (1985), Singh, Farquhar and Hewett (1991). Graham and Freeman (1986) taught learning disabled children a five step strategy (say and write a word, say and check the word, trace and say the word and write it) and Dalvi (1994) taught with write say method and these studies found similar results.

Discussion

All the remedial techniques have made a notable difference. The increased confidence of the disabled students and their willingness to perform during treatment was quite marked. The goal for students in this program is for them to reach their grade level. Techniques administered to the groups were designed on the basis of nature of errors. All the groups used more than one modality. The findings imply the suitability of modalities used for each group of the learning disabled.

Since vision dominates (Posner, Nissen & Klein, 1976) and visual imagery instruction facilitates learning to spell (Robert & Ehri, 1983), subjects surely relied upon visual modality only to receive the stimulus in visual and mixed group. That is why both the group improved effectively with the techniques.

Tactual/ kinesthetic modality were utilized only in phonetic group to receive stimulus to supplement the inputs from auditory modality and the two kinds of inputs proved to be congenial to each other. Tactual

kinesthetic modality has been absent in visual and mixed group. Subjects still improved comparably to other groups. It is yet to be seen, had these inputs been available, would it enhance performance or prove detrimental or redundant?

Emphasis of morphology in dysphonetic and phonology in dyseidetic group proved useful. This amply illustrates that the techniques evolved were appropriately designed to suit the modality preferences and differences of three experimental groups of the present study.

The results of the study are limited by the facts that this was a small scale investigation since the sample size was small. This study is very much significant for special educators, teachers and parents, as in this study an effort has been made to see the effectiveness of training in very important area, which has a direct bearing upon the education of children.

In the present research authors have developed a new technique i.e. visual orthographic method for dysphonetic also. The study has examined the effectiveness of three remedial techniques, TAK/v for Dyseidetic spellers, Visual orthographic methods for Dysphonetic spellers and Listen, speak, read and write method (LSRW) for Indian childrens with spelling disability.

The learning during remedial strategies sustains for a long time. This inference also reflected in other subjects in general. Since focusing on remediation has multiple outcomes, it must be attempted seriously. For further research following suggestion could be undertaken:

Development of assessment devices for diagnosis of individuals with learning disabilities can be undertaken, identification tool used to assess can be larger. Wider sample of spelling with different combination of vowels, consonants and diphthongs can be included to access the disable children.

All the phonetic, visual and mixed group can be treated with all the 3 techniques. If sample would be larger, generalizations would be better. Control group should be included to see the comparison of group.

References

- Armbruster, B.B., Lehr, F., & Osborn, J. (2001). *Put reading first: The Research building blocks for teaching children to read*. Jessup, MD: National Institute for Literacy at ED Publications.
- Bansal, V. (2005). *Effect of remediation in spatial perception on self-esteem and academic performance*. Unpublished Ph.D. Thesis, Panjab University, Chandigarh.
- Berninger, V.W., Abbott, R.D., Whitaker, D., Sylvester, L., & Nolen, S. (1995). Integrating low- and high – level skills in instructional protocols for writing disabilities. *Learning Disability Quarterly*, 18, 293-309.
- Blau, H., & Loveless, E. (1982). Specific hemispheric routing, TAK/v to teach spelling of dyslexics: VAK and VAKT Challenged. *Journal of Learning Disabilities*, 18, 461-464.
- Boder, E. (1971). Developmental dyslexia: Prevailing diagnostic concepts and a new diagnostic approach. In M. Myklebust. Ed., *Progress in Learning Disabilities*, (Vol.2.), New York: Grune and Stratton.
- Bradley, L., & Brayant, P. (1983). Categorizing sounds and learning to read-a causal connection. *Nature*, 30(1),419-421.
- Bradley, L., & Brayant, P. (1985). *Ryme and reason in reading and spelling*. Ann Arbor, University of Michigan Press.
- Bryant, T., Donahue, M., & Pearl, R. (1981). Learning disabled children's peer interactions during a small group problem solving task. *Learning Disabilities Quarterly*, 4, 13-22.
- Cronin, E.M. (1994). *English spelling*. Baltimore, MD: Johns Hopkins University Press.
- Curley, J.F., & Reilly, L.J. (1983). Sensory process instruction with learning disabled children. *Perceptual and Motor Skills*, 57, 1219-1226.
- Dalvi, S. (1994). *Study of effectiveness of 'Write say' method in teaching spelling to phonetic spellers having spelling disability*. Unpublished M.Ed. dissertation submitted to SNDT Women's University, Bombay.
- Darch, C. (2002). *The strategic spelling skills of students with learning disabilities*. Retrieved August 8, 2008, from http://www.idonline.org/id_indepth/reading/strategic_spelling_skills.html.
- Darch, C., & Simpson, R. (1990). Effectiveness of visual imagery versus rule-based strategies in teaching spelling to learning disabled students. *Research in Rural Education*, 7, 61-70.
- Deshler, D.D., Schumaker, L.B., Alley, G.R., Warner, M.M., & Clark, F.L. (1982). Learning disabilities in adolescent and young adult populations: *Research implications. Focus on Exceptional Children*, 15, 1-

12.

Diveta, S.K., & Speece, D.L. (1990). The effect of blending and spelling training on the decoding skills of young poor readers. *Journal of Learning Disabilities*, 23(9), 579-582.

Gerber, M.M., & Hall, R.J. (1987). Information processing approaches to studying spelling deficiencies. *Journal of Learning Disabilities*, 18(5), 279-286.

Gettinger, M., Bryant, N.D., & Fayne, H.R. (1982). Redesigning for learning disabled children An emphasis on unit-size, distributed practice and training for transfer, *Journal of Special Education*, 16, 439-448.

Gonschow, L. (1983). Teaching strategy for spelling success, *Academic Therapy*, 19, 185-193.

Gorden, J., Vaughn, S., & Schumm, J.S. (1993). Spelling intervention: A Review of literature intervention for students with learning disabilities. *Learning Disability Research and Practice*, 8(3), 175-181.

Graham, S. (1999). Hand writing and spelling instruction for students with learning disabilities : A review. *Learning Disability Quarterly*, 22, 78-98.

Graham, S & Freeman, S (1986). Strategy training and teacher vs. student controlled study conditions effects on LD students spelling performance. *Learning Disability Quarterly*, 9, 15-22.

Graham, S., & MacArthur, C. (1988). Improving learning disabled students' skills at revising essays produced on a word processor: Self-instructional strategy training. *Journal of Special Education*, 22, 133-152.

Gray, A. (2006). Young Readers' use of phonological information phonological Awareness, Memory and Comprehension. *Journal of Learning Disabilities*, 39 (4), 325-333.

Gupta, R.K., & Narang, S. (2005). Diagnostic Spelling Test. *National Psychological Corporation, Kacheri Ghat, Agra. India.*

Gupta, R.K., & Pavri, S. (2000). A study of the comparative effectiveness of TAK/v and VAKT approaches in teaching spelling to spelling disabled children. *Recent Research In Education & Psychology*, 54(4), 6-14.

Henry, M., Calfee, R., & Lasalle, R. (1989). A structural approach to decoding and spelling. In S. McCormick & J. Zutell (Eds.), *Cognitive and social perspectives for literacy research and instruction*, 155-163. *Chicago: National Reading Conference.*

Larsen, S.C., & Hammill, D.D. (1986). The Larsen Hammill Test for writing spelling. Austin, TX: Prod-Ed. *Annals of Dyslexia*, 40, 79-96.

Lovett, W., Warren, P.W., Ransby, M.J., & Dorden, S.L. (1987). *Training the word recognition skill of dyslexic children: Treatment and transfer effects.* Paper presented at the 15th annual meeting of the International Neuropsychological Society, Washington, D.C.

Maki, H., Voeten, M., Vauras, M., & Poskiparta, E. (2001). Predicting and writing skill development with word recognition and pre school readiness skills. *Reading and Writing: An Interdisciplinary Journal*, 14, 643-672.

Maver, D.M., & Kamhi, A.G. (1996). Factors that influence phonegrapheme correspondence learning. *Journal of Learning Disabilities*, 29, 259-270.

McNaughton, D., Hughes, C.A., & Clark, K. (1994). Spelling instructions for students with learning disabilities: Implication for research and practice. *Learning disabilities Quarterly*, 17(3), 169-185.

O'Connor, R., & Sharon, O.I. (2000). Comparison of phonological training procedures in Kindergarten classrooms. *The Journal of Educational Research*, 93(4), 226-233.

Posner, M.I., Nissen, M.J., & Klein, R.M. (1976). Visual Dominance: An information processing account of its origins and significance. *Psychological Review*, 83(2), 157-171.

Raven, J.C., Court, J.H., & Raven, J. (1977). Coloured progressive matrices. *London: H.K. Lewisd Co. Ltd.*

Recht, D.R., Caldwell, J.A., & Newby, R.F. (1990). Alternative instructional strategies for disphonetic spellers. *Reading Improvement*, 27, 26-30.

Robert, K.T., & Ehri, L.C. (1983). Effects of two types of letter rehearsal on word memory in skilled and less skilled beginning readers. *Contemporary Educational Psychology*, 8, 375-390.

Schneider, W., & Naslund, J.C. (1983). The impact of early metalinguistic competencies and memory capacity on reading and spelling in elementary school: Results of the Munich longitudinal Study on the Genesis of Individual Competencies (LOGIC). *European Journal of Psychology of Education*, 8, 273-287.

Singh, N.N., Farquhar, S., & Hewett, A.E. (1991). Enhancing the spelling performance of learning disabled students. *Behavior Modification*, 15, 271-282.

Smith, J. S. (1998). Spelling by phonographeme. *Dissertation Abstract International*, 59 (02), 446-A.

Swarup S., & Mehta, D. (1993). Diagnostic test of learning disability, *Department of Special Education. S.N.D.T. Women's University, Bombay, India.*

Thorpe, H.W., & Borden, K.S. (1985). The effect of multi sensory instruction upon the on task behaviour's and word reading accuracy of learning disabled. *Journal of Learning a Disabilities*, 18(5), 279-286.

Tijms, J., Hocks, J.J.W.M., Paulussen Hoogetboom, M.C., & Smolenaars, A.J. (2003). Long term effect of a psycholinguistic treatment for dyslexia. *Journal of Research in Reading*, 26(2), 122-140(20).

Traver, S., & Hallahan, D.P. (1976). Children with learning disabilities: A overview in J.M.

Kauffman and D.P. Hallahan (Eds.) *Teaching children with learning disabilities, personal perspectives*. Columbus, Ohio: Charles E. Merrill.

Wanzek, J., Vaughn,S., Waxler,J., Smanson, E.A., Edmonds, M., Kim, A.H. (2006).A synthesis of spelling and reading. Intervention and Spelling on their effects on the spelling outcomes of student's with LD. *Journal of Learning Disabilities*, 39(6), 528-543.