A SYSTEM FOR TEACHING WORD RECOGNITION

SKILLS TO CHILDREN WITH SEVERE READING DISORDERS

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CHAPTER ONE

Introduction and Background

A child's inability to learn to read proficiently is of great concern to everyone who knows and works with that child. While most children learn to read easily and naturally, just as they learn to talk, there are some children who struggle--and some who fail--to learn to read.

In 1969, the U.S. Department of Health, Education, and Welfare reported that 15 percent of American school children experienced reading disabilities that were not the result of inadequate teaching, low mental abilities, or emotional disturbance (Money, 1966). This population of children does not respond to traditional reading instruction.

Some low achievers in reading are often referred to as being "dyslexic." There is, however, controversy about which children are dyslexic and which are just having reading difficulties. Kirk (1978) distinguishes between slow readers and learning disabled readers. He suggests that readers can be grouped as slow learning readers, disabled readers that are not slow learners, and as disabled readers that are also slow learners. He recommends that the label "dyslexic" be applied only to those with very severe reading disabilities that fall into the learning disabled patterns.

Of the reported 15 percent of poorly achieving readers, the very severe learning disabled constitutes about 3 to 4 percent of struggling, failing readers (Pavlidis, 1981). These are labeled as dyslexics. They do not respond to normal remediation procedures. They fail even after remedial intervention. Their difficulty is often genetic in origin, and may involve a neurological dysfunction (Doehring, 1981). These children are those with whom this project was concerned.

The most significant characteristic of these readers is their difficulty with the Word Recognition and Word Identification process (Resnick, 1979). They have poor visual discrimination of letters and words with similar features, difficulty in associating sounds with letters or letter cluster symbols, difficulty seeing parts or patterns in words, and difficulty making generalizations about the coding system or the orthography of words. They often have confusion with left and right directionality, exhibit

"mirror-writing' or reversals, and their spelling is either totally phonetic or significantly not sound related. Language difficulty is involved about 80 percent of the time (Slingerland, 1981) and is indicated by a low level of receptive and/or expressive ability, with poor syntax or grammar, and low level semantic skills.

In trying to understand the difficulty that these children experience in learning to read, research has examined readiness to read, maturation and development, and cultural differences that might affect reading. The process of reading, instructional methods, and diagnostic procedures, as well as many other aspects of reading and reading difficulties have been investigated.

Educators have looked at classroom management of the reading time, teacher preparation, proper placement and pacing, and teaching strategies and techniques. Psychologists have studied the cognitive processes involved in reading, such as perception and conceptualization, as well as attention memory and general native ability. Linguists have looked at language development,. phonology, phonetic analysis, morphology, and orthography. Neurologists have investigated the central nervous system and brain functions that are involved in reading. Sociologists have studied social and economic factors that might put readers at a disadvantage. Physicians have researched vision, hearing, and biophysical inhibitors of learning. From each of these disciplines much has been learned about what is involved in the reading process. All reports have verified the complexity of reading.

In trying to find out why a child cannot read even after normal intervention for remediation, a number of procedures may be initiated to determine what the difficulty might be. First, the child's level of functioning is determined. Then the specific skills that are lacking or mastered are examined by criterion testing. If further information is needed, the general native ability is assessed and emotional or environmental interferences are examined. The general language ability is investigated as are the information processing systems of perception, attention, organization, memory, and retrieval. The ability to analyze, synthesize, generalize, and conceptualize, also may be examined.

Doehring cites Lloyd, Kauffman, and Hallahan (Doehring, 1981) as concluding that dyslexia is a heterogeneous disorder. It involves complex problems in diagnosis and even more complexity in

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remediation design. Through an extensive diagnostic procedure, causes for a child's inability to learn to read proficiently are identified, which can be very helpful to a teacher or parent in knowing how to work with the failing child.

<div align="center">The Project</div>

The difficulty of the dyslexic is in the language arts area, specifically in reading, handwriting, written and oral expression, and spelling. In this way the syndrome is unitary. The other area of unanimity is a point at which dyslexics seem to be blocked in their progress in reading, word recognition and identification. In this way, also dyslexia is unitary. But here the unanimity ends.

Dyslexics differ in how they are blocked at word recognition and identification. The blockage is unique to each student both by cause and by the effect on each individual. Each needs his/her own alternative route to follow because each has individual processing strengths and weaknesses and his own combination of deficits.

The following represent typical blockage of the ability to process words.

Visual and/or auditory perception:

> Specificity of distinctive features

> Parts and whole

Attention:

> Focus

> Selection of relevant stimuli

> Decentering from irrelevant input

> Sustaining attention at a learning level

Organization:

> Sequencing-the order of sounds, words

> Closure-blending parts to whole

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Generalizing-relationships, rules

Categorizing-classifications, groups

Synthesizing and analyzing

Memory:

Short Term Memory

Long Term Memory Storage

Recall-Retrieval

Language:

Receptive-interpretive thinking

Expressive

A dyslexic may be blocked in any one or a combination of these processes and others not yet identified. Calfee (Malatesha, 1982) suggests that the cognitive processing approach for assessing severe reading difficulties is vital for designing remediation.

Statement of the Purpose

The first purpose of this project was to design a system for teaching word recognition and identification skills to children with dyslexia. The system was designed specifically to teach the sound-symbol association concept, to remediate reversals and inversions in shape similarities, and to remediate inability to analyze word parts.

The second purpose of this project was to evaluate the progress of students using the system to determine improvement in word recognition and identification.

Questions to be Answered

Answers to the following questions were sought.

1.   What problems would be encountered in designing a system which uses both a cognitive-processing and task-analytic approach to word recognition that will address both the processing difficulties of dyslexics and the tasks of word recognition and identification?

2.   What problems would be encountered in designing a system that can be adapted to the individuality of each dyslexic child's unique pattern of difficulty?

3.   To what extent would the proper implementation of the designed system help the failing dyslexic child with word recognition and identification skills?

Delimitations

This project was concerned only with the population identified by Public Law 94-142 requirements as learning disabled with dyslexic reading disorders. The system was not designed for teaching word recognition and identification skills to normal readers.

The system designed, addressed only the word recognition and identifications skills and did not extend to comprehension or fluency skills in reading.

The system was not designed for use by teachers in a regular

classroom.

Importance of the Project

Spreen (1982) reported on follow-up studies of outcomes of remediation intervention and found that more severe dyslexics were "more reading retarded at follow-up than at referral." His report shows minimal effect of intervention except for students with higher innate abilities and those trained in private schools or clinics. The public schools seem to be unable to effect sufficient remediation for the disabled readers. Spreen concludes that children with reading disabilities do not catch up using present remedial interventions in the public schools.

Rourke (1975), retested normal and disabled readers after a four year interval, and found the normal readers making more than four years growth, while the disabled readers had made less than two years growth. The implication here is that even with intervention, the difficulty was not adequately remediated for the learning disabled readers.

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Remediation methods can be classified as non-systematic intervention, diagnostic-prescriptive teaching, and direct instruction. Yssekdykek and Mirkin (1981) researched the effectiveness of these methods and determined that direct instruction was the most successful, with non-systematic being the least effective.

Most current methods used for remediation of dyslexia are diagnostic-prescriptive teaching and direct instruction. They include a multisensory approach to language arts, teaching to the diagnosed strength of modality, training perception, overreaching the skills of reading, teaching to identified criterion tasks, the use of programs for a unitary disorder, preprogrammed task analysis methods, neurological impress methods, and reteaching the basal reader one more time.

Diagnostic-prescriptive teaching methods for dyslexics require a neuropsychological orientation toward the study of deficits in underlying processes, and educational orientation toward the analysis of tasks for remedial teaching strategies. Wong and Torgweson (1979) found the combination of task-analytic and processing oriented approaches serve best in designing effective remediation programs. Understanding the underlying information processing abilities of attention and memory is explained by Calfee (1981) as being critical in designing remediation that bypasses a processing deficit, or using a processing strength.

They advocate an integration of these two approaches be incorporated in future progress in remediation design, beginning with an analysis of the task, moving on to component skills, and then a development of diagnostic tests to assess the process required to learn the skills. The system designed in this project incorporated both the task analysis for word recognition and identification and the processing deficit perimeters for the individual dyslexic's pattern.

The need for a system to address the universal point of blockage for dyslexics--word recognition and identification--was readily apparent. Designing a system that could be adaptable to all difficulty matrices, and still accommodate the abilities and proficiencies of the special education teachers became the challenge. The system needed to utilize teacher insight into an individual child's needs. General concepts needed to be easily understood but be diverse enough to meet the specific needs of individuals.

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A system was needed rather than a set program. The ideal then, became an adaptable system specifically addressing the universal difficulty in word recognition processing that could be changed to accommodate each child's individual need deficits and learning style, and the teachers' abilities as well.

Summary

Reading is a multifaceted process. Diagnosis is complicated, and remediation is even more difficult because any one, or combination of difficulties can cause a multitude of problems in varying degrees of severity. Through an extensive diagnostic procedure, the identification of compensation patterns, modality preferences, and causes for a child's inability to learn to read proficiently, can be very helpful to a teacher or parent in knowing how to work with the failing child. A system that would be adaptable to various difficulty matrices and yet accommodate the competency of teachers would fill a void in remediation programs for severe reading disorders.

CHAPTER TWO

Review of the Literature

Investigation of reading difficulties was pioneered by medical people interested in children's education. The problem was thought to be pathological and medicine was the source of authority in pathology.

There is evidence of investigation of reading difficulties as early as 1896. Dr. Pringle Morgan (1896), reported a child patient who was unable to read but who was normal in every other way. His report concluded that the difficulty in reading was the result of a congenital deficit causing visual impressions of words to be incorrect.

In 1917, James Hinshelwood (1917), an eye surgeon from Scotland, labeled the disorder, Congenital Word Blindness and he documented visual perceptual distortions in children's reading performance that resulted in their inability to recognize or comprehend words. Fe suggested that the cause was a congenital brain defect that was hereditary, and treatment should be through diagnostic-prescriptive teaching.

In 1928, Samuel Orton (1937), an American neurologist and psychiatrist, modified Hinshelwood's theory somewhat. He agreed that reading disability was a difficulty involving visual word images in the brain, but he felt that the cause was more of a developmental lag than an injury of the brain. He projected the lag caused "Strephosymbolia" or 'twisted images.' He said visual images are stored as mirror images in the nondominant hemisphere, and if hemispheric dominance was not strongly established, visual perception would be distorted. He proposed that the developmental lag affected speech and writing and caused difficulty in spoken words, stuttering, and clumsiness.

Neither of these early theories was based on physical evidence of brain damage, but both theories assumed that the inability to read was a single type of disability caused by prevention of the normal function of the visual memory center for printed words. This is still accepted as a major sign of dyslexia. Gillingham and Stillman's (1960) reading remediation methods are based on this idea, and the Orton

Dyslexic Society was established as a nonprofit organization to promote remediation techniques, research, and publications related to dyslexia.

In the eighty years since these early twentieth century reports, the literature shows the reports on reading difficulties to be divided between two general groups. They are based on theories of the origin and the cause of the difficulty. One group says there is one basic factor causing the problem, while the other group feels there is more than one factor involved.

Velluntino (1979) reviewed the work of the two groups and lists Morgan, Hinshelwood, Orton, along with Bender (1956), Eustis (1947), Hermann (1959), Norrie (1958), Bakker (1970), Drew (1956), Downing (1973), and Zangwill (1962) as being theorists who propose that severe reading difficulties are caused by a single dysfunction in the brain's ability to process information correctly. Bender emphasized deficiencies in visual organization and pattern perception while Eustis pointed to slow neuro-muscular maturation. Hermann suggested directionality orientation was inadequately developed. Norrie investigated the hereditary aspects of dyslexia. Bakker found a universal deficiency in perception of temporal order but did not agree that this was due to a language disorder or memory difficulty, even though he found his problem only in the processing of verbal information. Downing looked at deficiencies in phonologic processing, while Drew found maturational lag in the parietal and parietal-occipital regions of the brain where auditory and visual information is processed. Zangwill suggests that poorly established dominance results in speech, language, and spatial difficulties. Velluntino points out that these single factor theories have an organic, medical basis that involves a type of neurological dysfunction causing the reading difficulty.

The theorists proposing that many basic process factors are involved in reading disorders suggest that reading problems can only be categorized and classified in terms of subtypes of the abilities and inabilities observed as opposed to the etiology or intrinsic cause of the difficulty classifications. Modality abilities have been investigated by Myklebust and Johnson (1962), Boder (1970), and Ingram, Mason, and Blackburn (1970). These researchers propose classification by visual, auditory, or combinations of these modalities. Mattis, French, and Rapin (1975) categorize the reading disorders into

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the subtypes of language problems, visual-motor deficits, and visual-spatial problems. Satz and Sparrow (1970) propose developmental lag as the cause of the subtypes of dyslexic problems, while Birch (1962) suggests difficulties in transferring information between the modalities.

Velluntino (1979) says that these theories are the same in that dyslexic reading disorders show dysfunction in perceptual processes and that the etiology is intrinsically based, as opposed to other reading difficulties that are caused by extrinsic involvement. They are together also in the belief that visual perception and visual memory, intersensory integration, serial order recall, and verbal processing are present in dyslexia.

Doehring (1981), after an extensive review of the research, concluded that reading is not a unitary skill, and reading difficulty is not a unitary disorder. Maletesha (1982) concludes that dyslexia is a group of disorders, not a single isolated syndrome, and this is one of the reasons for continued disagreement among researchers.

<u>Summary</u>

In trying to understand the difficulty that these children experience in reading, the process of reading, diagnostic procedures, and remedial instruction methods, as well as many other aspects of reading and reading difficulties have also been investigated. Educators have looked at classroom management of the reading time, teacher preparation, proper placement and pacing, and teaching strategies and techniques. Psychologists have studied the cognitive processes involved in reading, such as perception and conceptualization, as well as attention, memory, and general native ability. Linguists have looked at language development, phonology, phonetic analysis, morphology, and orthography. Neurologists have investigated the central nervous system and brain functions that are involved in reading. Sociologists have studied social and economic factors that might put readers at a disadvantage. Physicians have researched vision, hearing, and biophysical indicators of learning.

From each of these disciplines much has been learned about what is involved in the reading process. All results have verified the complexity of reading.

CHAPTER THREE

Methods and Procedures

Remediation of severe reading disorders is complicated by a variety of causes of the difficulty, the multiplicity of strengths and weakness affected in individuals, deficits in degrees of severity, and limitations of remediation materials and methods. Remediation is further compounded by a variety of skill levels of teachers in considering the reading difficulty and applying appropriate methods. Because dyslexic children make little progress in their reading, this population is of great concern to both educators and parents.

The major purpose of this project was to develop an instructional system for teaching word recognition and identification skills to children with severe reading difficulties. The system was designed specifically to teach the sound-symbol association concept, to remediate reversals and inversions in shape similarities, and to remediate inability to analyze word parts. A further restriction placed on the design was that it was to be easily adaptable to accommodate individual need deficits and to utilize the varying special education teachers'. skills.

A subsequent purpose of this project was to evaluate the achievement progress of students using the designed system.

This chapter is organized into two sections. The first part reports the methods and procedures that were used in the development of the system, including the identification of participating children for the development, the basic concepts and word patterns selected for instruction in the system, and the materials that were created. The second part reports the methods and procedures that were used in the evaluation of the system, identification of the teacher and pupils participating in the evaluation, pretesting and postesting of the progress of the pupils, the participating teacher's evaluation of the effectiveness and adaptability of the system, and a report of observations made of the participants during the use of the system.

Development of the System

Because dyslexic children vary so much in their compensation patterns and modality preferences, the author determined that the development and designing of the system would best be served while working with children having severe difficulty in reading. Development of the system included the following:

Identification of Children Participants

The project began with the selection of the children to be studied during the development of the system. From the group of children attending the resource center in an elementary school, four children classified as Learning Disabled by the requirements of Public Law 94-142 and reportedly experiencing severe difficulty in reading, were selected. These middle and upper grade children were considered by teacher opinion and by resource records to be the children consistently making the least amount of progress during their three or more years in the learning disability special education remediation program.

These children were identified as Learning Disabled by the use of test batteries as follows:

Wisc-R intelligence test

Woodcock Johnson Achievement Test

Slingerland Specific Language Disability Tests

Visual Motor Integration Test

Motor Free Visual Test

Wepman-Auditory Discrimination Test

Detroit Test of Learning Aptitude

Slosson Oral Reading Test

Woodcock Reading Test

These tests are used by educators to examine innate ability, the processing of information, and learning modality strengths and weaknesses of students. According to the federal law, the criteria for

identification as Learning Disabled are: an average or above Intelligence Quotient, a 40 percent deficit between expected and actual performance in oral or written language, reading, math, and/or perceptual motor skills, and/or an identified learning disability in a specific modality.

The four children were more than two years below expected level of achievement. They were classified in the learning disabled category by identifying a processing difficulty in one or more learning skills, as required by law. The primary reason for their difficulty was not low innate ability, social or cultural environment, physical acuity or apparent lack of instructional exposure. Two of the four selected children were fourth grade boys, one a third grade girl, and one a sixth grade boy. A complete analysis of the testing is included in the case study for each of the children and can be found in Appendix A. Common to all the children was a poor understanding of the concept of sound-symbol association, low spelling ability, and an inability to read independently. These children formed the population for the pilot study, and for a five-month period, the author worked with these children daily for approximately 30 minutes to one hour, either individually or in a small group in a resource room setting.

Teaching and Observing
    Children While using a Basal
    Reading Program

Using the school district mandated basal reading program and the publisher's recommended supplementary materials including workbook, supplementary work sheets, and games, the children's reactions and performances were observed and recorded. The children were observed for perceptual and conceptual misunderstandings, and for phonics generalizations that were not understood or transferable for use in word recognition tasks.

Modality preference of visual or auditory strengths and weaknesses for each student were identified from the Slingerland Test. Observations of the children consistently indicated that the basal program techniques for presenting concepts was not appropriate. The inability to make generalizations from a presentation, to remember the last word pattern they had been taught and apply it to new words, and especially their inability to move from one concept to the next as the basal program design

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recommends, resulted in frustration and failure. The suggested format of the basal did not address the difficulty with visual and auditory perception of incoming information with which these children were dealing.

The following patterns of compensating for individual learning deficits were observed: (1) verbalizing and sub-vocalizing; (2) finger pointing; (3) excessive head or body movement; (4) rhythmic body movement; and (5) withdrawal or self-defeated behavior and avoidance of the assigned task.

Teaching and Observing
  Children While Using a Modified and Supplemented Basal Program

The basal reading program was modified to include direct instruction in the specific phonics skill difficulties the children were experiencing. Word lists from the Dolch Word List, American Heritage Word List, and the Slingerland Multisensory Approach, were used to supplement the core vocabulary of the basal program. Nonsense word decoding was used with the children to identify the word pattern concepts they did not understand.

Word patterns of CVC, CCVC, CVCC, and CVCE were taught, tested, and retaught as suggested by the basal program, but modified by teaching the patterns in a unit of study instead of as encountered in the sequence of the basal.

Progress, compensation patterns, and modality preferences were observed and noted. From the observations, the author determined that the basal reading program, even with the supplementations and modifications, was not sufficiently meeting the children's needs. It was therefore decided that the use of any basal program should be discontinued.

Current Remedial Programs Reviewed

The following programs were compared and analyzed for the basic concepts, the word patterns, and the materials that could be used in instructing the learning disabled children:

  The Total Reading Program

  Slingerland Multisensory Approach to Language Arts

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  Gillingham and Stillman Remediation Program

  Alphabetic phonics

  Grant Von Harrison Tutorial program

Selma Herr Program for Special Education

The June Orton Phonics Program

Herrman Reading Reversals Program

<u>Selection of Basic Concepts
    and Word Patterns to be Taught</u>

After reviewing the reading remediation programs and comparing and analyzing the basic concepts

taught in each program, the concepts to be taught in the system were selected as follows:

1.   Phonemic awareness that words are made up of separate sound units.

2.   Single letters or letter clusters are symbols for the separate sound units.

3.   Only certain letter and letter clusters can be put together to make a word.

4.   Words have consistent patterns of the letter and letter clusters.

5.   The sound units are blended to make words.

6.   The letter or letter cluster symbols in words must be matched to a sound.

7.   The sound units heard in a word must have a symbol matched to it in a word.

8.   Some sound units have meaning.

9.   A printed word is language that you can see.

10.   Words have consistent patterns that we can base phonic structure generalizations on.

Word patterns selected to be taught in this system were as follows: VC; CVC; CV and open syllable;

CVCE; CCVC; CVCC; CCVCC; vowel + /r/ wor and ear; CVVC; ff-11-ss double endings; ck and ke;

silent letters; si-ci-ti (sh); /y/ as a vowel and /y/ as a consonant ending; prefixes; suffixes; structural

patterns, drop e and add endings er ed, *s,* ing, double last consonant and add endings, change y to i and add

es, ed, ing, er, ness, change f to v and add endings; and syllabic divisions.

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<u>Selection of Available Materials
 to Use in Teaching the Selected
  Concepts and Word Patterns</u>

The following specific materials were selected for use in teaching

the basic concepts and word patterns to the identified children:

Link-Letters

Letter tiles from Auditory Discrimination in Depth

Slingerland letter cards
Felt letter writing cards, word cards, and word lists from the
Herman Reading Reversal Program

Magnetic letters and magnetic chart from the Goldman Lynch
Language program

Anagram Letters on small wood tiles

Colored chalk

Colored ink pens

Colored cards with letters in black

White cards with letters printed in different colors

<u>Use of Selected Materials</u>
   <u>in Teaching Selected Concepts</u>
   <u>and Word Patterns</u>

The selected concepts and word patterns were taught using these materials for a period of five weeks. During this time the materials of these several programs were reviewed for any possible redesign in their structure. It was observed that the hands-on, manipulative, concrete letters and letter tiles were consistently the most enjoyable and effective materials that were used in presenting the phonics structure to the children.

After using the materials to present the selected concepts and word patterns, it became evident that because of the diversity of the modality deficits and compensation patterns of the children, new materials

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needed to be designed that could be adapted to the specific deficits and modalities as well as the concepts and word patterns for the system.

At this time it was determined that by designing a set of letters and letter clusters that could be handled and moved about, the children would be able to physically manipulate sounds. It was further

determined that by organizing the set into groups of structure by color, that modality and compensation patterns might be assisted as well.

<u>Currently Available Programs</u>
    <u>Reviewed for Selection of Letter and Letter</u>
    <u>Clusters Needed for</u>
    <u>the Materials Set</u>

The following programs were analyzed and compared to determine which letters and letter clusters would be needed to make a set that could be used to build the words needed to teach the phonetic generalizations and concepts.

<u>Gillingham and Stillman Remediation Program</u>

<u>Alphabetic Phonics</u>

<u>Grant Von Harrison Tutorial Program</u>

<u>June Orton Phonics Program</u>

<u>Language Tool Kit</u>

<u>Slingerland Multisensory Approach to Language Arts</u>
<u>Total Reading Program</u>

The letters and letter clusters selected were:

Single Consonants: b, c(k), c(s), d, f, g, h, j, k, 1, m, n, p, qu, ro,
         s t, v, w, x, y, z
Consonant Digraphs: sh, th(unvoiced, th(voiced), ch, wh

Short Vowels: a, e, i, o, u, y(long e), y(long i)

Controlled /r/ Vowels: or, ar, er, ir, ur

Controlled /l/ Vowel: al
Final /e/ Patterns: cvce, ccvc
Initial Consonant Blends: br, tr, gr, dr, cl, sl, sk, gl, st, sn, sm,

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    sk, str**,** scr, thr
Final Consonant Blends: nt, nk, ng, nd, mp, ft, pt, st, ld, lm, lt, nch

Vowel Combinations: ee, oa, oe, ai, ay, aw, au, oo(book), oo(soon), ow(cow), ow(snow), ea(beat), ea(head), ea(great), ey(key), ey(they), ei(rein), ei(neither), ie(chief), ou(ouch), ou(could), ou(fought), ou,(soup)

Silent Letters: kn, wr, ck, tch, dge, ld, gn, lf, pn, mb, n, t, s, l,

 Suffixes: ous, tion, sion, es, est, er, ed(d), ed(t), ed(ed), ing, ish,

        ful, age, ment, less, ness, ly, le, able, ive, ent, cious, si, ti, ci(sh), sure, ture, ance

Prefixes: ex, pre, pro, per, re, a, con, com, in, im, un, de, dis,

        trans

Because of the unavailability of letters that were colored and organized in phonics patterns, the creation of new materials became necessary.

New Materials Designed

The following procedures were used in designing the new materials:

First, a set of the selected letter and cluster combinations were cut from colored pellon, laminated and cut out again to make them manipulative. This set was discarded because the letters and clusters were difficult for the children to handle, not very durable, and the tactile input was missing.

Second, another set was made by printing the letters and clusters in different colors on thick plastic sheets and then heating them in an oven to shrink them, making small tiles similar to the anagrams and letter tiles. The children printed some of the letters making them personally meaningful to them. This set was discarded because it was very time consuming to make, tactile input was missing, and it was difficult to color the plastic.

Third, an attempt to make individual letters was made by purchasing 26 rubber alphabet letters and using them in making a plaster of paris mold for each letter. It was thought that by using a mold, any number of letters could be made for the set. A liquid ready-to-use rubber was poured into the molds to form the needed letters. The rubber, however, was only available in two colors, and several colors were

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needed to organize the letters and letter clusters into single consonants, vowels, blends, vowel combinations, prefixes and suffixes, and silent letters'.

A liquid acrylic was then tried but it didn't dry into letters that could be popped out of the molds, and it also dissolved the plaster of paris.

A rubber mold material called Omniflex which is used by dentists to make a denture mold after taking an impression, was successfully used replacing the plaster of paris in making the molds needed for each of the 26 letters.

Powdered and liquid acrylic material used in creating a denture artifice by being poured alternately into a mold, was used to create the letters. The powdered acrylic could be purchased in three colors, one of which was clear. Liquid acrylic coloring was added to the liquid acrylic and used with the clear powder to make the several colors needed. As the acrylic was hardening, a small magnet was added to the back of the letter, making the letter both color-coded and magnetic. The letters were then popped out of the mold, and lightly sanded to remove the rough edges. The letters were then glued together in the

selected clusters.

Making the Prototype Set
of New Materials

Each letter of the prototype was made separately. Each was colored, magnetized, filed, and then glued to the other letters needed for a cluster. There was a total of 372 individual letters in the set. The letters and clusters were placed in groups on four metal trays, then traced around with a pen to indicate their "home' position on the tray. Each group was a different color to enhance the understanding of the classification of the group to which they belonged.

Two small stainless steel sheets cut in 12 by 15 inch sizes were used for working tray boards on which the students would display and manipulate the letters.

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Use of the Prototype Set
With the Four Children

This prototype set was then used with the four identified children to teach the concepts and word patterns. Adaptation, additions, and deletions were continuously made in the letters and clusters for the next five weeks. The children, other teachers, and advisors made suggestions. This resulted in a number of revisions and additions in the materials, and in the basic concepts and word patterns as well. The children's progress was noted and recorded.

Modifications, Revisions,
   and Additions

Revisions and additions were added to the prototype materials and to the identified concepts and word patterns of the system, with special consideration for the modality preferences and compensation patterns of the children. Included in the additions was a master word list. The word list was compiled after reviewing the lists of words used in the Slingerland Multisensory Program, Speed Spelling Program, Hegge-Kirk Word List, Skillstuff Word List, and June Orton's Phonics List of Words.

The Manual of Directions

A manual of directions was written for use with the materials. The manual contained the selected concepts, the word patterns and generalization, and a master word list to use in introducing and reinforcing conceptualization of a word pattern or concept of structure.

Other components developed for the manual included a record keeping system, general and specific techniques of presentation, and a rationale for the system. The record keeping system was suggested by one of the special education teachers when it became necessary to keep track of which patterns and clusters had been taught to each student and which had been mastered at the application level. The specific techniques were developed and written as suggestions for adapting to the compensation patterns and modality preferences of the children. A copy of the component parts can be found in Appendix B.

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Instructional Video Tape

A video tape was made showing the suggested techniques of presentation, and also the interaction of the teacher and the children as they learned the concepts presented through the use of the materials.

The tape was made for clarification of instructional procedures.

Procedure Used in the Evaluation of the System

The following methods and procedures were used to evaluate the

effectiveness of the designed system.

Evaluation by Implementation

To evaluate the effectiveness of the system, a pilot study was conducted in three different schools for a period of one month. The schools were selected in two school districts, and each of the teachers that implemented the system was a special education, learning disabilities teacher. These three teachers were certified resource teachers with special training in learning disabilities.

The pupils taught, using the system, were classified as Learning Disabled by Public Law 94-142 requirements. They were identified by test batteries commensurate with the test batteries used to identify the four children used in the development of the system. The children were above average in intelligence, achieving 40 percent below their expected performance level, and exhibiting an identified processing deficit.

The pre-testing to evaluate the system by growth in reading achievement for this evaluation consisted of:

> The Slosson Oral Reading Test, selected for measuring word recognition skills.
>
> Woodcock Reading Test Form A (Word Attack Subtest), selected for measuring decoding skills.
>
> The Steed Phonics Inventory Form A, selected for specific criteria of phonic items.

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> The tests were given to the students by special education student teachers who had been trained by the researcher in giving and scoring these tests. Scores were recorded and filed by the researcher.

Piloting Sets Made

A source for purchasing colored individual rubber letters was located, and arrangements were made with the manufacturer to purchase them in bulk by the hundreds. Using these ready made letters, nine sets were made up for the purpose of piloting and evaluating the system in several schools. Each set was made up using the prototype set as a model for the letters, letter clusters, and for the grouping by colors. For storage and transporting the sets, four metal trays were purchased for each set and the letters and clusters were placed on the trays and traced to indicate their permanent position. For the student display boards, nine stainless steel sheets were cut in 12 by 15 inch sizes, painted white, and the edges were rounded and taped. These were used as the lap size working tray boards on which the letters could be displayed and manipulated.

Each week teachers used the system with their identified learning disabled children 20 minutes for a period of one month. The teachers recorded the concepts presented, the children's reactions, and the progress of the children.

The post-testing of the system consisted of:

Slosson Oral Reading Test

    Woodcock Reading Test form B (Word Attack subtest)

    Steed Phonics Inventory form B

The tests were given by special education student teachers trained in administering and scoring these tests. Scores were recorded and filed by the researcher. The children's growth scores were evaluated by using a t-test analysis for each of the three tests.

<u>Evaluation by Observation</u>

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An observation form was developed by the author to record observation of the teachers' use of the system, the child's reactions to the materials and the concepts, and to observe the adaptability of the system to teacher insight.

The experimental teachers were observed two or three times by the author during the one month period. The observations were recorded on the form and compiled. A copy of the form can be found in Appendix C.

Evaluation by Interview

A form for interviewing the teachers that implemented the system was developed by the author. Each of the teachers were asked to respond on the form and give their opinions as to (1) the effectiveness of the system; (2) the adaptability of the system to individual compensation patterns and modality preferences; and (3) the adaptability to teacher insight. The written responses were recorded and compiled. A copy of the form can be found in the Appendix D.

Evaluation by Publisher

The system developed for this project was presented to Lauri, Inc. (the manufacturer of the rubber letters) for producing and distributing the system commercially. The presentation was made in person to the Vice President and General Manager, the Marketing Director, and the Educational Consultant for the company. A copy of a confirming letter of this presentation can be found in Appendix E.

Summary

Children identified as learning disabled by P.L. 94-142 were the population used in the development of the instructional system. The children were observed for perceptual and conceptual misunderstandings and for word pattern structures that were not understood or transferred for use in word recognition while using the regular basal program. Component parts of special programs currently being used for the learning disabled reader were used, and the children were observed while using these adaptations. The use of the parts from several programs led to the refining of concepts and word patterns to be taught, and to the designing of new materials for teaching the concepts and word patterns. The

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materials were designed with consideration of the identified modality preferences and compensation patterns of learning disabled children. A prototype set was then made, used, and refined, and an instructional manual and video tape were constructed.

The system was then evaluated as to its effectiveness by implementing the system in three different schools for one month. The children using the system were given pre- and post-tests to determine growth scores, and the teachers were observed and interviewed. The system was presented to a commercial publisher.

CHAPTER FOUR

Presentation and Evaluation of the Project

The first purpose of this project was to develop a system for teaching word recognition and identification skills to children with severe reading difficulties. The system was designed specifically to aid in the teaching of the sound-symbol association concept, to remediate reversals and inversions in similar shapes of letters and words, and to help the reading disabled child to analyze word parts.

The second purpose of this project was to evaluate the progress of the students using the designed system.
This chapter is organized into the following sections:

(1)   Presentation of the System; (2) Questions to be Answered;

(3)   Presentation of the Evaluation of the Effectiveness of the System;
        and (4) Summary.

Presentation of the System

As designed, the system consists of concrete, manipulative materials, basic concepts, word patterns, word lists, and general and specific presentation techniques. The materials are color-coded foam rubber, magnetized letters and letter clusters. The letters are organized by color indicating consonants, short vowels, controlled vowels with /r/, vowel combination clusters, initial and final blend consonants, prefixes, suffixes, and silent letter clusters. The letters are magnetized for easy manipulation, retention of position for sound sequence, and easy handling by the children. The foam rubber material is bumpy on one side to help prevent reversals and durable enough not to break. The letters and clusters are color-coded to help visual analysis and visual imagery as well as the general organization of the phonics system.

The letters or clusters are presented to the children as symbol units and/or as sound units, depending on the child's modality preference. For example,, there are two units presented for the two sounds of /ow/, and three units presented for the three sounds of /ea/, and so forth.

These concrete letter manipulations serve to address the difficulty that dyslexic children have with word recognition and identification and the codification of the orthography of words. They see no system or organization to how words are constructed. By using the concrete codification system, they manipulate, they physically match sound to symbol, they separate words into parts and put them back together again. When they get the parts in the wrong sequence, by touching and sounding each part, they self correct their error and reconstruct the word. The dyslexic's inability to analyze or separate words into parts is remediated by the built-in analytic units of letters and clusters. The inability to synthesize is remediated by the manipulating of the letters and by touching and sounding them as the units are blended or built into a word.

For the visual dyslexic, color-coding helps analyze the word, and also gives a visual image for memory. For the auditory dyslexic, color-coding helps match the symbol to the sound unit that is so difficult for the auditory dyslexic to identify or sequence, and also gives a visual image of the sound units to synthesize and blend the word together.

A letter printed on a card or on the chalkboard is a symbol of a sound. It is abstract and processed at a symbolic level. A letter in the hand gives tactile input, and bridges the gaps between a presymbolic object and a symbol for a sound. Physically moving the letters helps the children experience the sound-symbol association concept. As they put letters or clusters in a sequence, they touch and concretely experience the temporal sequence of the word. The children 'build' a word and then self-check by touching and sounding the letters or clusters, which they easily rearrange if they discover they are not matching sound and symbol. This is feedback they can count on when their visual and/or auditory processing is faulty.

<div align="center">Questions to be Answered</div>

The answers to the following questions were sought in this project: 1. What problems will be encountered in designing a system which uses both a cognitive-processing and task-analysis approach to word recognition that will address both the processing difficulties of dyslexics and the tasks of word recognition and identification?

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2.   What problems will be encountered in designing a system that can be adapted to the individuality of each dyslexic child's unique pattern of difficulty?

3.   To what extent will the proper implementation of the designed system help the failing dyslexic child with word recognition and identification skills?

The answers and findings pertaining to questions one and two will be presented first, then the findings of question three concerning the evaluation of the effectiveness of the use of the system will be presented.

Problems Encountered in Designing
the System

Several problems were encountered during the designing of the system. They were, determining the subskills of word recognition, identifying the basic concepts and word patterns needed for instructing dyslexic children, selection of materials to use in the instruction, designing new materials for instruction, designing adaptive techniques in using the materials.

Suhskills of Word Recognition. The first concern in designing the system was to determine the specific subskills involved in the act of recognizing and identifying words, and the second concern was to find out in what ways dyslexic readers differ from normal readers in these skills.

If normal and slow readers use the same cognitive processes for word recognition, one just being slower than the other, then remediation could be based on common approaches to reading instruction, but if fundamental differences in the recognition process are identifiable, then totally different approaches are appropriate.

Principles obtained from a literature review revealed that (1) word recognition subskills can be identified as being: attending to letter orientation, attending to letter order, attending to word detail, sound matching, and sound blending (Venesky, 1970; Massaro, 1980; and Bateman, 1979); (2) words are recognized and identified by their distinctive features, by invariant relationship features such as patterns and order, and by higher order variability, such as rules and structure (Gibson and Levin, 1975); (3) a cognitive information processing approach to word recognition does not stop with the visual perception

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of letters and words. Orthographic structure is a major variable in the word recognition process (Murray and Piulski, 1978).

The learning disabled reader has difficulty with segmentation of sound or symbol in a word, with blending or synthesizing, and with generalizing the orthographic structure of words. These subskills previously were often identified as visual perception difficulties and remediated as splinter <u>skills</u> (Johnson, 1979).

While auditory phoneme or visual grapheme analysis is automatic for some children, for learning disabled children it is necessary for them to understand the concept of breaking words into parts before they can identify segmented phonemes or graphemes, depending on their difficulty.

Through personal observation, it was found that the four identified children participating in this project were unable to identify the separate units of words. There was either poor or no phonemic awareness or poor or no visual symbol awareness of the parts of words, or there was evidence of both phonemic and visual difficulty in segmented unit awareness. The segmentation of sound and/or symbol was identified as a basic concept that needed to be overtly taught to the dyslexic children.

The concept that sound units or symbol units are put together in patterns to make a word was another basic concept not understood by the identified children. Observation of instruction while using the basal reading program showed these basic concepts about words were missing from the instructional scope and sequence of the basal readers, as they are not needed for direct instruction for normal readers.

<u>Concepts and Word Patterns for the system</u>.

The next problem encountered in designing the system was to identify the basic concepts and word patterns to include in the system.

After reviewing several programs especially designed for remediating learning disabled reading difficulties, it was found that there was an extensive variance in the concepts being included in the programs. Several programs addressed only one concept such as auditory discrimination or the auditory

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identification of sound units, or splinter skills of visual perception. The concepts and word patterns were similar but not identical in each of the programs.

The following list of concepts were identified for inclusion in the designed system for dyslexics.

1. Printed words are language you can see.

2. Words are made up of separate units.

3. Each separate unit can be identified.

4. The units can be identified by sound (auditorily) and are

called phonemes, and by sight (visually) with a symbol of the sound unit called a grapheme.

5. Sound units are blended together to make words.

6. Unit symbols must be notched to a sound unit in a word.

7. Sound units in a word must have a symbol matched to it.

8. The units are put together in patterns to make a word.

9. Only certain patterns can make a word.

10. Words have consistent patterns that we can make rules from.

The choice of word patterns in the several programs reviewed were found to be quite similar and were easily identified for the system. They are as follows: vci, cvc cv and open syllable, cvce, ccvc, cvcc, ccvcc, vowel + /r/, wor, ear, cvvc, double endings (ff-ss-11), ck and ke, silent letters, si-ci-ti (sh), /y/ as a vowel, /y/ as a consonant ending, prefixes, suffixes, structural patterns (drop /e/ and add endings, double last consonant and add endings, change /y/ to /i/ and add endings, change /f/ to /v/ and add endings), syllabification divisions.

<u>Materials for the System</u>. Another problem encountered was the selection of materials to use to present the concepts and word patterns. Because the available materials could not be adapted to all the compensation patterns and modality preferences of the identified children, it became necessary to design and create the materials needed for the system.

It was found in reviewing and analyzing special programs designed for remediating learning disabled reading problems that some were primarily addressing-very specific difficulties such as auditory discrimination or phonics rules or graphic writing skills, while others were very broad in scope

addressing modality preference with a visual presentation or an auditory presentation of all phonics structures. Still others were primarily based on understanding language structure and some had a portion of all of these. Most of the programs were highly structured, but in order to meet the needs of the identified participating children, components were selected from each of the programs and adapted to a different structure.

Designing New Materials. Another difficulty was encountered when it was determined to create new materials for the system. The mechanical problem was to create letters that were small, easily manipulated, with only one correct side to help prevent reversals and inversions, and colored to denote their group classification. Some needed to be single letters, while others needed to be in appropriate cluster units. Making each of the 327 letters needed for the prototype was very time consuming and it wasn't until a source for buying ready made letters in several colors was found, that several sets could be made up in order to initiate the evaluation of the effectiveness of the system.

Adaptive Techniques Using Materials. A problem was encountered in designing adaptive ways to use the materials to meet the unique needs of children with their various combinations of difficulties. It was found that by starting with the learning style of the individual child (either analytic or synthetic), the basic concepts could be taught through the modality preference of the child while at the same time the modality deficit could be supported with the tactile manipulation and touch. The specific word patterns could then be presented through overt, direct instruction, using the letters and clusters either visually or auditorily (or both if necessary) to teach the concepts of phonemic or visual awareness (segmentation), discrimination (distinctive features), blending (closure), and sequencing (sound-symbol association). Through manipulation of the letters or clusters by substituting, deleting, reversing, or adding letters or clusters, the understanding of the concepts was facilitated. These teaching techniques were described in the manual.

To show how this the system is adaptable to the individuality of each child's unique pattern of difficulty, a chart was developed showing the component parts to consider in designing the remediation. See Figure 1.

First the teacher needs to decide what learning style and modality preference to use with the child. Then the word patterns that the child needs to learn are selected and presented with the letter and cluster materials, using the appropriate specific technique suggested in the manual. All of these are a lead to the understanding of the basic concepts.

<u>Presentation of the Evaluation of the</u>
<u>Effectiveness of the System</u>

There were four methods used to evaluate the system developed for this project. (1) Evaluation by implementation of the system; (2) Evaluation by observation of the implementation; (3) Evaluation by interviewing the participating teachers who implemented the system; and (4) Evaluation by a commercial publisher. The results of these four methods of evaluation are reported below.

<u>Evaluation by Implementation</u>
<u>   of the System</u>

The extent of success for the failing dyslexic child having word recognition and identification difficulty was evaluated through the

Basic Concepts	Word Patterns	Letters or clusters	Modality Preference	Learning Style	Specific Techniques

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implementation of the designed system in three schools, with three special education teachers and nine children participating in the use of the system for a one month period. The identified learning disabled children were given three pretests by special education student teachers who had been trained in administrating and scoring the tests. The system was used for a one month period and the children were then given post tests on three tests by the student teachers.

Word Recognition Skills. The data obtained on the Slosson Oral Reading Test is presented in Table 1, which shows that the children, in all cases, made a greater gain in their word recognition skills than would be expected of normal readers. The mean gain for the Slosson Oral Reading Test was 6.0 months, with the highest gain being 9 months and the least gain 3 months.

Word Attack Skills, The data obtained on the Woodcock Reading Word Attack Subtest is presented in Table 2. The children, in all cases, made a greater gain in their word attack skills than expected by normal readers. The mean gain for the Woodcock Reading Word Attack Subtest was 6.4 months, with the highest gain being 10 months and the least gain 2 months.

Encoding and Decoding Skills. The data obtained on the Steed Phonics Inventory is presented in Table 3, which shows that the children, in all cases, made a greater gain in their encoding and decoding skills than would be expected. The mean encoding gain was 15.4 items, with the highest gain being 23 items and the lowest gain being 4

Table I

Slosson Oral Reading Pretest, Postest Grade Equivalent
and Gain Scores of the Children as a Result of
Using the Touch and Sound System
for a Period of One Month

Child	Pretest	Postest	Months Gain	
1	1.4	2.3	9	
2	.6	1.3	7	
3	1.9	2.3	4	
4	2.1	2.8	7	
5	2.4	3.0	6	
6	1.9	2.3	4	
7	.9	2.2	3	
8	1.9	2.7	8	
9	.4	1.1	7	
		Mean Gain	6.1	

Table 2

Woodcock Reading Word Attack Subtest Pretest, Postest Grade
Equivalent and Gain Scores of the Children as a Result
of Using the Touch and Sound System
for a Period of One Month

Child	Pretest	Postest	Months Gain
1	1.6	2.2	6
2	1.2	1.7	5
3	1.6	2.2	6
4	2.0	2.9	9
5	2.2	3.1	9
6	1.8	2.0	2
7	1.2	1.9	7
8	1.8	2.8	10
9	1.2	1.6	4
		Mean Gain	6.4

Table 3

Steed Phonics Inventory Encode and Decode Errors and
Gain Scores of Nine Children as a Result of
Using the Touch and Sound System f or a
Period of One Month

Child	encode errors of 50 items			decode errors of 41 items		
	pretest	postest	gain	pretest	postest	gain
1	25	21	4	34	13	21
2	24	1	23	22	5	17
3	20	9	11	26	6	20
4	22	15	7	30	18	12
5	33	16	17	21	14	7
6	45	23	22	34	28	6
7	44	25	19	28	12	16
8	41	20	21	33	21	12
9	27	12	15	21	16	5

Mean number of items gained   15.4   1

items. The mean decoding gain was 12.8 items, with the highest gain

being 21 items and the lowest gain being 5 items.

<u>Evaluation by Observation of the</u>
<u>Implementation</u>

The three teachers who each used the designed system with three children for a one month period,

were observed by the developer of the system for one and one half hours in three different observation, for

the purpose of determining if the teachers were able to implement the system as it was designed. An

observation form was used to record the observations and may be seen in Appendix C. Observation data

was recorded for each of the observational visits. The information indicated that both the teachers and

the children enjoyed using the materials, and that the letters and clusters used the most were the single

consonants, final e, and the silent letter clusters. The techniques most often used were, the teacher

building the word (encoding) and using the substitution, reversing letter sequence, and the cover and write

technique. The technique used least was deletion. The concepts being taught most often were the sound-

symbol association concept using the cvc pattern. The word pattern cvce was taught next most often.

<u>Evaluation by Interview of Participating</u>
<u>Teachers who Implemented the System</u>

The participating teachers evaluated the system by responding to an interview form which may be

seen in Appendix D. A summary of the interview responses for the first section may be seen in Table 4.

Table 4

A Summary of a Questionnaire of Three Teachers
Who Used the Designed System for a
Period of One Month

_____

Question	Rating Scale 1 to 5 (1 excellent - 5 very poor) Teacher	#1	#2	#3
1. Adaptable to my population		1	1	2
2. Effective for word recognition and identification		1	1	1
3. Effective for sound-symbol association		1	1	1
4. Effectiveness of color-coding		1	2	1
5. Magnetic feature		1	1	1
6. Useful to my needs		1	1	1
7. Presentation Techniques		1	2	2
8. Manual		2	1	2

_____

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Summarizing the responses found, that on a scale of 1 to 5 (1 being excellent and 5 being very poor), all of the teachers rated items concerning the effectiveness in teaching word recognition and identification skills, the effectiveness in teaching the sound-symbol association concept, the usefulness of the letters being magnetized, and the adaptability of the materials as a number 1. The evaluation concerning color-coding and adaptability to their total population, both received one number 2 rating. The manual and the presentation techniques were rated with a number 2 by two of the teachers.

The participating teachers' answers to the open questions concerning the system are presented as follows:

1.   Most effective aspect of the system:

'It works.'

"It's manipulative, the children experience how
reading is organized.'

'The manipulative aspect of touch and feel to sequence letters."

2.   Least effective aspect of the system:

'Need more sets, the children want a turn."

"Color-coding didn't transfer to written words in
the book."

"The set is heavy to carry."

3.   Liked best about the system:

'The versatility for me, its flexibility."

"It holds kids attention, the kids like it.'

Students can see their progress."

4.   Liked least about the system:

'Heavy to carry from place to place."

'It doesn't help fluency."

"Nothing."

5.   Other ways I use the system:

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"We use the words we build or decode in a sentence."

"I transfer from the letters to the blackboard by using colored chalk."

"None."

6.   Suggestions to improve the system:

"A separate set of black letters."

"A carrying case for the set."

"Improve the record keeping sheet."

Evaluation By a Commercial Publisher

The system was presented to Lauri, Inc. for the purpose of evaluating the system for manufacturing and marketing potential. The Vice President and General Manager, the Marketing Manager, and the Educational Consultant for the company were enthusiastic about the marketing potential and were impressed particularly with the thoroughness of the development of the product. A response letter from this company can be found in Appendix E.

Summary

The system designed for this project consists of magnetic, color-coded, foam rubber letter and letter cluster materials, identified basic concepts, selected word patterns, word lists, and presentation techniques. It was found necessary during the development of the system, to identify the cognitive subskills involved in recognizing and identifying words, and to determine what concepts dyslexics have difficulty with.

The segmentation of sound or symbol units, blending or synthesizing segmented parts to make words, and patterns of orthographic structure were found to be concepts not understood by dyslexic readers. Word patterns needed to teach these concepts were found to be the same word patterns needed to be known by normal readers. It was found necessary to design new materials to teach the children because of the variety of difficulties encountered in teaching them. A prototype set was made of the new materials and when used with the four identified children participating in the development of the system,

adaptive techniques of presenting the word patterns were found to accommodate the modality preferences and learning styles of the children.

Through the evaluation by implementation of the system, it was found through pretesting and posting procedures that in all cases the children made more gain than would be expected of normal readers. The teachers evaluated the system as being excellent, especially in adaptability, usefulness, and effective for teaching word recognition and sound-symbol association. The observations of the implementation revealed that both the children and the teachers enjoyed using the system and the teachers, for the most part, were able to use the system properly, finding even more uses and techniques than were in the design. A commercial publisher is investigating the potential manufacturing and distributing of the system.

Major Findings of the Project

1. Words are recognized and identified phonologically, graphically, orthographically, semantically-morphologically, and syntactically.

2. Children with severe reading problems have specific difficulty in:

   a. Recognizing the segmentation of either sound units or symbol or both.

   b. Matching the sound unit to the symbol unit and the symbol unit to the sound unit, in reverse.

   c. Learning and identifying the legitimate patterns that words are made of, using either the sound units or the symbol units.

3. These children benefited immediately from having the distinctive features of sound units and/or symbol units, the invariant relationships or patterns, and the higher order of variability or structure of the units, presented to them by direct instruction in small groups or in a tutorial setting using concrete manipulatives.

   4. This system is workable for other special education teachers

      and can be implemented in the way it was designed to be used.

Discussion of the Project

In developing the system for this project, some insights were gained regarding word recognition and identification. (1) Words are recognized and identified by more than visual and auditory perception. (2) Words are also recognized and identified by the conceptualization of the substructure of language. (3) A word is a composite of distinctive graphic and phonologic features combined with orthographic, semantic and syntactic structures of language.

Awareness of graphic and phonologic features of words is the primary visual and auditory perception training addressed in reading readiness instructional programs of kindergarten and first grade. However, an understanding of the structures and patterns of words, and the semantic and syntactic concepts of language, is also needed.

Perceptual inability interferes with the analyzing (decoding) of words. In recognizing and identifying words, it is necessary to know: (1) words are made up of separate units; (2) each separate unit can be identified both by sound and by sight; and (3) each sound unit has a corresponding sight unit and vice versa.

Conceptual inability interferes with the synthesizing (encoding) of words. In encoding words, it is necessary to know: (1) the units are put together in patterns to make a word; (2) only certain patterns can make a word; (3) patterns in words follow rules or orthographic regularity.

The implication of this is the possible restructuring of the primary emphasis of the reading readiness program, to addressing both perceptual and conceptual considerations of word recognition and identification. Maybe teachers should be asking 'Could this be a word?' instead of "What is the name and sound of this letter?" We could start with, 'Is this a word?" instead of starting with the letters and sounds and moving toward a vague understanding of the structure of the patterns.

If children visually or auditorily are not aware of the segmentation characteristics of word structure they cannot match a symbol unit to a corresponding sound unit. Also, if they are not able to see or hear structure patterns in words, they must resort to guessing. If teachers continue addressing only part of the word identification process, some children will continue to fail.

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CHAPTER FIVE

Summary, Conclusions, and Recommendations

The first purpose of this project was to develop an instructional system for teaching word recognition and identification skills to children with severe reading difficulties. The system was designed specifically to teach the sound-symbol association concept, to remediate reversals and inversions in shape similarities, and to remediate inability to analyze word parts. A further restriction of the design was that it was to be easily adaptable to accommodate individual need deficits and to utilize the varying special education teachers' skills.

The second purpose of this project was to evaluate the achievement progress of students using the designed system to see if word recognition and identification skills improved.

Summary of the Project

Four children identified as learning disabled participated in the development of the instructional system. 'The children were observed for perceptual and conceptual misunderstandings, as they were taught, using traditional methods, using special reading remediation programs, and using both the regular suggested materials and materials modified for their individual deficits. Based on the observations and literature research, basic concepts needed by these children were identified, word patterns for instruction were selected, and new materials were designed and constructed creating a new system. The system consists of magnetized, color-coded, foam rubber letter and letter cluster materials, identified basic concepts, selected word patterns, and a manual containing word lists, presentation techniques, a record keeping system, and the rationale of the system.

The system was used with the four identified children, revised, and then further modified. After modification indicated that the system was operational, it was evaluated as to its effectiveness by implementing the system in three different schools by three special education teachers using the system with nine identified learning disabled readers for one month, with a pretest-postest evaluation of student

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progress. It was evaluated further, by observing and interviewing the teachers using the system, and by presenting it to a commercial publisher.

<u>Summary of the Findings</u>

In developing the instructional system, it was found that:

1.   Words are recognized and identified phonologically, graphically, orthographically, semantically-morphologically, and syntactically.

2.   Children with severe reading problems have specific difficulty in:

a.   Recognizing the segmentation concept of either sound units or symbol units or both

b.   Matching the sound unit to the symbol unit and the symbol unit to the sound unit in reverse.

c.   Learning and identifying the legitimate patterns that words are made of, using either the sound units or the symbol units.

3.   These children benefit immediately from having the distinctive features of sound units and/or symbol units, the invariant relationships or patterns, and the higher order of variability or structure of the units presented to them by direct instruction in small groups or in a tutorial setting using concrete manipulatives.

4. This system is workable for other special education teachers and can be implemented in the way it was designed to be used.

<u>Conclusions</u>

As a result of this project it was concluded that:

The system designed is effective in teaching word recognition skills to dyslexic readers.

This system is a workable system for other special education teachers.

<u>Recommendations</u>

Recommendations for improving the system designed are as follows:

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(1) Adding a component designed for carry over from concrete letters to the abstract printed page. Perhaps a bridging technique for this might be, after the student 'builds' the word, the task would be to

(2) find and read the word on a printed page containing words in a sentence using the word pattern being presented. Selected phrases, sentences, and paragraphs could be included.

(3) Lighter working lap trays for the students and a case for carrying the set would make it more convenient for transporting.

(4) The manual of this system could be revised to include more specific directions on how to implement the component parts of the system. Some teachers may be more comfortable with specific directions for presenting each word pattern, with a word list and detailed, specific techniques including the letters and letter clusters to us in the presentation of each word pattern.

(5) A similar system for use with older readers still struggling with word recognition and identification skills, could be designed using syllables and word structural analysis units instead of single letters and clusters. This system could emphasize morpheme units, base words, roots, and derivations.

(6) This system was designed for word recognition and identification skills only. It should be noted that it does not contain elements for addressing comprehension or fluency in the total act of reading. These other components could be researched and systems designed especially to assist children with severe reading disorders with these skills.

(7) This system needs to have the color component, the magnetic component, and the manipulative component each evaluated separately as to their effectiveness and value in this system. It is unknown at this time if one is more effective than the other or if the combination of all components produced the results achieved in this project.

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APPENDIX A

CASE STUDIES

Case Study Child #1

Grade: 4th   Age: 9.3   Sex: male

Wisc-R full scale Score: 102
Woodcock Johnson Achievement Test:
        Reading-2.1, Math-3.6, Written Language-2.0 Slosson Oral Reading Test: 2.3
Woodcock Reading: Test-2.2
Visual Motor Integration Test: perceptual age 7.1 years
Motor Free Visual Test: perceptual age 6.7 years

Wepman Auditory Discrimination Test showed normal response with no errors. The Detroit Test of Learning Aptitude and The Slingerland Tests indicated a severe inability to see parts of words, to see distinctive features of similar words, an inability to identify phonemes in words, or to blend sounds into words. The use of context clues was more effective than decoding skills. The Motor Free Visual Test showed a very severe figure-ground difficulty.

This 4th grade boy reading at the low 2nd grade level is having severe visual perceptual difficulty with and without motor response. He also has some auditory difficulty. He is able to hear distinctive features of sound, but cannot blend sounds, or identify phonemes. He uses context clues and and extensive vocabulary and guesses.

Case Study Child #2

Grade: 6th   Age: 11.10   Sex: male

Wisc-R full scale score: 109
Woodcock Johnson Achievement Test:
Reading-2.6, Math-6.4, Written Language-2.5
Slosson Oral Reading Test: 2.5
Woodcock Reading Test: 2.7
The Motor Free Visual Test: perceptual age 8.4 years
Visual Motor Integration Test: perceptual age 8.9 years

The Wepman Test showed no errors. The Detroit Test of Learning Aptitude and the Slingerland Test D indicated very poor visual skills, only fair auditory perception, with many reversals, inversions, and sequencing errors both visually and auditorally. The echolalia, sentence and story subtests of the Slingerland were high, indicating good oral language skills. Creative, artistic skills were also evident in several informal tests given to this child.

This 6th grade boy reading at the 2nd grade level has very poor visual perceptual skills, non-phonetic spelling, very poor writing, and consistent reversals of letters and words in both reading and writing. The comprehension score was higher than the decoding score by a full grade level (3.3).

Case Study Child #3
Grade: 4th   Age: 9.3   Sex: male

Wisc-R full scale score: 97

Woodcock Johnson Achievement Test:
Reading 2.6, Math:2.2, Written Language 2.1
Slosson Oral Reading Test: 3.5
Woodcock Reading Test: 2.5
Motor Free Visual Test: No errors
Motor Integration Test: perceptual age 8.9 years

Wepman Auditory Test showed 5 discrimination errors. Three errors of vowel sounds, and two of final sounds, indicating significant auditory perceptual difficulty. The Slingerland Test C and Detroit Test of Learning Aptitude confirmed this pattern of difficulty showing stronger ability visually than auditorily. He indicated a strong visual memory for words, but could not match sounds to the symbols. This 4th grade boy reading at the 2nd grade level knew many sight words but could not decode even the cvc pattern words.

Case Study Child #4

Grade: 3rd   Age: 9.2   Sex: female

Wisc-R full scale score: 114
Woodcock Johnson Achievement Test:
         Reading: no score, Math: 2.7, Written Language: no score
Slosson Oral Reading Test: not given, no words could be read
Woodcock Reading Test: K.7
Motor Free Visual Test: perceptual age 4.7 years
Visual Motor Integration Test: perceptual age 5.2 years.

The Wepman Auditor Test showed 7 errors of discrimination, 4

initial sound, 2 middle sound, and I final sound, indicating a very severe auditory difficulty. The Detroit Test of Leaming Apptitude and the Pre-Reading Slingerland Test showed both visual and auditory perceptual problems and expressive motor and verbal skill deficits as well.

This 3rd grade girl had been retained in lst grade, then passed each consecutive year even though she was unable to read. She did not know all of the alphabet sounds, but could recognize all of the letters. She had very poor receptive and expressive language skills, and low fine motor skills. She exhibited a withdrawn behavior, and consistently showed avoidance of any written work. Her self concept and self esteem were very depressed, and her actions were lethargic and unmotivated.

APPENDIX B

MANUAL FOR

TOUCH AND SOUND SYSTEM

TOUCH AND SOUND SYSTEM RATIONALE

Hands-on, concrete manipulative color coded letters can be used to be objects of sounds. A letter printed on a card or on a chalkboard is a symbol of a sound and is abstract at the symbolic level. A letter in the hands, not only gives tactile input, helping poor visual or auditory perception, but bridges the gap between a pre-symbolic object and a symbol for a sound.

The fact that the child can physically move the 'sound' around, helps him experience sound-symbol association. This very important concept can be taught concretely, not abstractly.

As the child puts letters in a sequence, he can TOUCH and SOUND them, and concretely experience the sequence of their temporal order. He feels very much in control and he is able to self-correct (without erasing). He knows he can self correct by touch when he can't count on his visual or auditory perception to give him correct feedback.

This method is a way of organizing the phonics system with concrete visual reinforcement. For the visual dyslexic, the color helps analyze the word, and also gives a visual image for memory. For the auditory dyslexic, it brings a visual symbol to the sound and physical movement to the blending and sequencing when synthesizing a word. When a dyslexic takes in information through impaired input perception, either auditorily or visually, and he tries to organize and use it, he is unable to interpret and use this information. If, however, this information comes in kinesthetically, or is reinforced perceptually, a child can learn the phonics structual code along with his peers.

Phonics structures and concepts can be taught by concrete, physical (tactile) manipulation, to dyslexics with either audio or visual perception deficits.

Basic Concepts for Touch and Sound System

Printed words are voiced words you can see or "visual language".

Words are made up of separate units.

Each separate unit can be identified.

The units are put together in patterns to make a word.

Only certain patterns can make a word.

The units can be identified by sound (auditorily) {phoneme}.

The units can be identified by sight (visually) {grapheme}.

The grapheme is a symbol of the sound unit.

Concepts to be Taught Auditorily	Concepts to be Taught Visually
Auditory input	Visual input
Sound units	Symbol (sight) Units
1. Awareness of the separate sounds units	1. Awareness of the separate symbol units
[Auditory Signal Ground]	[Visual figure ground]
2. Discrimination (identification) of each sound units	2. Discrimination (identification of each symbol unit
[Auditory discrimination]	
3. Position or the placement of each sound unit in a word	3. Position or the placement of each symbol unit in a word
[Auditory sequencing]	[Visual sequencing]
4. sound units can be represented by a written symbol.	4. Symbols can be written to represent the sound unit.
5. Some sound units can be written several different ways using different symbols.	5. The same symbol can represent more than one sound. {placement affects this}
[Sound - Symbol Association]	[symbol – Sound Association]
6. Sound units are arranged in consistent patterns to make words.	6. Symbol units are arranged in consistent patterns to make words.
7. Only certain sound patterns can make words.	7. Only certain symbol patterns can make words.

8. Sound units are blended together to make words.

8. Symbol units can blend

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9. Some sound units have meaning.

9. Some symbol units have Meaning.

Presentation Format:

Encode

Decode

Synthesize
Parts to whole

Analyze
Whole to parts

TOUCH AND SOUND WORD PATTERNS

VC

CVC

CV AND OPEN SYLLABLE

CVCE (FINAL E)

CCVC (INTIAL BLENDS)

CVCC (FINAL BLENDS)

CCVCC

VOWEL + R,   WOR, EAR

CVVC, CCVVC, CVVCC (VOWEL CONIBINATIONS)

FF, LL, SS (DOUBLE ENDINGS)

CK AND KE

SILENT LETTERS

SI, CI, TI = SH;   PH=F

Y AS A VOWEL (THEY, KEY)

Y AS A VOWEL (WITH CONSONANT ENDINGS)

PREFIXES

SUFFIXES

DROP /E/ AND ADD ENDINGS /ER/, /ED/, ISI, /ING/

DOUBLE LAST CONSONANT AND ADD ENDINGS (1, 1, 1 RULE)

EXCHANGE /Y/ FOR /I/ AND ADD /ES/, /ED/, /ING/, /ER/, /NESS/

EXCHANGE /F/ FOR /V/ AND ADD ENDINGS
SYLLABICATION DIVISIONS

TOUCH AND SOUND TECHNIQUES

DECODE:

1.   Teacher pulls letters out, puts in sequence, and child reads word

2.   Teacher changes letters and child reads word.
                 a. Substitution
                 b. Deletion
                 c. Reversal
                 d. addition

  Teacher changes vowels, consonants, clusters, endings, prefixes, and suffixes.

3.   Child reads the pre-written, color-coded words on lists matching concepts presented through letters.

Child reads phrases sentences and paragraphs with color-coded clusters where needed.

ENCODE:

1.   Child "builds" a real word.

  a. Teacher pulls out several letters, and puts them in one area of the magnetic board. Vowels in one place and various consonants in another place. (Use smaller selection or larger selection of choices depending on the child's level of deficit and ability.)

  Child chooses the consonants and the vowel and puts them in correct sequence to build the words that the teacher has selected from the list for teaching the concept (in this instance the CVC concept). The teacher repeats the word slowly sounding the word (helping the child sound and select the letters). The child repeats sounds as he is selecting and placing letters.

  b. Using a clear magnetic slate, the child chooses all letters from the tray (this is a larger selection choice).

2.Teacher shakes up selected letters and throws them like dice on the tray. The child unscrambles them

and puts them in correct sequence.
>   a. Teacher uses only the letters in the word.
>   b. Teacher uses extra letters for the child to select from and omit unneeded letters.

3.   Child changes existing word he has built to another word at the teachers request by:

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>   a.   Changing the vowel, consonant, cluster, blend, prefix, or suffix.
>   b.   Adding something
>   c.   Rearranging the sequence
>   d.   Taking something away

4.   Child builds a nonsense word.

>   a.   Dictated by teacher
>   b.   Child chooses any consonant-vowel-consonant word by color only, not by sound. He reads it or another child reads it.
>   c.   Child closes eyes and draws from the consonant pile, and from the vowel pile.
>   d.   With eyes closed, the child feels the letters and 'reads' the word.

5.   Child closes eyes and feels each letter as it is handed to him one at
a time. He says the sound and places them letter by letter in sequence. Then opens eyes and reads the word he has built.

6.   Child picks up the letter that the teacher makes on the child's back

and letter by letter builds the word to see and read.

WORD LISTS FOR STAS SYSTEM

VC WORDS:

REGULAR   NONSENSE

AN	IN	ON		IP	IB	OP
IT	AT	UP		AB	OM	UG
IF	IS	A		UM	EK	ET
AM						

CONSONANT AND VOWEL:

GO ME BE HI SO MY SPY CRY TRY FRY
WHY SHE HE NO

CVC WORDS: SOUND SYMBOL ASSOCIATION

REGULAR WORDS:

BUG BAG BEG BIG BOG
GOT GET GIT GUT GAT
BAT BIT BET BUT
CUT CAT CAN PAN PIN PEN
PET PIT PUT POT HOT HUT
HIT HAT HAM HIM HUM GUM
LES LOG LAG LUG
NUT NOT NET
TIM TOM PAM PUP POP HAD
MEN MAN MAD MID MUD KID
TAG TUG TOG JOG JUG JIG
JAG TIP TOP TAP
LAB GAS JOB WAX VAT SAD
BAD

CVC NONSENSE WORDS:

NET	JEG	HOD	TUM	TIG	HOM	GOM	GAM	MAG	LIG
BOT	MUP	NIT	MED	DOP	HED	NEP	LEM		

CVC WORDS FOR REVERSAL CONCEPT:

TAB BAT   TAG GAT   TUG GUT   TIP PIT

MUG GUM   LAG GAL   TUB BUT   TAM MAT

NAP PAN   LAP PAL   NIP PIN   SAG GAB

FINAL E   CONCEPT:

BIT	DIM	CAN	HOP	PIN	FAT	PET	ROB	HAT	FIN
MAN	TAP	RAT	RIP	WIN	MAD	AT	NOT	HID	FAD
VAN	SAM	PAN	MAN	CAP	JAN	GAP	PAL	FIN	BID
RID	MIT	TIM	i-IT	DOT	ROD	ROB	COD		

SPIN	SLIM	SLAT	PLAN	PRIM	SLID	SHIN	SNIP	TWIN	SPIT
GRIP									

HUG	CUT	CUB	TUB	CUR	US

SHUT	PLUM	MUTT	FUSS	FILL	MILL	PILL	TILL

RAG	WAG	STAG	THEM

Steed Phonics Inventory   Form A

Name_____ Date_____ Grade_____ C.A. _____ Teacher_____

Tell me what needs to go in the blank to make this word say _____   (Auditory/Visual)

___ap	(1)	___ow	(gr)	p__d	(a)	p___	(ay)	s___	(oy)
___ark	(d)	and	(st)	p__t	(e)	m___n	(oo)	paint___	(ed)
___all	(w)	___ock	(bl)	g___n	(u)	p___ch	(ea)	want___	(ing)
___an	(v)	___ash	(spl)	r___g	(i)	r___	(aw)	hunt___	(er)
___et	(y)	___ife	(kn)	g___t	(o)	cr___	(ow)	look___	(ed)

___eat	(n)	ba___	(ck)	gam___	(e)	sh___k	(oo)	kind___	(est)
___ick	(qu)	ma___	(sk)	pil___	(e)	___l	(oi)	st___	(ar)
___ig	(j)	co___	(ld)	f ___t	(ee)	___t	(ou)	st___y	(or)
fo___	(x)	mi___	(lk)	p___nt	(ai)	n___	(ew)	fl___	(ight)
hand___	(y)	wi___	(ng)	g___ t	(oa)	___l	(ow)	r___	(ough)

These are not words. Tell me what you think it says, and I'll just write what you say.

dap_____	(a)	reet_____	(ee)	whik_____	(wh)
jek_____	(e)	hoad_____	(oa)	thop_____	(th)
ytm_____	(i)	poy_____	(oy)	quib_____	(qu)
vog_____	(o)	wout_____	(ou)	ling_____	(ing)
lub_____	(u)	jow_____	(ow)	zult_____	(lt)
loce_____	(o-e)	taul_____	(au)	dest_____	(est)
bute_____	(u-e)	doot_____	(oo)	digh_____	(igh)
hife_____	(i-*)	rawl_____	(aw)	phug_____	(ph)

pate_____	(a-e)	strue_____	(ue)	wrall_____	(wr)
bede_____	(e-e)	vor_____	(or)	sidle_____	(le)
tay_____	(ay)	zar_____	(ar)	fomb_____	(mb)
sook_____	(oo)	lirt_____	(ir)		
kain_____	(ai)	jerg_____	(er)		
fean_____	(ea)	shoff_____	(sh)		
hoil_____	(oi)	chem_____	(ch)		

Steed Phonics Inventory   Form B

Name_____ Date_____ Grade_____ C.A_____ Teacher_____

___ip (1)   ___een (gr)   m___d (a)   th___f (ie)   sl___gh (ei)

___eep (d)   ___ick (st)   g___t   (e)   s___n (oo)   th___f   (ie)

___ill (w)   ___ack (st) g___m (u)   b___ch (ea)   help___(ing)

___et (v)   ___ice(spl)   f___g   (i)   th___ (aw)   play___ (er)

___es (y)   ___eel(kn)   r___t   (o)   gr___   (ow)   cook___ (ed)

___ ip (sh)   tr___ (ck) sam___ (e)   cr___ck (oo)   d___t   (ir)

___ack(qu)   ta___   (sk)   smil___ (e)   sp___l (oi)   h_____m (ar)

___og (j)   he___ (ld)   sp___ (ee)   ___h (ou)   h___se   (ou)

f o___ (x)   si___   (k)   f___nt (ai)   bl___ (ew)   ac___   (tion)

cand___ (y)   ma___ (tch)   t___d (oa)   t___n (ow)   pic___   (ture)

Tell me what needs to go in the blank to make this word say --------.

These are not words.   Tell me what you think it says, and I'll just write what you say.

dap_____	(a)	reet_____	(ee)	whik_____	(wh)
jek_____	(e)	hoad_____	(oa)	thop_____	(th)
yim_____	(i)	preit_____	(ei)	quib_____	(qu)
vog_____	(o)	prout_____	(ou)	knop_____	(kn)
zub_____	(u)	jow_____	(ow)	zult_____	(It)
lote_____	(o-e)	taul_____	(au)	thric_____	(thr)
wilk_____	(1k)	door_____	(oo)	dig_____	(igh)
hife_____	(i-e)	rawl_____	(aw)	phug_____	(ph)
Pat_____	(a-e)	stru_____	(ue)	wrall_____	(wr)
bede_____	(e-e)	vor_____	(or)	sidle_____	(le)
tay_____	(ay)	zar_____	(ar)	refib_____	(re)
trook_____	(oo)	lirt_____	(it)	explub_____	(ex)
kain_____	(ai)	jerg_____	(er)	piction_____	(tion)
flean_____	(ea)	shoff_____	(sh)	hoffy_____	(y)
hoil_____	(oi)	che_____	(ch)	imlet_____	(im)

Name _____ SKILL _____ NEED | Grade _____ SKILL _____ NEED | Teacher _____ SKILL _____ NEED | Report _____ NEED

SKILL	NEED	SKILL	NEED	SKILL	NEED	NEED
Initial Consonants		Final /e/		w/ est/ ing		
Digraphs th/ wh/ sh/ ch		ai/ ay		(ed/ ed/ ed (t) (d) (ed)		
qu/ x/		oa		ugh/ igh/ ight (f) (i)		
s/ s=z/ s=sh/		ee		(--ten)		
c/ g/ (e-y-i)		ea/ ee/ ea		Prefixes un/ dis/ re		
Y sounds y- end- y to i		ou/ ow/ ow		Suffixes ion/ tion		
Final consonants		oo/ oo		Suffixes less/ ful		
Initial Blends /s/ st/sc/ sw/ sl/ sn/ sp/		aw/ au/		contractions		
Initial Blends /l/ bl/ gl/ cl/ fl/ pl/ spl		oi/ oy/		double last consonant		
Initial Blends /r/ br/ gr/ cr/ fr/ str/dr/		ew/ ue/ ui/ oo		syllabication		
Short /a/		ei/ ie				
Short /o/		wr/ kn				
Short /u/		ck/ mb				
Short /i/		ar				
Short /e/		or				
Final Blends st/ lt/ nd/ sk/ mp		ir/ er/ ur/				

STAS TRACKING SHEET

NAME_____

1. <u>Consonant Words</u>   ___b   ___c   ___c=s ___d   __r **g**   ___g=j ___h   ___j
                                  ___k   ___l   ___m   ___n ___p ___qu ___r   ___s   ___t
                                  ___v   ___w   ___x   ___y ___z ___

2. <u>Diagraphs</u>   ___th   ___ch   ___wh   ___sh

3.<u>Short Vowels + y</u>   ___a   ___e   ___i   ___o   ___u
4.<u>Initial and Ending Vowel Sounds</u>   ___VC   ___CV   ___ Nonsense words

5.<u>Silent E   </u>   ___CVCE   ___Wordz   ___Nonsense words
6.<u>Initial Blends</u>   ___l   ___r   ___s   ___other   ___words   ___nonsense words
7.<u>Final Blends</u>   ___n ___t ___sm   ___ng ___nk   ___nt   ___nd ___nch   ___pt

8. <u>Silent Letters</u>   ___kn   ___ck   ___wr   ___tch   ___dge   ___ld   ___gh   ___gn   ___lf
                                  ___pn   ___mb   ___n   ___t

9. <u>R Controlled</u>   ___or   ___ar   ___ir   ___e ___ur   ___ear ___wor   ___words   ___n.ws
10. <u>Final E CCVCE</u>   ___CCVCE   ___words   ___nonsense words

11. <u>Vowel Combinations</u>   ___ee   ___on ___ou   ___ou   ___ou   ___ou   ___ou   ___ou   ___ue,ew
                                  ___ea   ___ea   ___ea   ___ey   ___ei   ___ei   ___ie   ___ey   ___ai,ay
                                  ___oo   ___oo   ___oe   ___aw   ___au   ___oi   ___oy   ___ow   ___ow
12. <u>PG GH as F</u>   ___ph   ___gh

13. <u>Y as a Vowel</u>   ___ y=i   ___y=y   ___y=e   ___words
14 <u>Sion Sion</u>   ___si on   ___sion   ___words
15. <u>CK KE</u>   ___ck   ___ke   ___words

16. <u>Suffixes</u>   ___ous   ___ion   ___ci   ___ti   ___si   ___es   ___s   ___e
                                  ___er   ___en   ___ed   ___ed   ___ed   ___ed   ___ing   ___ish
                                  ___ful   ___age   ___ment   ___long   ___ness   ___ly   ___le   ___able
                                  ___ive   ___ff   ___ll   ___ss   ___ent   ___words

17. <u>Prefixes</u>   ___sure ___ture   ___ance   ___mis   ___pro   ___por   ___pre   ___re
                                 ___a ___com   ___con   ___in   ___un   ___ex   ___en   ___de
                                 ___dis ___trans   ___words

18.   <u>Contradictions</u>   ___contradictions   ___words

19.   <u>Ending Vowels</u>   ___igh   ___ild   ___ind   ___words

APPENDIX C

OBSERVATION FORM

Touch and Sound System Observation Form

Teacher Observed: _____   Date_____

Observation. No_____   Length of observation_____

General Teacher Behavior Observed:

Letters and Clusters Used: Concepts/Patterns taught:

Techniques used: (circle each one observed)

encode (child builds word)   Shake up technique

decode (teacher builds word)   Cover and write technique

Substitution technique   deletion technique

addition technique   reversal technique

other techniques:

General Child Behavior Observed:

Materials: Concepts:

Comments:

APPENDIX D

INTERVIEW FORM

Touch and Sound System Questionnaire

On a scale of 1 to 5 (1 being excellent and 5 being very poor, and NA.
being not applicable) please rate the system you have been using.

1. Adaptable to my population of students: 1 2 3 4 5 NA

2.Effective in teaching word recognition
 and identification skills: 1 2 3 4 5 NA

3.   Effective in teaching the sound-
 symbol association concept: 1 2 3 4 5 NA

4. Usefulness of color-coding: 1 2 3 4 5 NA

5. Usefulness of magnets: 1 2 3 4 5 NA

6. Materials adaptable to my needs: 1 2 3 4 5 NA

7. System techniques adaptable
 to my needs: 1 2 3 4 5 NA

8. Manual of Instructions: 1 2 3 4 5 NA

Open Questions:

        Please answer as completely as possible.

1.   The most effective part of this system is

2. The least effective part of this system is

3. What I like best about this system is

4. What I like least about this system is

5. Other ways I use the system that are not suggested in the manual are

6. My suggestions for improvement of this system are

APPENDIX E

November 30, 1983

Mr. Blaine Steed
1941 North 520 West
Orem, UT 84057

Dear Blaine and Robin,

It was with great pleasure that we all finally met in Las Vegas. We had been wondering for some time what was happening to all those rubber letters. To say the least, we're quite impressed particularly with the painstaking thoroughness in which the product was developed.

Yes, we are interested in the product and would like the opportunity to explore its manufacturing and marketing potentials. Timewise, it would be well after the new year before we could properly focus on the project. Our new factory construction timetable has slipped somewhat. We are now scheduled to move in mid-January. Once the move is accomplished, we will have the facilities to take on significant new product development such as yours.

As to a working agreement between ourselves, to be honest, we do not have prior experience with independent developers. At this time we don't have the slightest idea about what would be the most mutually beneficial approach. Logically, I think we first need the opportunity to make some preliminary feasibility studies. Given some positive indications we would then thoroughly explore the contractual possibilities.

If you consider this to be a suitable departure point, please send the information Clyde requested at our meeting. If possible, short of an actual prototype I think it would be beneficial if you can send us photographs of the letter combinations.

We are all very enthusiastic about the possibilities for success. I know Mike was very impressed with your work and I'm hopeful for its commercial potential. We only regret that circumstances do not allow more immediate action on our part. Look forward to hearing from you.

Cordially,

Philip G. Noury
Marketing Manager

cc: Clyde Wentworth
     Mike Woodard

LAURI, Inc.   Phillips-Avon, Maine 04966   207/639-2000

A SYSTEM FOR TEACHING WORD RECOGNITION SKILLS
TO CHILDREN WITH SEVERE READING DISORDERS

Maurine Robins Steed

Department of Elementary Education
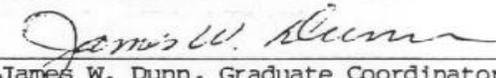
EdD Degree, April 1984

ABSTRACT

It was the purpose of this study to develop and evaluate an instructional system for teaching word recognition and identification skills to children with severe reading disorders. The system was developed while observing and teaching four learning disabled readers, using traditional and modified special programs. The system consists of identified basic concepts, selected word patterns, and new materials created for the system (magnetized, color-coded, foam rubber letters and letter clusters), and a manual containing a pre and postest, word lists, presentation techniques, a record keeping system, and the system rationale. The system was evaluated by three special education teachers in three schools, implementing the system with nine learning disabled children for a one month period, by interviewing the participants, by observing the implementation, and by presenting the system to a publisher. It was concluded that the children made higher than expected gains, and the system is workable for other special education teachers.

COMMITTEE APPROVAL:
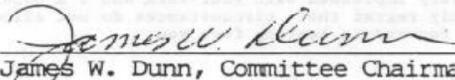
James W. Dunn, Committee Chairman
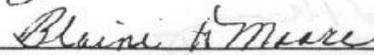
Blaine H. Moore, Committee Member

Callis Harms, Committee Member

James W. Dunn, Graduate Coordinator