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An Evaluation Study of the Effects of the PIRK Reading Program on Reading and Learning Development in Learning-Disabled Students

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AN EVALUATION STUDY OF THE EFFECTS OF

THE PIRK READING PROGRAM ON READING AND LEARNING DEVELOPMENT

IN LEARNING DISABLED STUDENTS

by

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ABSTRACT OF THE DISSERTATION

An Evaluation Study of

The Effects of the PIRK Reading Program on

Reading and Learning Development in

Learning Disabled Students

An emerging view on learning disabilities is that failure in learning to
read in the early grades results in continuing failure in school, along
with cognitive and social/emotional dysfunctions. Educational leaders
have called for reading programs that are maximally effective and
minimally time-consuming, and are suited to the needs of our particular
students. Leaders in the field of special education stressed a need for
the prevention of failure. This evaluation study examined how the PIRK
reading program components fit with the current literature on teaching
reading and language arts to all children and to LD children. This
study investigated the effects of the PIRK reading program on LD
students in the early grades and elicited teachers' perceptions of the
effects of PIRK on LD students' academic-related classroom behaviors.
The subjects were 14 LD students using PIRK and 13 LD controls not using
PIRK in resource rooms in Texas. Scores on tests of reading, spelling,
writing, and listening were compared.

The results of the data analysis indicated that students using the
primary PIRK outperformed the controls in word knowledge and the

intermediate group using the revised PIRK outperformed the controls in listening comprehension. A resource teacher reported that LD students' test scores in reading rose rapidly when they began using the new primary PIRK. Students were able to achieve 90% to 100% accuracy in decoding, in both the primary and the revised PIRK, and 75% to 85% accuracy in the upper revised PIRK levels. Teachers also reported that PIRK had positive effects on student academic-related classroom behaviors. The current literature on theory, research, and practice supported an approach like PIRK and the PIRK components as effective for teaching phonics, decoding, word knowledge, and beginning reading to children and specifically to LD children.

Information from this evaluation study indicated a need to reduce the difficulty in the upper levels of the revised PIRK. There is a need for more word meanings in sentences, in stories, and in nursery rhymes, along with comprehension strategies beginning in third grade.

DEDICATION

This dissertation is dedicated to God, the inspiration for
my work, the author of my faith, and the provider of all
good things in my life, to my parents, whose faith in God
and love of learning inspired my lifelong learning, to my
family whose support made this study possible, to my husband
Jim for his belief in my work, to my children Jimmy and
Sandy, Debbie and Rob, Marilyn and John, and to my
grandchildren, Jason, Charity, Amity, John, Mike, Sara, and
Brian, and their belief in the value of my work. This study
is also dedicated to all of the educators, teachers, and
administrators who share my dream of all children joyfully
learning to read, and to all those very special educators
who made PIRK work for children in resource rooms and
classrooms.

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I am honored to be a student in the leadership program, and I am grateful to Dr. Joe Rost for the opportunity to explore the nature and meanings of leadership. I am grateful for the learning experience with Dr. Bill Foster, his model of teaching, learning, and understanding of organizations and change.

The administrators and teachers of the two participating school districts have my heartfelt gratitude and appreciation for their commitment, cooperation, assistance, and patience, and for the use of their valuable time to extend the knowledge and understanding of the needs of LD children in learning to read.

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CHAPTER ONE

INTRODUCTION

A crisis has emerged in American education. The Task Force on Federal Elementary and Secondary Education Policy reported an educational system unable to meet the needs of increasing numbers of students with problems in learning to read. Their 1985 report entitled "Barriers to Excellence: Our Children at Risk" estimated that 20% to 30% of the school-age population, at least 8,000,000 students, are having difficulty progressing in our schools because of learning problems (Chalfant, 1987). Adams (1990) stressed that children who do not succeed in the primary grades are likely to continue to fail in school. Failures in the critical task of learning to read can result in feelings of inadequacy, low self-expectations, failure to persist on tasks, and continued failure (Chalfant, 1987). Stedman and Kaestle (1987) reported that "functional literacy tests suggest that 20% of the adult population, or 30 million people, have serious difficulties with common reading tasks" (p. 8).

In Becoming a Nation of Readers, Anderson, Heibert, Scott, and Wilkinson (1985) reported that research indicated highest returns on investment in education when children are first learning to read. The early years of schooling set the stage for later learning.

Stanovich (1988) noted "one key to fluent reading" appears to be the development of word recognition. Reading disability may be understood as "processing failures at the word level" (p. 158).

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Persistent failure in word recognition is characteristic of the dyslexic child and may have severe effects on the development of higher-level cognitive processes. Stanovich (1990) focused on "the most critical foundation assumption underlying the learning disability concept: the concept of qualitative differences in cognitive/behavioral characteristics" (p. 8). He discussed reading disability—the most prevalent type of learning disability, and also his "particular area of expertise" (p. 8). The disabled reader, with a phonological core deficit, can develop "generalized cognitive, behavioral, and motivational problems" (p. 36). Dyslexic children have a higher performance I.Q. than verbal I.Q., and show a discrepancy between I.Q. and reading ability. Other poor readers may show a developmental delay in many cognitive areas.

Language processing and phonemic awareness are major components of reading ability, and memory and visual processing are necessary for word recognition (Wong, 1991). Poor readers have problems with phoneme awareness and language-processing of speech perception, vocabulary and naming, and using phonetic representation in linguistic short-term memory. All of these "involve phonological processes of the sound pattern of language" (Mann, 1991, p. 153). Problems in visual perception and visual memory abilities characterize individuals who have difficulties in processing written language. "A very high proportion of those designated as learning-disabled...[have difficulties] in the areas of reading, spelling, handwriting, and written composition,...[and] in their abilities to perceive, discriminate, identify, and remember visual symbols" (Willows, 1991, p. 164).

Phonological coding in short-term memory has a primary impact on word identification and spelling skills, but not on comprehension of

oral language. Difficulties arise in the rapid and accurate pronunc-
iation of individual words, in processing a series of separately encoded
phonological elements, and in following a series of directions
(Torgesen, 1991).

Learning-disabled (LD) children have problems in the processing of
information, in "how input is transformed, reduced, elaborated, stored,
and retrieved; and used" (Swanson & Cooney, 1991, p. 104) in the
interaction of short-term memory, working memory, long-term memory, and
executive processes.

A learning disability may coexist with an attention deficit
disorder. The "basic processing problems and failure experiences in
school lead to frustration and secondary attentional problems" (Felton &
Wood, 1990, pp. 89-90).

Classroom behaviors characteristic of LD children may be a result
of experiences of repeated failure. "The attention deficit and problem
behavior subtypes had low task orientation and low independence in
common, and these behaviors have been associated with low academic
productivity in the classroom" (McKinney, 1990, p. 135). LD children
are likely to be off-task. Information processing problems affect
children's thinking, speaking, and listening. "It is important to
consider how problems in attention, memory, visual perception . . .
affect children's social cognitive development" (Bryan, 1991, p. 197).

"LD students show lack of executive control or self-regulation in
learning" (Wong, 1991, p. 249). Deficits may be in the abilities to
plan, monitor, test, revise, and evaluate. They seem unable to direct,
guide, and govern their own successful learning. They may become

passive learners, lack motivation to learn, and develop low self-concept, low self-efficacy, and low self-esteem.

Leaders in the field of education continued their search for an effective approach to the instruction of students who fail in the early grades and lag behind their age group and classmates. These students need intensive instruction in reading along with remediation of mental processing deficits (DeHirsch & Jansky, 1984).

"The topic at issue is that of reading words," Adams (1990, p. 3) explained, "phonological awareness, basic print awareness, word awareness, and letter recognition" (p. 54) need to be developed before first grade to reduce the rate of failure in primary grades. Adams called for better programs, "ones that are maximally effective, minimally time-consuming, and optimally suited to the needs of our particular students" (p. 274).

Johnson (1988) stressed early intervention and prevention with a code emphasis and learning strategies, the techniques, principles, or rules needed to facilitate the acquisition, manipulation, integration, storage, and retrieval of information. There is a need for studies of intervention on motivation and attitudes toward learning, adjustment and affective variables, independence, and individual versus small group instruction in order to understand the impact of special education. Studies are needed on the best way to teach the code with automaticity and time on task along with any aspect of vocabulary, syntax, or semantics that may be deficient.

Chalfant (1987) called for a preventive model in the early grades before children fail and are placed in specialized programs. In the 1984 to 1985 school year, of the 42 million young people in public

schools, at least 4% (over 1.5 million) were classified as LD under Public Law 94-142. The number of identified LD pupils more than doubled in the decade from 1976 to 1986. For the 1987 to 1988 school year, the Office of Special Education Programs in the 11th Annual Report to Congress, revealed that approximately 2 million LD students had been identified as learning disabled in the United States. Currently, 5% (over 2 million) of public school children have been identified as LD. Variation of incidence among the states ranged from 2.4% to 9.6%, depending on geographic location (Torgesen, 1991).

LD identification criterion focuses on the discrepancy between expected and actual achievement. The LD student has adequate intelligence to learn but fails to achieve primarily in reading, spelling, handwriting, and mathematics. Failure to achieve, however, does not explain integral parts of learning disabilities, such as "perception, memory, attention, linguistic, social, cognitive, and neuropsychological factors" (Kavale, 1988, p. 6).

The Issue

The crisis in American education has stemmed from the rising number of students with learning problems. Chalfant (1987) reported at least 4% of approximately 40 million have severe learning disabilities and another 10% to 20% have mild learning problems that interfere with their educational progress. Such students have social, conduct and behavior problems, low self-esteem, may be experientially deprived, or may have problems in understanding and using language.

Specialists in the field of learning disabilities addressed the need to identify LD students. A symposium consensus centered on the

following needs and the directions for further research on learning
disabilities:

1. There is a need to use knowledge and theory from pertinent
   disciplines and to develop theories and taxonomies in
   learning disabilities.

2. There is a need for well-designed and well-implemented
   programmatic intervention research.

3. There is a need to provide appropriate services for students
   with learning disabilities, while at the same time
   responding to the sociopolitical and economic factors that
   may influence learning disabilities (Vaughn, Bos, & Kukic,
   1987).

Vaughn et al. (1987) proposed five directions for future research.
One direction was to describe how a group as a whole performed after
intervention, and to report the characteristics of students who did and
who did not achieve. Dynamic assessment was proposed with a detailed
analysis of the learning processes in the domain studied. A second
direction was to ensure that intervention research was well grounded in
sound theory, and assumptions underlying the methods were tested in the
interactions and principles of teaching and learning. A third direction
was to select and describe the sample to determine the success of the
intervention and with whom it was successful. A fourth direction was to
match the research design to the research questions being asked, and to
use case studies that "can provide data rich with descriptions of the
interactions among learner, task, and context variables" (p. 262). The
fifth direction was to include educational research on teacher effects

in their interactions with students. An examination of the intervention was proposed to determine the purpose and necessity of each component.

Wong (1988) proposed an intervention model for a powerful teaching method. The model's components were knowledge-facts or concepts, procedure, and metacognitive; cognitive processes and processing problems; and motivation to learn.

The knowledge component consisted of facts and concepts, a procedure for developing knowledge and metacognitive knowledge of how to organize and structure materials for success in learning, and how to monitor one's own learning progress.

The cognitive processes component included learning, attending to and coding information, rehearsing and chunking related information, and monitoring. LD students' processing problems are related to task demands that may tax attentional and memory capacities that may impair acquisition and retention. Appropriate materials and procedures were needed to engage student attention for accurate perception and response.

The motivation component was the use of intrinsic motivation in enjoyment and control of the task, belief in the value of the task and one's own effort for success, and expectancy for success to assist the effort needed for mastery.

The Perceptual Integration Reading Kit (PIRK) reading program (Shippey, 1970, 1977, 1987) was developed by this investigator interactively with LD students while teaching language arts, reading, phonics, word recognition and comprehension, writing, and spelling. The primary purpose of PIRK was to respond to student difficulty in identifying and recognizing words. A second purpose was to find ways to teach using the activities students liked to perform and persist in

doing. A third purpose was to find ways to accelerate growth in reading so that students could catch up with their agemates.

The LD students liked card games. They were able to focus their attention on the words on cards and persist on task. The word on each card was divided into beginning sounds and phonograms and placed above the word to assist the student to focus on the rhyming word parts. The words were organized in word families and similar phonograms or syllables, placed in packets with contrasting phonogram groups, with the same vowel followed by a different consonant. The students were able to follow the procedure to match phonograms, read rhyming words, copy, write, and spell words.

PIRK was organized in a sequence of levels from simple to complex word usage. The packets of words were organized in groups by vowel sounds in three levels: Basic, Level I, and Level II. Level III contained morphological structures of words from Level II. Level IV contained special sounds, and "l" and "r" controlled vowel sounds. Level V contained compound words and words with two syllables. Level VI contained multisyllables. Level VII contained word roots with affixes and meanings. Criterion tests were constructed for each level to assist with student placement and to determine areas needing practice.

The PIRK components were examined by reviewing the literature on theory, research, and practice in teaching reading, in relation to the three components proposed by Wong (1988) for intervention research:

1.   Knowledge of facts and concepts were identified as phonic elements and their relationships. The alphabet principle, phoneme awareness, and word analysis, which included letter names, the onset and rhyme, rhyming phonograms, syllables, spelling patterns,

and whole words; morphology of verb tense, adjectives, and adverbs; and semantics or the meanings of syllables, word roots, prefixes, and suffixes. Procedural knowledge was the PIRK four-step procedure. The student analyzes, classifies, organizes, sorts, matches, compares and contrasts onsets and rhymes, phonograms, or syllables of words on cards; reads a stack of rhyming words to the teacher; and then copies, spells, writes, and names each letter and word as it is written. The student follows the procedure with all of the words in a packet, takes the next packet, and repeats the procedure. Metacognitive knowledge was knowledge about cognition and the regulation of cognition in the procedure which allows students to organize and control, to direct, guide, and govern, and to monitor their own learning.

2. Cognitive processes were identified as language and discrimination, and producing speech sounds, identifying, discriminating, and sequencing auditory and visual stimuli in letters and words, the auditory and visual recognition of words, and the receptive and expressive processing of language. The attention and memory processes were in verbal learning, naming, and lexical access.

3. Motivation to learn was in the game format of the materials and procedures which students liked and valued, and in their expectancy for success. The manipulative game-like format of the materials engaged the student's attention and provided accurate models of words, and the teacher's feedback on accuracy and achievement, which motivates them to persist on-task. The

learning efficacy of immediate and ongoing success sustains motivation as they observe their own learning progress.

Small group instruction provided for students to work cooperatively sharing materials, and for positive student-teacher interaction and student success which promoted motivation. The student works independently at his/her own pace. The teacher monitors group activity, gives corrective feedback, monitors student progress, and gives criterion tests to determine areas needing more practice for mastery.

The PIRK reading program is used in California, Texas, and other states. PIRK was well-implemented, as part of the total language arts program, in a number of districts with LD students for the teaching of phonics and the development of word recognition.

The Texas State Board of Education (1986) approved a program for students with "dyslexia or related disorders" who have difficulty in learning to read, write, or spell despite conventional instruction, adequate intelligence, and sociocultural opportunity. The program was implemented in the following four phases:

1. Phase I is data-gathering and identification of students who are not achieving and who are at-risk for dyslexia. Identified students are provided with modified teaching methods and strategies for remediation.

2. Phase II provides remedial programs for students who do not make expected progress in Phase I.

3. Phase III is the identification of an instructional program for students who have not made expected progress in Phase I and/or Phase II. Treatment is provided in a remedial class setting with

instructional strategies that utilize individualized, intensive,

multisensory methods containing reading, writing, and spelling

components that include ten descriptors: individualized,

multisensory, intensive phonetic, synthetic phonics, linguistic,

meaning based, systematic, process-oriented, sequential, and

cumulative.

4. Phase IV is a referral to special education.

The PIRK reading program components were identified and related to

the program descriptors for the treatment of dyslexia and related

disorders. The primary PIRK reading program was developed in 1986 to

1987 for use with primary LD students in Phases II, III, and IV.

Purpose

The first purpose of this dissertation study was to determine how

PIRK fits in current literature on teaching reading to learning disabled

students. The second purpose was to assess in-depth information based

on the perceptions of current long-term users of PIRK, especially how

they use PIRK and the effect of PIRK on student academic-related

classroom behaviors. The third purpose was to examine the effects of

the PIRK reading program on the development of reading and language arts

in LD students in elementary resource rooms, and to compare these

effects with LD control groups not using PIRK.

This study investigated the needs of LD groups in the early grades

by reviewing the literature on research and theory. It also examined

the components of the PIRK reading program in the light of what experts

reported as needed. The perceptions of users of PIRK, as to its effect

on student academic-related classroom behaviors, was assessed. This was

accomplished with interviews and questionnaires. Data from the Pro-ed DAB tests of receptive and expressive language from the LD students using PIRK and not using PIRK were collected and analyzed. The results provided information about the growth in reading of LD students who participated in PIRK and compared with LD students who did not participate in PIRK.

The information gained from this study may increase understanding of how LD students responded to participating in PIRK, of how teachers utilized and integrated PIRK into their language arts programs, and of the effects of PIRK usage on the LD student's later performance on oral and written communication. The information provided will assist in improving PIRK components and in developing a more effective implementation of PIRK. The review of literature identified the PIRK components supported by research and also those components in need of change, additions, and improvement.

<u>Research Questions</u>

This evaluative study investigated the outcomes of PIRK as it is being used on a population of LD students in Texas. The following questions were addressed through qualitative and quantitative measures:

1.   How does PIRK fit into current literature on teaching reading to LD students?

2.   What are teachers' perceptions of PIRK's effects on student behaviors during PIRK activities and other reading and language arts activities?

3. What are the effects of the PIRK reading program on the
    development of reading and language arts skills in LD students,
    and compared with LD control groups?

Statement of Hypotheses

Ho1: There will be no differences between the scores in reading, word
     recognition, and comprehension made by the LD students using PIRK,
     and the LD students not using PIRK.

Ho2: There will be no differences between the scores in spelling made
     by LD students using PIRK, and LD students not using PIRK.

Ho3: There will be no differences between the scores in writing made by
     LD students using PIRK, and LD students not using PIRK.

Ho4: There will be no differences between the scores in listening made
     by LD students using PIRK, and LD students not using PIRK.

Definition of Terms

The following terms and key concepts used throughout this research
report are here defined:

Reading is defined as the recognition and interpretation of words
and their meaning in sentences and paragraphs. Reading is limited by
the speed, accuracy, and effortlessness (automaticity) with which
readers can recognize words in print and their meanings, all of which
occur interactively and interdependently and in an integrated process in
support of comprehension. The comprehension and interpretation of text
depend on knowledge and sensitivity to the grammatical function and
meaning of each word and the overlapping meanings of words in phrases,
sentences, and paragraphs within a story or other contexts.

Learning disabilities is defined as a generic term referring to a heterogeneous group of disorders manifested by significant difficulties in the development or acquisition of skills in listening, speaking, reading, writing, spelling, and in the social context. A central nervous system dysfunction is presumed to influence ability to receive, categorize, and integrate information, and to attach sounds to letters and words. Dysfunctions may be acquired or intrinsic, developmental disabilities in memory, attention, perception, thinking, and language.

Perception is defined as the sensing, selecting, grouping, sequencing of stimuli, and assimilating with past stimuli (Harris, 1975). Dysfunctions are in attention, discriminating, sequencing, grouping, organizing, and integrating stimuli-sounds, symbols, and past experiences.

Visual perception is defined as processing tasks that consist of the recognition of visual stimuli and the cognitive analysis and synthesis of visual information (Chalfant & Scheffelin, 1969). Dysfunctions are in whole-part-whole discriminating between similarities and differences, segmenting, sequencing the serial order, grouping, and organizing objects.

Auditory perception is defined as auditory stimulus processing, a composite of experiences with language and other sounds. It is basic to the perception and production of speech sounds and language development, and is dependent upon hearing sound, discriminating difference among sounds and phonemes, and in analyzing and synthesizing a sequence of sounds (Chalfant & Scheffelin, 1969; Tallal, 1988). It is referred to as phonological awareness, the internal linguistic-phonetic structure of

words, and linguistic awareness. Dysfunctions are related to a lag in language development (Liberman, 1988; Tallal, 1988).

Perceptual integration is defined as the discrimination and selection of stimuli from the environment to form units of interstimulus correlations or integrated perceptions (Hochberg, 1974). It is the matching of stimuli within and between the senses; the organization of stimuli within relationships; matching, comparing, and interpreting the stimuli in relation to past experiences; at first executive, conscious direction and control, then automatic with practice (Anderson, 1975). It is viewed as a cognitive function, an extension of assimilation and organization, a part of an interiorized coordination of action—schemata which make up the intelligence (Piaget, 1971). Dysfunctions may be disorganized behavior: inattentive, hyperactive, distractible; inability to learn or to follow instructions, to make connections between sounds and letters, to analyze, segment, sequence letters, and to synthesize words and meanings.

Attention is defined as the ability to focus on a task or on stimuli in the environment. Dysfunction is task- or situation-specific distractibility due to cognitive processing demands, and the inability to sustain attention on the task.

Cognition is defined as perceiving, thinking, and learning. Dysfunctions occur in inaccurate perception and processing of stimuli, in organizing and storing information in memory, and in constructing knowledge and meaning, thinking, and learning.

Metacognition is defined as awareness of self, task, and strategy variables affecting cognitive performance, the use of knowledge to plan, monitor, and regulate performance.

Classroom behavior is defined as social interactions with peers and teacher(s), and learning the tasks conducive to productive effort and learning. Social-conduct-behavior problems may be produced by the stresses of coping with processing dysfunctions, and may be manifested as confusion, disorganization, hyperactivity, distractibility, poor recall, failure to persist on tasks and continued failure, the inability to attend, comprehend, or follow instruction, organize or complete tasks, and delayed social development, social rejection, and low self-esteem.

Limitations and Assumptions

A limitation of this study is the possibility of bias by this researcher who developed PIRK over a period of several years. Modifications in PIRK were made to accommodate to the needs of teachers for an efficient and effective approach to teaching phonics and word recognition to LD students who failed in the beginning stages of reading.

To minimize bias, the investigator did not participate in the testing. She conducted workshops for teachers and administrators in the use of the PIRK procedure and materials. The special education supervisors and the teachers did the testing and observing of participants in the school setting during the routine day. Data and other pertinent information were provided to this investigator who analyzed, interpreted, evaluated, and then wrote the research report.

The investigator made the following assumptions:

1. Data provided by the teachers on the interview questions and on the questionnaires, and also on the measures of reading, were accurate.

2. The administrators followed the research design for sampling in the resource rooms.

This research was delimited to the study sample and the population from which the sample was drawn. The participants were from suburban and rural areas in the lower to middle socioeconomic range, some Caucasians and others from minority groups. The participants were in elementary learning disability resource rooms in two districts in Texas.

CHAPTER TWO

REVIEW OF THE LITERATURE

Leaders in the field of education have called for better reading programs that are maximally effective, minimally time-consuming, and optimally suited to the needs of students. The purpose of this dissertation study was to examine how PIRK fits into the literature on teaching reading to LD students, to evaluate the PIRK reading program as it was being used with elementary learning-disabled (LD) students, and to examine its effects on academic-related classroom behaviors, and on reading achievement, word recognition and comprehension, writing, spelling, and listening. A need was stressed for the prevention of reading failure and related learning disabilities. This literature review focused on the identified PIRK program components in light of the current theory, research, and practice of teaching reading to elementary school children and what more is needed in teaching reading to LD children.

The literature from 1987 to 1992 was explored in the fields of reading and learning disabilities. Books and periodicals were examined for current thinking on teaching reading to all children, and for the specific needs of LD children. Citations from earlier pertinent research were examined. The Educational Resources Information Center (ERIC) search included descriptors of remedial reading, word recognition, comprehension, cognitive processing problems, and motivation. A dissertation search included descriptors of remedial reading, evaluation, case study, and reading programs.

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Learning Disabilities

"Although learning disabilities is solidly established as an important category of exceptionality in both research and educational practice, it is an area full of controversy" (Torgesen, 1991, p. 6). Issues related to the concept of learning disabilities involved the basic definitions of LD children, differentiating LD children from other non-learning children, and establishing that LD children required educational treatment different from children with other kinds of problems. Issues related to research and theory involved the causes of learning disabilities and the heterogeneity of the LD school population. Torgesen suggested that researchers go beyond definitions to a "narrowly defined...specific population of interest" (p. 22).

Reading Problems

Torgesen (1991) reported studies of the problems of poor readers that compared samples of children with specific learning disabilities and samples of children with more general learning problems. The findings indicated that few differences existed between general learning problems and specific learning disabilities on tests of phonological skills and reading decoding skills. The differences between the two groups were on tests of nonverbal skills or verbal-conceptual, vocabulary, and abstract verbal reasoning.

> We do not have good evidence that their actual reading processes, or abilities central to the attainment of basic reading skills, are different...LD children with a phonological coding processing disability make strikingly slower progress in acquiring basic

reading skills than did another group of LD children of the same
general intelligence (p. 27).

Torgesen concluded that children with "certain types of disabilities may
require more intensive instruction than other poor learners to master
beginning reading skills" (p. 28). The research suggested that children
with specific reading disabilities would show slower growth in basic
reading skills. But once their decoding difficulties were overcome,
they would be able to comprehend a wider variety of materials than
children with more generalized cognitive limitations.

Gelzheiser and Clark (1991) reported that "83% of second-grade
poor readers were deficient in their knowledge and/or use of letter-
sound correspondences...and by sixth grade, 70% of poor readers still
lacked phonetic word-attack skills" (p. 263). Their problems were in
"focusing attention on individual sounds in words, a task referred to
phonemic awareness, or phonemic segmentation" (p. 263).

Phonemic Awareness

Mann (1991) noted the phonemic awareness problems, in language
processing associated with reading and speech perception, that were
related to problems in remembering speech sounds. Her research
indicated that letters and words were held in short-term memory through
use of phonetic representation, and that poor readers were "less able to
use phonetic structure as a means of holding material in short-term
memory" (p. 145). However, their errors revealed that "poor readers
made use of many of the same features of phonetic structure as good
readers do" (p. 145). They made the same sorts of errors, but more of
them. The evidence revealed a problem with integrating the phonological
information in letter sequences. LD children tended to pronounce the

first letter of a word but had difficulty with subsequent letters, and more so with vowels than with consonants. These poor readers had difficulty recalling a sequence of words and the words in spoken sentences. Further research has suggested training to facilitate phoneme awareness in "word games, nursery rhymes" (p. 155), in phonics instruction.

Dyslexia

Stanovich (1990) explained that dyslexic children have deficits in various aspects of phonological processing. Their difficulties are with sound segments at the phoneme level, naming, the inefficient use of phonological codes in short-term memory, and the categorical perception of certain phonemes. The linkage of these phonological skills with reading was a causal one, and seemed to be the basis of difficulty in learning the grapheme-to-phoneme correspondences. Stanovich stressed that "there was growing evidence...of a group of dyslexics who had severe problems in accessing the lexicon on a visual/orthographic basis,...orthographic-core deficits which would mirror the phonological-core group" (p. 32).

Written Language

LD children have difficulties with written language: reading, spelling, handwriting, and written composition, as well as receptive and expressive language processes (Willows, 1991). Studies have indicated that "the early visual information processes of disabled readers were different from those of nondisabled normal readers,...[and which] may have some direct causal role in the perception, discrimination, and analysis of the visual features of letters and words" (p. 180). A basic underlying processing difference between disabled and normal readers,

such as the speed of information processing, may have a causal role in reading disabilities. Willows' studies of children's visual recognition memory for unfamiliar visual symbols indicated that "reading-disabled children were less accurate and lower in their visual recognition performance;...there was a developmental pattern;...[and] the deficit appeared to be at the level of initial visual perception rather than visual memory" (pp. 182-183). Willows suggested that the deficits in their visual processing abilities could be a factor in the difficulties with differentiating between similar letters and words, in analyzing and remembering the spelling patterns in words, and in processing letters and words at rapid rates in text.

Language Problems

Tallal (1988) explained language as one of the most complex of all human functions, that it required the integration of sensory, perceptual, cognitive, and linguistics functions. Language development may be delayed or disordered when one or more of these functions fails to develop normally. Tallal (1988) reported, 100 children with specific developmental language impairments, 60 age- and IQ-matched controls, and 30 language-age matched children, were carefully selected at age 4 and studied for 5 years to assess their neuropsychological-sensory, perceptual, motor, cognitive development, and their receptive and expressive language, phonology, morphology, semantic, and pragmatic development. These large series of studies demonstrated that the processes of identifying, discriminating, and using auditory stimuli were the major difficulties in language impaired children. The ability to discriminate and sequence rapidly presented nonverbal stimuli and remembering them was specifically impaired. There was a co-occurrence

of developmental reading disorders in the same children at different ages, progressing from language impaired to reading impaired. Tallal noted their social-emotional problems in "attempting to cope with the stresses produced by their language and learning disabilities" (p. 205).

Cognitive Processing Problems

Swanson and Cooney (1991) defined executive function as "a cognitive activity that determined the order in which processes were performed," and working memory as the "executive function and search processes that individuals learn to organize and retrieve" (p. 114) information. LD children have difficulty with checking, planning, and monitoring the control processes. The implications of memory research were that LD children may be taught to organize information into common categories, rehearse the category names, and orient their attention with objects and procedures, and transform the unknown to the known by use of category and analysis of items into smaller units. They can develop imagery through mental manipulation, the use of concrete materials, and learn the use of metamemory to become aware of the value of using a specific strategy. "When instructed to organize information into semantic or related categories,...they improved considerably and performed comparably to [non-learning disabled] NLD students" (p. 118).

Metacognitive Knowledge

Wong (1991) explained two aspects of metacognition. "Knowledge about cognition and regulation of cognition to direct, guide, and govern successful learning, efficient reading, and effective studying....Metacognition originated in Flavell's research on young children's memory processes" (p. 234). This construct was

an attempt to explain young children's failure to maintain and

generalize learned mnemonic strategies,...the failure to

categorize items into discrete categories,...[and] impaired recall

in children with LDs....Prompting them to put related items into

suitable categories remarkably improved their recall (p. 235).

Dyslexic children's cognitive problems in phonological processing and

difficulties in learning letter-sound associations have created problems

in motivation and self-esteem. Wong viewed metacognitive problems as "a

joint by-product of deficient reading experiences and motivation" (p.

243).

Memory Processes

Swanson and Cooney (1991) studied the memory problems of LD

students in the context of "how information was received, transformed,

elaborated, stored, retrieved, and used" (p. 104). Most of their

research focused on problems in short-term memory which may influence

related processes in working memory, long-term memory, and executive

processes. Their findings indicated that learning disabled and non-

learning disabled children were comparable at the encoding stage of word

recognition, but that LD children required more time to conduct a memory

search, and that they relied more on smaller subword components in the

decoding process than did normal readers. Variations in auditory-

verbal-linguistic information retained in short-term memory was

attributed to the control processes of rehearsal and to meaningful

material. Crucial factors in the encoding of units or sequence of items

were information load, the similarity of items, and the number of items

processed. LD children were found not to use verbal rehearsal,

organizational strategies in rehearsing several items, or elaborative

processing of words, such as analysis and comparison of words. Their memory problems were coding errors in the phonological features of language. Their research on memory processes of LD children revealed storage and retrieval problems of rehearsing and organizing, and a "failure to integrate verbal and visual codes" (p. 111). LD children with visual and auditory impairments had recall deficits in both storage and retrieval. Meaningful tasks were found to ameliorate the recall deficits of LD children with single modality impairments, but not those with both visual and verbal impairments.

Attention

Felton and Wood (1990) explained that specific reading disability and attention deficit disorder (ADD) often coexist. Children with ADD have impairments in attentional mechanisms with secondary learning problems. Children with LD have basic processing problems and failure experiences in school which lead to frustration and attentional problems. The neuropsychological perspective viewed children with ADD as having problems in "sustained attention, attributed to frontal and limbic dysfunction....Children with [reading disability] RD had problems in selective attention, attributed to temporal lobe dysfunction" (pp. 89-90). Both reading disabled and ADD children showed task or situation specific attentional problems due to stress from other specific dysfunctions.

Felton and Wood (1990) compared samples of reading disabled children with samples of ADD children. Their findings indicated that "deficits in rote verbal learning and memory occurred as a function of ADD,...while deficits in word retrieval and rapid naming were specific to [reading disability] RD" (p. 94), as well as tasks that provided

visual cues. Further studies indicated that the cognitive deficits associated with reading disability were consistent across samples, developmental levels, and definitions and subtypes of reading disabilities. The deficits were in "confrontational naming, rapid automatized naming, and phonological awareness,...but not on measures of verbal learning and memory for lists of words, memory for narrative material, or on tasks involving visual memory or visual perception" (p. 108). There was a moderate reading disability effect on a "word string memory task that required verbatim recall of words in sequence" (p. 108). Conclusions from these studies led to a call for early identification and appropriate instruction prior to the development of reading problems severe enough to meet standard learning disability criteria. Felton and Wood stressed that

> phonological awareness and decoding principles for the development of fluent reading, and automaticity in word recognition should be an integral part of the basal reading curriculum form the beginning of reading instruction rather than a peripheral remedial effort offered after failure (pp. 109-110).

Conte (1991) defined the primary symptoms of Attention-Deficit-Hyperactivity-Disorders, ADD, and hyperactivity as "short attention span, impulsivity, and overactivity" (p. 61). Social relationships may be a problem for children with ADD and hyperactivity. The rules and subtle perception cues that govern social interactions may not be correctly interpreted. Conte noted an arousal deficit. "In a testing situation,...excessive arousal may lead to anxiety and disorganization" (p. 76). However, if arousal was too low, such as presenting material

at slow rates, children with ADD and hyperactivity learned less efficiently than with more rapid rates of presentation.

Motivation

Academic failure may erode the motivation to learn and result in lack of effort and beliefs in lack of ability. Wong (1991) explained that the consequences of failure were poorly developed self-systems which "restricted LD students' development of self-efficacy and self-regulation and made them into passive learners" (p. 249). Schunk (1990) focused on the relationships between self-efficacy and motivation and a view of "reciprocal interactions among behaviors, environmental variables, and cognitions" (p. 139). He explained that self-efficacy may be effected by positive feedback from teachers on students' achievement which in turn motivates them to persist on task. Students who perceived value in a learning task tended to be willing to expend the needed effort. Task variables that may affect motivation included perceived difficulty of content, freedom from distractors, opportunity to learn and experience success, and feedback of performance success. "A sense of learning efficacy helped sustain task motivation,...as they observed their goal progress" (p. 148).

Social and Behavioral Problems

Evidence has linked problems in peer relations to problems in school achievement, and peer interaction to children's development of reasoning in personal, societal, and moral domains of knowledge. Teacher-child interactions and a child's "teachability," as well as academic achievement, have been part of the referral process and

identification of children as LD (Bryan, 1991). Their problems in attention, memory, language, and visual perception may affect their social cognitive development. LD students' perceptions of the self affect their judgments of their own competence and their explanations of their success or failure. Children's self-perceptions were found to be influenced by teacher evaluative feedback. Bryan suggested that "children with learning disabilities are more likely to prosper in a classroom in which evaluative feedback was de-emphasized and not so public" (p. 202).

LD students who believed they lacked ability did better in a structured learning task. Bryan (1991) explained that LD student experiences with success, along with positive teacher feedback on effort, shaped their beliefs in their own ability and enhanced their acquisition of content. Since LD children attributed failure to lack of ability, an emphasis was needed to relate acquiring new skills to increased ability — thus, "recasting ability...as a characteristic we acquire as we work hard" (p. 107).

Bryan (1991) defined social competence as classroom behaviors which were "appropriate peer-interaction skills, but also behaviors to cope with the demands of the classroom setting, such as being on-task, completing work, gaining attention appropriately" (p. 208). In studies of social cognition, differences were not found between LD and non-LD children "when adjustments were made in the complexity of the stimulus materials, or when extra special care was taken to control for students' attention" (p. 216). Developmentally appropriate ways for providing structure seemed to be needed "whereby children can observe, model, and practice social skills" (p. 220).

McKinney (1990) stressed that the pattern of "progressive underachievement...was not easily remediated" (p. 133). Learning disabilities could be classified into more specific subgroups according to their patterns of behavioral strength and weaknesses. These patterns were prognostic of developmental trends in academic progress. The data suggested that attentional and conduct disorders were linked developmentally. Low task orientation and low independence were associated with low academic productivity in the classroom, "and exacerbated by social/emotional sequelae that develop subsequently" (p. 135).

Theory and Instruction

Pennington (1991) provided a neuropsychological framework for the classification of learning disorders in five cognitive functional domains: "phonological, spatial, social, executive, and long-term memory" (p. 22). He explained that the functional domains most vulnerable to developmental disorders were executive functions, such as organization, "planning, set maintenance, selective attention, inhibition, and initiation of both cognitive and social behaviors" (p. 8); and the language system of phonological processing. Nonphonological language processing disorders, such as syntax, semantics, and/or pragmatics were rarer. Executive dysfunctions "disrupt the organization and control of behavior" (p. 14).

Spatial cognition and visual/spatial dysfunctions included "object localization and identification, short- and long-term visual or spatial memory, deployment of attention to extrapersonal space, mental rotations and displacements, spatial imagery, and spatial construction" (p. 9).

These functions overlapped with other functions, such as long-term memory and attention. Pennington (1991) noted that short- and long-term memory were different as were verbal and visual memory. Problems in short-term memory were associated with dyslexia or ADD with hyperactivity, while long-term memory disorders were associated with anoxia or closed head injuries.

Bos and Vaughn (1988) related information processing theory to learning disabilities in the way that "sensory input is perceived, transformed, reduced, elaborated, stored, retrieved, and used" (p. 31). These highly interactive processes consisted of the following: Metacognitive or executive functions coordinate, monitor, and determine what sensory stimuli to attend to learn and remember information. The information, recognized or perceived, uses salient features, context and prior knowledge, and may be held for a short time in working short-term memory. There were strategies that assisted with storage in long-term memory, such as verbal rehearsal, chunking, or grouping to make fewer pieces to remember, and elaborating, by relating new to known information for meaningful storage as part of the cognitive structure. LD students may have an automation failure, process information slowly, and use more effort to sustain attention on a task. Bos and Vaughn recommended an interactive teaching and active learning environment, modified to facilitate student attention and perception to critical differences in stimuli; to teach strategies that keep information active in working memory, that facilitate storage and organization in long-term memory; and to teach the executive functions that coordinate learning and memory strategies.

Direct instruction theory structured an efficient and humane learning environment which enhanced the student's self-concept, and maximized learning in a minimal amount of time. The organization of direct instruction focused on engaged time-on-task in activities that were neither too difficult nor too easy, at each student's ability or skill level, with minimal time lost in transitions between tasks. The teacher arranged materials for student access, provided help when needed, and checked the work, held the student accountable for his/her work, and made expectations clear to the student. Reading programs were designed to meet student needs and objectives were specified. Strategies and procedures were taught, with guided practice in an easy-to-difficult sequence, with teacher feedback on the accuracy of student responses. Individualized small group instruction provided extra practice if needed, fast pacing without rushing. Each student was monitored with observation and tests, motivated with success, praise, and pride in his/her work (Carnine, Silbert, & Kameenui, 1990).

Reading Theory

Levy and Carr (1990) conducted component process analyses of reading and its development to show "the relationships among reading processes, as these were related to reading ability" (p. 423). They concluded that "deficits in phonological processing were major contributors to reading failure irrespective of the population studied or age of the reader,...but orthographic deficits also contributed in some cases" (p. 424). Phonological and orthographic factors appeared to be interdependent during development, in discriminating orthography in regular sequences in the development of spelling-pronunciation

correspondence knowledge. But as phonological knowledge improved, it appeared to support orthographic discrimination. Memory span appeared unrelated to phonological processing, but it appeared to be in the integrative processes involved in language comprehension. Language comprehension compensated to some extent for poor word recognition, but for most poor readers, language skills were not sufficient to overcome deficits in word recognition processes. Across populations and ages it seemed clear that word attack and word recognition skills, memory abilities, and higher order language facility all contributed to individual differences in reading fluency.

Seidenberg and McClelland's (1989) distributed developmental model of word recognition and naming was based on the connectionist's parallel distributed processing approach to understanding perception, cognition, and learning. The model simulated aspects of differences in the processing difficulty of words, in readers' word recognition skill from beginning to skilled reading, and on lexical decision and naming tasks.

Rumelhart (1989) used the brain metaphor to relate the fundamental processing unit to an abstract neuron and the interactions between them in parallel processing. This connectionist framework contained seven major components: a set of processing units; a state of activation; an output function for each unit; a pattern of connectivity among units; an activation rule; a learning rule; and an environment for its operation.

Reading Instruction

The complex skill of reading requires the coordination of a number of interrelated sources of information in the process of constructing meaning from written texts, as "the parts are put together in a smooth

integrated performance" (Anderson et al., 1985, p. 7). Anderson et al.
believed that with the new understanding of what children are capable of
learning, that children can begin systematic reading instruction in
kindergarten, except for those children "who cannot sit still in their
seats, or who cannot follow simple directions" (p. 29), and need
experiences with oral and printed language, and early opportunities to
write. Anderson stressed the best results for these students came from
programs that were "formal, structured, and intensive" (p. 29), but good
results also came from informal programs. The best evidence suggested a
balanced formal and informal program in reading and language. Reading
as part of language development in listening, speaking, and writing
builds especially an oral language. Reading comprehension is based on
vocabulary, knowledge about the world, and talking about the knowledge
in thoughtful discussion of their experiences and of stories read to
them. Children need to learn letters and sounds, the different meanings
of a word, reading along in whole books, the functions of reading and
writing, and the use of handwriting practice "to apply and extend their
knowledge of letter-sound correspondences" (p. 34)

> The purpose of phonics is to teach children the alphabetic
> principle...the relationships between letters and sounds and
> letters and meanings....Phonics instruction should have been
> completed by the end of the second grade...except in cases of
> diagnosed individual needs (p. 43).

Children need experiences with reading the words they learn in
interesting, comprehensible, and instructive, meaningful reading of
stories or sentences with picture clues. Reading coherent and
interesting texts contain clues to pronunciation and meaning, which adds

to reading fluency in a "reciprocal relationship between word identification and comprehension" (p. 44). "Research has shown that children's learning is facilitated when critical concepts on skills are directly taught by the teacher" (p. 71). The direct instruction of comprehension strategies was found to increase comprehension among the students who could identify words, and was effective with third and fifth grade students.

Anderson et al. (1985) described the phases of comprehension instruction in beginning reading. The preparation phase introduces new words encountered in the reading selection, phonics, background knowledge, and asking questions to guide reading. The focus is on concepts central to understanding the story and in constructing meaning. The second phase is reading, silent reading to improve oral reading fluency, and reading aloud and listening to others read. The third phase is discussion following silent and oral reading includes direct instruction in comprehension using "questions that lead children to integrate information about the central points of a selection with their prior knowledge, which significantly enhance reading comprehension" (p. 55). The questions "explain the steps in a thought process that gives birth to comprehension...why and when to use a strategy...to develop the strategic process [that is] characteristic of skilled readers" (p. 72). Independent reading was found to be "significantly related to gains in reading achievement [which] is a major source of vocabulary growth...and reading fluency" (pp. 76-78). All of the language arts are interrelated and mutually supportive. Writing activities "have been found to contribute to knowledge of how written and oral language are related,

and to growth in phonics, spelling, vocabulary development, and reading comprehension" (p. 79).

Pearson viewed Adams' (1990) report on phonics as the most complete review within a single cover of what we know about processes and instructional practices in word and letter identification and early reading; and which can place all prior and current research on visual and auditory perception and basic reading processes within the context of parallel distributed processing. The goal of the report was to provide guidance on how systematic instruction in word recognition may be achieved in the most effective and efficient way as the best support for the comprehension of text.

Adams (1990) concluded that successes and failures in the classroom depended on what a teacher did and how she did it. Approaches that included systematic phonic instruction resulted in comprehension skills comparable to, and word recognition and spelling skills significantly better than, those that did not. Adams stressed that "code instruction...alongside meaning emphasis, language instruction, and connected reading resulted in superior reading achievement; and these approaches seemed as valid for children with low reading-readiness profiles" (p. 49). Adams emphasized that excess phonics may be a burden to children, and that the optimal amount of phonics was a "disciplined, sequenced coverage of individual elements and their interrelations, as well as a continuous evaluation of students' levels of mastery" (p. 51). The issue was the ability to discriminate between phonemes, Adams explained

> it was not the working knowledge of phonemes that was important,
> but conscious, analytic knowledge. It was neither the ability to

> hear the difference between two phonemes nor the ability to
> distinctly produce them that was significant....The attributes of
> each phoneme spill over into that which precedes and that which
> follows (pp. 65, 69).

Phonemic segmentation of a syllable into its phonemes was "strongly, directly, and causally related to decoding abilities...and to reading comprehension" (p. 70). However, only those who could "produce phonemes in isolation could benefit from training on phonemic blending" (p. 76). Both letter knowledge and phoneme discrimination were causally related to reading acquisition, and central consequences of phonic instruction. The ease and fluency, letter naming speed, the familiarity with letters, "the speed with which they can name individual letters was both a strong predictor of success for prereaders and a strong correlate of reading achievement among beginners" (p. 62).

Phonics Instruction

Adams (1990) referred to phonics as teaching correspondences between letters or groups of letters and their pronunciations. Adams stressed activities requiring children to attend to the individual letters of words, their sequence and sounds should be included in all beginning reading programs. The issues of effective phonics instruction were related to the child with little prior literacy and who had difficulty with the alphabetic principle, phonic rules, and phonological awareness. Letter and sound correspondences were found to be not one-to-one, but in the hundreds, and there has been no consensus as to the "best set of grapheme-phoneme pairs to teach explicitly to our students" (p. 345). The issue of whether to teach "short" vowel or "long" vowels first, and whether to teach phonemes or letter names cannot be resolved

due to the "exceptions to every rule" (p. 248). These abstract concepts or basic principles cannot be explained but must be illustrated in mapping single consonants to phonemes in short two- or three-letter words to establish the alphabetic principle. Adams stressed that phonemes are not discrete sounds but overlap in the acoustic stream. "Proficient word reading is a perceptual skill. It depends on over-learned and thus effortless visual recognition of letters, words, and frequent spelling patterns [p. 254],...and the direct linkage of these patterns in memory to the speech patterns and meaning to which they pertain" (p. 270). Adams emphasized that rules with many exceptions cannot substitute for direct familiarity with the letter patterns to which they apply. The best use of rules was not to memorize but to explain and apply in guided practice in the functions of sound-to-letter relationships and word recognition, which is the purpose of phonics.

Syllables were found to be the "smallest unit of speech that can be produced in isolation" (Adams, 1990, p. 300). Adams explained a psychologically real level of analysis sits between the syllable and the phoneme. The onset and rime of a syllable are separate but internally coherent psychological units. "While it is relatively easy to break the onset away from the rime, it is relatively difficult to break either the onset or the rime into its phonemic components" (p. 308). Adams emphasized "the associational architecture of our minds was set up precisely to cluster and sort our perceptions on this sort of distributional data" (p. 315). Adams stressed onsets and rimes to be a focus of explicit attention as a step in isolating and recognizing phonemes and for developing phonemic awareness. The simplest of the phoneme awareness tasks required only the ability "to compare and

contrast similarities and differences...in the sounds of syllables" (p. 77), such as "rhyming, alliteration, and nursery rhymes" (p. 79).

Adams (1990) cited Treiman's (1988) idea of a teaching approach whereby children were taught to divide spoken words into syllables, its onset and rime taught as units, separable from each other but integral in themselves. They were taught to analyze by comparing and contrasting the onsets and rimes, and to spell words that were organized around words with similarly spelled rimes in phonograms or word families. Treiman's research findings indicated a developmental progression from awareness of syllables alone to awareness of syllables, onsets, rimes, and single phonemes.

Bradley and Bryant (1991) supported Treiman's (1988) theory of the onset and rime approach to training phonological awareness. Their research findings indicated that phonological categorization was superior to semantic categorization and strongly attested to a causal relationship to success in reading and spelling. Gough and Walsh (1991) supported Treiman's idea that word recognition required two subskills, the sound-letter relationship, the ability to translate a string of letters into phonological form, and to decode with the rule mechanism as the basis along with knowledge of the language, form reading, listening ability, and intelligence in English.

Ehri and Wilce (1987) investigated whether learning to spell helped beginners learn to read words. The posttest performances of the spelling-trained students were superior in learning to read a set of words, in phonetic segmentation, and in spelling recognition skills. The results indicated that successes were because of the associations of letters in spelling, and of sounds in pronunciation, rather than in

sounding and blending, and the value of "linking spelling instruction to reading instruction when children begin learning to read" (p. 63). Adams explained that the process of writing, copying, and tracing letters assisted with children's ability to recognize the letter visually. Children usually named or sounded each letter as they printed it, which "should help bind the visual, motor, and phonological images of the letter together at once" (p. 355). "Research demonstrated that the process of copying new words significantly strengthened their visual perceptibility,...the writing of a word inherently forced attention to its full sequence of letters" (p. 397).

Cognitive abilities, "such basic logical and analytical tasks as classification, seriation, and conservation of quantity,...strongly predicted early reading achievement" (Adams, 1990, p. 57), and were strongly and casually related to both linguistic awareness and their concepts about print,...and to reading achievement" (p. 58). Adams stressed

> that some basic level of logical and analytical abilities made the processes involved in learning to read much easier,...and it was both wiser and more efficient to provide all beginning readers with a variety of language games and activities designed to develop their linguistic awareness directly (p. 58).

Tunmer, Herriman, and Nesdale (1988) examined the role of metalinguistic abilities in the initial stages of learning to read, which enabled one to reflect on and manipulate the structural features of spoken language, phonemes, words, syntax, and pragmatics, and concrete operational thought. Their major findings were that these abilities were significantly intercorrelated at the beginning and end of

first grade, and each was more strongly related to operativity
(seriation and classification tasks) than was verbal intelligence. The
results of this study indicated that

> phonological awareness was significantly related to aspects of
> general cognitive development, and...some minimal level of
> explicit phonological awareness was required to discover the
> alphabetic principle, and that slow development in this area may
> result in snowballing problems in reading and in other areas (p.
> 156).

Lack of segmentation skill was viewed as an "indication of a slower rate
of cognitive development, which can be partially overcome by intensive
training in phonological awareness" (p. 156). A strategy was suggested
that all children be provided with metalinguistic skills, in the use of
language games and activities to improve the effectiveness of reading
instruction.

Research on children at risk (Chall, Jacobe, & Baldwin, 1990)
indicated that in beginning reading, the direct teaching of phonological
aspects of language, how sounds related to words, resulted in better
reading and spelling. A factor analysis based on children's scores in
grades 2, 4, and 6 indicated that the strongest factor for all of the
reading, writing, and language measures was a literacy (reading/writing)
factor, with the strongest loadings from accuracy in word recognition
and decoding. The other three factors concerned with language and
writing had strong loadings from word meanings and vocabulary. Chall et
al. concluded from a synthesis of research on beginning reading methods
that "systematic and direct teaching of phonics in the early grades was
effective in general, and especially for those at risk—low income

children and those with learning disabilities" (p. 6). She emphasized two kinds of strengths that children need in order to avoid "the fourth grade slump, a sufficient knowledge of the meanings of more academic and abstract words, and a facility with advanced word recognition, spelling, and fluency" (p. 46). Chall et al. explained what students need in learning to read in primary grades through seventh grade:

> Correlational studies confirmed the results of research over seven decades that word recognition and phonics are of first importance for progress in early reading....Beyond the primary grades, word meanings and comprehension are more highly correlated (p. 49) Reading comprehension in the early grades correlates higher with word recognition and phonics than with word meanings....High correlations with early reading achievement have been found also for rhyming, sound discrimination, word segmentation, and auditory blending, all highly related to phonics and word recognition.... From fourth grade through high school, the research literature generally indicates higher and stronger correlations of reading with cognition and language than with word recognition and phonics....Through grades 6 and 7, accurate recognition, decoding, and fluency can make up for a lack of precise word knowledge....They use their cognitive abilities to guess from context....At 6th or 7th grade and beyond, skill in word meaning becomes increasingly crucial (p. 52).

Teaching LD Students

Johnson (1988) emphasized that LD children needed practice in analyzing language into its component parts, its graphemic, phonemic, morphemic, lexical, and word origins in small unit size, with

distributed practice for transfer. She noted the importance of "early training in rhyming, linguistic awareness, and auditory categorization" (p. 136). Johnson viewed spelling as a linguistic process abstracted from both oral and written language in use of the alphabet code, in awareness of the phonological and morphological structures of language, word origins, meanings, and pronunciation.

Torgesen (1990) studied academic tasks that focused on the reading, spelling, and language comprehension of LD children. LD children showed special difficulties in the rapid and accurate pronunciation of individual words. Torgesen explained that "the phonological coding deficits of [LD] children would have a particular impact during the early stages of learning to read, when words were likely to be processed as a series of separately encoded phonological elements" (p. 51). Another difficulty was in processing the phonological components of words in learning new spelling words. These LD groups performed as well as controls in "their ability to comprehend normal prose that was presented aurally" (p. 51). LD children also had difficulty "in remembering specific words used to convey meaning of passages,...[and] in following a series of directions in which the separate command segments were arbitrarily organized,...[but they did not show any] phonological coding deficits on comprehension of normally organized oral language" (p. 52). Torgesen suggested further study to help "identify circumstances or other abilities that might reduce the impact of phonological coding problems on the attainment of reading skills" (p. 53), which may be related to LD children's difficulty in the perception of speech sounds. Torgesen recommended an approach to teaching LD children that emphasized practice in recognizing words as

units, and practice sequences that used "speed of response as a criterion for lesson mastery,...as the best indicator that recognition of words as whole units had been achieved" (p. 54); and another approach that involved the "explicit instruction and practice in identifying the phonological structure of speech" (p. 54).

The direct instruction of morphology, in the use of frequently occurring affixes as cues for analyzing words, played a key role in morphological and vocabulary development in grades 4 and above (White, Power, & White, 1989). Support was found for the concept of morphologically based word families in that derivatives and inflections were grouped together and represented in a similar manner in the lexicon. The knowledge of morphology appeared to play a role in word recognition during normal reading (Nagy, Anderson, Schommer, Scott, & Stallman, 1989). Leong (1989) examined the productive knowledge of derivational morphology in 75 poor readers in grades 4, 5, and 6. Results of this study emphasized the need for explicit teaching of word knowledge and spelling based on morphemic structure and origin of words and their rules from elementary grades onward. "The need was greater for students with reading and spelling problems" (p. 115).

Johnson (1988) stressed that "perceptual-motor deficits cannot be overlooked for handwriting and other physical activities,...when studying the needs of the total population" (p. 87). Handwriting may deteriorate during complex writing tasks and "interfere with the ability to convey ideas to others" (p. 122). LD students have severe writing problems including "spelling, punctuation, capitalization, handwriting," and cognitive processes underlying effective writing, such as "content generation, text production, framing text, planning, and

revising" (Graham, Harris, MacArthur, & Schwartz, 1991, pp. 311, 312).
A procedural facilitator "think sheet" was described to direct student
actions during the writing processes of "planning, organizing
information, writing, editing, and revising" (p. 320). Graham et al.
emphasized the importance of "lower-level skills of getting language
onto paper. The failure to develop proficiency and fluency in such
skills can impede the writing of students" (p. 324). Text production
problems included rate of writing, handwriting, spelling, vocabulary,
and syntax. Graham et al. suggested that handwriting and spelling
should be taught during a separate period. Handwriting instruction
should include practice in tracing, copying, and writing letters and
words, saying word parts and words before or during copying, with
extended practice to develop writing fluency. "The 1,000 most common
words, supplemented by words that students misspell in their writing,
comprise the basic core of the spelling vocabulary program for LD
students" (p. 328). Effective word-study techniques included a focus on
the whole word, the use of word analysis and spelling patterns, writing
and sounding the word, as the students self-regulate and monitor their
own work in practice activities using games. Sentence production
activities included "arranging and rearranging word cards to form
sentences" (p. 330) and building complex sentences from simple ones.
Self-directed behavior was stressed with the process approach to
writing, including student journals, "integrating assigned topics with
self-selected topics to extend students' writing skills" (p. 314).

Assessment

Johnson (1988) stressed that more studies were needed that
included assessment of cognition, oral language, listening, speaking,

reading, decoding and comprehension, writing, handwriting, and spelling. Mercer (1987) referred to Curriculum Based Assessment (CBA) as the assessment of LD student progress in relation to the classroom curriculum for instruction to fit student needs. CBA included direct observation and analysis of the learning environment, student processes and products, and control of student tasks (Algozzine, 1991). Environmental variables included the content, concepts, organization, and sequencing of instruction with emphasis placed on the structure of the school day, the amount of time allocated, the student time on task, and the student attention engaged in activities. Product analysis included systematic examination of student performance and error patterns. Task analysis included "ways in which materials...and concepts were presented, and feedback strategies" (p. 46). Bursuck and Lessen (1987) defined CBA as "a method of measuring the level of achievement of a given student in terms of the expected curricular outcomes of the school" (p. 17). They described Curriculum Based Assessment and Instructional Design (C-BAID) as "a system of assessing LD students and their peers for cooperative decision making between regular and special educators" (p. 17). The assessment focused on academic and task-related skills needed in the regular classroom, employed direct observation and criterion referencing, and compared LD student performance with classroom peers.

Curriculum

Goodman (1989) defined whole language as a philosophy of curriculum, of learning, of teaching, and of language. Whole language unified and integrated oral and written language development with development of thinking and building knowledge. It redefined reading

and writing as processes for making sense out of and through written language, with the teacher as both a professional decision maker and the curriculum leader in the classroom; and with the learner as someone who is strong, active, and already launched on the road to literacy before school begins. The relationship between teacher and learner was one of supporting development rather than controlling it. Language is learned from the "whole generalized meaning to specific meanings of words and word parts, letters, sounds, phrases, and sentences learned in the context of whole real language" (p. 9). Goodman explained "integration is a key principle for language development and learning through language....Language development and context become a dual curriculum" (p. 3). The teacher evaluates both linguistic and cognitive development, speaking, listening, writing, and reading in the context of children's interests. It starts where learners are in language and knowledge and builds from there. Learning centers are "structured to facilitate the integration of the language processes with conceptual learning" (p. 32).

Chall (1990) explained that the whole language approach means different things to different people, on a continuum from reading instruction in whole books, and not teaching any skills (not even phonological skills), to reading instruction in whole books, along with basal readers and phonics. Promoters of the code emphasis agreed with whole language proponents that learning language was natural. The disagreement was that "learning to read and write was not natural and the alphabetic principle must be taught" (Liberman & Liberman, 1990, p. 51). Strickland (1990) believed the evidence supported "a whole language and integrated language arts approach with some direct instruction, in context, in spelling-to-sound correspondences" (p. 433). The

emergent literacy curriculum was described as the ongoing development of reading and writing in literacy activities that are meaningful from the child's point of view. Literacy is integrated in the development of language in listening, speaking, reading, and writing in oral language and print.

Pappas, Kiefer, and Levstik (1990) explained that emergent literacy has its roots in infancy in the cultural environment. Early literacy begins in the home when children have access to books, explore print on their own, and become aware of the purpose of written language within a natural literature environment of language use. An integrated language perspective builds on emergent literacy in reading and writing as "tools" for learning, for expanding what is already known in the schemas or concepts within the cognitive structure of the brain. Individual differences in children's literacy result from the manner and extent to which written language has been shared with them. "Instead of direct instruction, children learn written language by interacting with adults (or older children) in reading and writing situations" (p. 21). The readers and writers bring the meanings from their schemas or concepts, predict and guess what the writer meant, and structure their new knowledge or schema regarding what was read. The comprehension and meaning comes from the interaction "between the written words of the text and the reader" (p. 174). The integrated language perspective uses "oral and written language across the curriculum and the integration of the curricular areas...of social studies, science, mathematics, art, and music" (p. 228).

Short and Burke (1991) believed that learning is natural. "Learning is synonymous with life." Curriculum which supports and

enhances the nature of the learning process would contain "three characteristics of natural learners: curiosity, intentionality, and sociability" (pp. 10-11). Curiosity helps to build connections between ourselves and the world around us in eager, persistent, searching, seeking, exploring, and solving puzzles and mysteries in making sense of one's own personal world in testing the assumptions and hypotheses about the world with the purpose and intention of understanding, and in making connections between current and past experiences and expectations for the future. Social relationships allow people to gain others' experiences and understandings to enlarge and expand upon their own. Reflecting on the thinking of others and their intent leads to the ability to see beneath the surface and recognize similarities, concepts, and principles. Thinking and inquiring together assists awareness of others' intents, and supports one's own reflection in a consensus process "developing understanding into new knowledge" (p. 25). The authoring cycle curriculum shares perspective, life experiences, and meaning with others in discussion, reading, and writing. "Authoring, for the children and the teacher, was a metaphor for learning" (p. 53). Reading and writing were integrated into their subject area units and used as tools along with other communication systems for learning.

Smith (1985) stressed that reading to children helps them with understanding the functions of print, how it can be meaningful, useful, and satisfying and helps them become familiar with written language and reading with them helps them recognize words. "Children identified as poor readers are often deprived of opportunities to read...[and] the cure for dyslexia is to read" (pp. 132, 140). Smith did not "argue that there be no phonics, only that phonics has a widely unsuspected complex-

ity and that children should be expected to learn about phonics only to the extent that they can make sense of the instruction" (p. 137). Learning as a natural process does not need to be rewarded. "The final exquisite virtue of learning is that it provides its own reward.... Deprivation of learning opportunities is boring and failure to learn is frustrating" (pp. 90-91).

Effective Teaching

Anderson et al. (1985) explained that effective teachers create literate environments, and believe that all children can learn to read. "They schedule reading and writing activities as a priority, move through materials at an appropriate pace, stimulate and sustain children's attention, and arrange for high rates of success....[They] spark children's interest in meanings and origins of words....Children spend their time engaged in reading" (pp. 85-92).

Brophy (1992) summarized effective teaching research of the past 25 years to highlight the changing implications of research. Major conclusions were that teachers made a difference because of how they provide students with opportunity to learn academic content, how they maximize time on task, and how they actively instruct their students. Effective teachers emphasized mastery of the curriculum, established expectations of students, and defined their own teaching role. The time allocated to activities for mastery maximized student engagement on task with minimal time lost in getting organized and making transitions. The time was spent in student-teacher interaction and discourse. Teachers circulated during seatwork, monitored progress, and provided assistance. Students related what they learned to what they already knew in the

active construction of knowledge, beyond memorization, to understanding
as they "developed and integrated a network of associations linking new
input to preexisting knowledge and beliefs anchored in concrete
experiences" (p. 6), in conceptual change, and in the gradual increase
of self-regulated learning and autonomy.

Effective student behaviors were described as positive relations
with others and the absence of inattention, acting out, or withdrawn
behaviors (Vaughn, 1991). Student engagement depended on the momentum,
support, and expectations created by the classroom teacher, as well as
the pace and keeping instruction in between ease and difficulty (Adams,
1990).

<div align="center">Summary</div>

This review of the literature examined the current thinking on
teaching reading to beginning elementary school children, and what more
is needed in teaching reading to LD children.

Phonological processing deficits were found to be the major causes
of reading failure in the ages and populations studied, but orthographic
deficits also appeared in some cases. Both phonological and ortho-
graphic factors appeared to be interdependent during development, in
discriminating orthography during the development of spelling-pronunci-
ation correspondence knowledge. Across populations and ages it seemed
clear that word attack and word recognition skills, memory abilities,
and higher order language facility all contributed to individual
differences in reading fluency (Levy & Carr, 1990). Decoding and word
recognition based on the sound-letter relationship, knowledge of the
language, listening ability, and intelligence are believed to form
reading ability in English (Gough & Walsh, 1991). However, research

indicated that the cognitive development level of operativity or seriation and classification was more related to learning to read than verbal intelligence. Phonological awareness required to discover the alphabetic principle, and segmentation skill need to be trained with language games and activities to increase effectiveness of reading instruction (Tunmer et al., 1988).

Anderson et al. (1985) emphasized that reading requires the coordination of a number of sources of information in the process of constructing meaning from written tests. Children need to learn letters and their sounds, the different meanings of a word, how to read along in whole books, and the functions of reading and writing.

Chall et al. (1990) concluded from synthesis of research on beginning reading methods that systematic and direct teaching of phonics in the early grades was effective in general, and specifically for at risk and LD children. She emphasized avoiding the fourth grade slump with knowledge of word recognition and meanings, spelling, and fluency with more academic and abstract words. Further, at sixth or seventh grades or beyond, word meaning becomes increasingly crucial. "Comprehending information in textbooks is easier if students are instructed in strategies that cause them to focus their attention on relevant information, synthesize the information, and integrate it with what they already know" (Anderson et al., 1985, pp. 71-72).

Adams (1990) concluded that systematic phonic instruction resulted in comprehension skills comparable to, and word recognition and spelling skills significantly better than, those that did not. Adams stressed code instruction, meaning emphasis, language instruction, and connected reading resulted in superior reading achievement for low-readiness as

well as those better prepared children. However, successes and failures in the classroom depended on what a teacher did and how she/he did it. Excess phonics may be a burden to children and many children do not learn from phonemic drill. Phonemes are not discrete sounds but overlap in the acoustic stream. Abstract phonic concepts and basic principles cannot be explained but must be illustrated in mapping single consonants to phonemes in short two- or three-letter words to establish the alphabetic principle. Rules have many exceptions, and the best use of rules are not to memorize but to explain and apply in guided practice in the functions of sound-to-letter relationships and word recognition. Syllables were found to be the smallest unit of speech that can be produced in isolation, but a psychologically real level of analysis between the syllable and the phoneme is the onset and rime of the syllable. The use of the onset and rime as the best means for developing phonological awareness of syllables, single phonemes, sound-letter relationships, and word recognition was supported by Adams (1990), Treiman (1988), and Bradley and Bryant (1991). Anderson et al. (1985) stressed that phonic instruction should be completed by the end of the second grade, except in individual cases of diagnosed need.

Leaders in the field of education stressed the need for the prevention of reading failure and related learning disabilities. Torgesen (1990) concluded that children with reading disabilities may require more intensive instruction than other poor learners to master beginning reading skills, but they could comprehend a wider variety of materials than children with more generalized cognitive limitations. Gelzheiser and Clark (1991) reported that 83% of second-grade poor readers had difficulties with learning letter-sound correspondences, and

sixth grade poor readers still lacked phonetic word-attack skills. Mann's (1991) research indicated that poor readers were less able to use phonetic structure as a means of holding material in short-term memory. Their problems were with integrating the phonological information in letter sequences and with vowel sounds, in recalling a sequence of words, and the words in spoken sentences. Mann (1991) agreed with Adams (1990) Treiman (1988), Bradley and Bryant (1991), and Tunmer et al. (1988) on the use of word games and rhymes in phonics instruction to facilitate phonemic awareness.

Stanovich (1990) and Willows (1991) agreed that dyslexic and LD children have deficits in phonological processing, and difficulties with sound segments at the phoneme level, naming, the inefficient use of phonological codes in short-term memory, and the categorical perception of certain phonemes, all of which formed the basis of difficulty in learning the grapheme-to-phoneme correspondences. Stanovich and Willows stressed the growing evidence of dyslexics with severe problems in accessing the lexicon on a visual/orthographic basis with orthographic-core deficits. Willows (1990) explained that the early visual information processes of disabled readers were different from those of nondisabled normal readers, and appeared to be related to the perception, discrimination, and analysis of the visual features of letters and words, and to the speed of information processing. The deficit appeared to be at the level of initial visual perception rather than visual memory. Tallal (1988) found that language-impaired children had phonological processing problems in identifying, discriminating, and using auditory stimuli, and inabilities to discriminate and sequence rapidly presented nonverbal stimuli and remember them. However,

training in "nonlinguistic perceptual and motor skills; or teaching to modality preference are not supported by research for promoting success in learning to read" (Adams, 1990, p. 61).

Pennington's (1991) neuropsychological framework classified learning disorders in five cognitive functional domains which are phonological, spatial (visual), social executive, and long-term memory. The functional domains most vulnerable to developmental disorders were executive functions-organization, planning, set maintenance, selective attention, inhibition, and initiation of both cognitive and social behaviors; and the language system of phonological processing. The executive dysfunctions disrupt the organization and control of behavior. Swanson and Cooney (1991) explained working memory as the executive function and search processes that organize and retrieve information. LD children may be taught to organize information into common categories, rehearse the category names, orient their attention with objects and procedures, relate unknown to known in categories, and analyze items into smaller units. LD children were found to perform comparably to non-LD students when taught to organize information into semantic or related categories.

Felton and Wood (1990) found that children with ADD had problems in sustained attention, rote verbal learning, and memory, while children with reading disability had problems with selective attention, word retrieval and rapid naming, as well as tasks that provided visual cues. Both reading disabled and ADD children showed task or situation specific attention problems due to stress from other dysfunctions. Conte (1991) emphasized the importance of pace in presenting materials to children with ADD plus hyperactivity. Excessive arousal may lead to anxiety and

disorganization, but low arousal in slow presentations may result in less efficient learning.

Wong (1991) explained metacognition as knowledge about cognition and regulation of cognition to direct, guide, and govern successful learning, efficient reading, and effective studying. Dyslexic and LD children can be trained to categorize and to use mnemonic strategies to improve impaired recall. Children's cognitive problems and difficulties in learning to read cause problems in motivation and self-esteem, and their metacognitive problems result from deficient reading experiences and motivation. Schunk (1990) viewed the relationships between self-efficacy and motivation as reciprocal interactions among behaviors, environmental variables, and cognitions. He stressed the importance of positive feedback from teachers on students' achievement which motivates them to persist on task. Bryan (1991) found children's self-perceptions to be influenced by teacher evaluative feedback. Their problems in attention, memory, language, and visual perception may affect their social cognitive development. LD children's experiences with success, along with positive teacher feedback on effort shaped their beliefs in their own ability and enhanced their acquisition of content. Bryan (1991) defined social competence as classroom behaviors which were appropriate peer-interaction skills, and coping with the demands of the classroom, being on-task, completing work, and gaining attention appropriately. Differences between LD and non-LD children were not found with the usage of appropriate pace and complexity of materials, and control of students' attention. McKinney (1990) suggested that attentional and conduct disorders were linked developmentally. Low task orientation and low independence were associated with low academic

productivity in the classroom that was exacerbated by social/emotional sequelae that develop subsequently.

Bos and Vaughn (1988) explained that LD students may have an automation failure, process information slowly, and use more effort to sustain attention on a task. They recommended an interactive teaching and active learning environment, modified to facilitate student attention and perception to critical differences in stimuli, to teach strategies that keep information active in working memory, that facilitate storage and organization in long-term memory; and to teach the executive functions that coordinate learning and memory strategies.

Adams (1990) and Chall et al. (1990) emphasized the systematic and direct instruction of phonics and word recognition in the most effective and efficient way, in a sequenced coverage of individual elements and their interrelations, and a continuous evaluation of students' levels of mastery. Carnine, et al. (1990) explained direct instruction theory that structured an efficient and humane learning environment which enhanced the student's self-concept, and maximized learning in a minimal amount of time. Direct instruction focused on engaged time-on-task in activities that were neither too difficult nor too easy, at each student's ability or skill level. Materials were arranged for student access, guided practice with help when needed, fast pacing without rushing, and positive teacher feedback with success and praise for motivation in individualized small group instruction.

Torgesen (1990) focused on the reading, spelling, and language comprehension of LD children. He recommended an approach to teach LD children that emphasized practice in recognizing words as units, and practice with sequences that used speed of response to indicate the

recognition of words as whole units. Johnson (1988) emphasized that LD children need practice in analyzing language into its component parts, it graphemic, phonemic, morphemic, lexical, and word origins in small unit size with distributed practice for transfer, early training in rhyming, linguistic awareness, and auditory categorization, meanings, and pronunciation. Leong (1989) Nagy et al. (1989), and White et al. (1989) supported the direct instruction of morphology for analyzing words, vocabulary development, and spelling, especially for students with reading and spelling problems from elementary grades onward.

Johnson (1988) noted that handwriting may deteriorate during complex writing tasks and interfere with getting ideas onto paper. Graham et al. (1991) explained that LD students may have severe writing problems that include spelling, punctuation, capitalization, handwriting, and cognitive processes in content generation, text production framing text, planning, and revising. They suggested handwriting instruction that included practice in tracing, copying, and writing letters and words, saying word parts and words before or during copying, along with practice to develop writing fluency, and the use of word card games that focus on the whole word, word analysis, spelling patterns, writing and sounding words, and sentence production in arranging word cards to form sentences.

Johnson (1988) stressed the need for assessment of cognition, oral language, listening, speaking, reading, decoding and comprehension, writing, handwriting, and spelling. Mercer (1987) supported curriculum-based assessment of LD student progress in relation to the classroom curriculum for instruction to fit student needs. Algozzine (1990) supported direct observation and analysis of the learning environment,

student processes and products, and control of student tasks. Bursuck and Lessen (1987) focused on the assessment of academic and task-related skills needed in the regular classroom with direct observation and criterion referencing that compared LD student performance with classroom peers.

Anderson et al. (1985) explained that all the language arts are interrelated and mutually supportive. Writing activities show the relationship between oral and written languages, and assist growth in phonics, spelling, vocabulary, and reading comprehension.

Strickland and Cullinan (1990) supported a whole language and integrated language arts approach with direct instruction, in context, in spelling-to-sound correspondences. They described the emergent literacy curriculum as the ongoing development of reading and writing in literacy activities of oral language, listening, speaking, reading, and writing.

Goodman (1986) explained that children discover the "alphabet principle; the relationships between letter patterns and sound patterns when they learn to write" (p. 37). Whole language teachers keep phonics in the context of "real" reading and writing. Smith (1985) stressed phonics instruction in a context that makes sense to children. Pappas et al. (1990) agreed that "letters have some relationship to speech sounds" (p. 22).

Effective teachers create literate environments, and believe all children can learn to read; reading and writing activities are a priority and arrange for high success rates. Brophy (1992) summarized effective teaching research that included both direct instruction and interactive teaching in the mastery of the curriculum. Adams (1990)

explained that student engagement depended on the momentum, support, and
expectations created by the classroom teacher, appropriate pace, and
difficulty of instruction. Effective student behaviors were described
by Vaughn and Bos (1991) as positive relations with others, and the
absence of inattention, acting out, or withdrawn behaviors.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

The purpose of this dissertation study was to examine how PIRK
fits into the literature on teaching reading to LD students, to evaluate
the PIRK reading program as it was being used with elementary learning-
disabled (LD) students, and to examine its effects on academic-related
classroom behaviors, and on reading achievement, word recognition and
comprehension, writing, spelling, and listening. The PIRK reading
program components were identified in relation to Wong's (1988) proposed
instructional model: knowledge, cognitive processes, and motivation to
learn. The knowledge component consisted of facts and concepts,
procedural knowledge, and metacognitive knowledge. The cognitive
processes component spanned attending, rehearsing, chunking, and
monitoring. The motivation component was the use of intrinsic
motivation in enjoyment and control of the task, expectancy for success,
and the effort needed for mastery. Program evaluations have been used
to "analyze and describe the significant characteristics of an
educational program" (Borg & Gall, 1983, p. 743).

Research Design Rationale

An evaluative study was designed to gather information about the
PIRK reading program. This study examined the PIRK components by
reviewing the current literature on theory, research, and practice in
teaching reading to LD students. An evaluative study examined the

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effects of PIRK used with ID students for insights, in-depth
understanding, and for "data rich with descriptions of the interactions
among learner, task, and context variables" (Vaughn et al., 1987, p.
262). "A clear description of the characteristics of the subject and
the intervention can lead to a generalization that the intervention will
work on another person with the same characteristics" (Kirk, 1987, p.
179). Description of information about the context may facilitate
judgments about the extent of transfer of outcomes to a similar context.
The "overlap of methods...usually advocated in support of validity, also
undergirds claims of reliability to the extent that they produce
complementary results" (Guba & Lincoln, 1983, p. 328). A posttest-only
control-group design with matching, based on age, was used to compare
the scores of students using PIRK with students not using PIRK.
Matching is used with small samples and when large differences between
treatment and control groups on the dependent variable are unlikely
(Borg & Gall, 1983).

The evaluation has as its purpose to improve, to "make programs
work better for the people they are intended to serve" (Stufflebeam,
1987, p. 118). The Context, Input, Process, Product (CIPP) approach to
evaluation was used. Context evaluation identified strengths and weak-
nesses in the PIRK reading program so as to target needed changes.
Interview questions elicited users' perceptions of PIRK's strengths and
weaknesses. Initial achievement scores provided for student growth
patterns. Diagnostic test scores indicated present performance. The
research findings were reported to the two Texas school districts. In-
put from the literature, teachers' perceptions, and students' scores
assisted with evaluation and overall improvement. Process evaluation

provided information about PIRK's implementation and what was intended.
Product evaluation measured, analyzed, and interpreted the effects of
PIRK and whether the needs of the users were met. This evaluative study
was "periodically reviewed, revised, expanded, and operationalized" (p. 137).

Overview of the Research

The following activities provided the information needed to answer
the research questions, and explained how the research was conducted.

1.   The literature in the fields of learning disabilities and reading
      was searched. Books and periodicals were examined for current
      thinking on teaching reading to all children, and on the specific
      needs of LD children in learning to read.

2.   The literature review focused on current theory, research, and
      practice related to the identified PIRK components, and the issues
      and principles of teaching reading to LD students.

3.   Numerous districts using PIRK were contacted to discuss
      participating in this study. The criteria for selecting the two
      districts were that the district using PIRK and the control
      district not using PIRK be similar in size, location,
      socioeconomic status and culture, and that both used the
      ability/achievement discrepancy formula for identifying LD
      students. A limitation was that the two districts used two
      different ability/achievement discrepancy formulas. The criteria
      for selecting the district using PIRK were that there be an
      adequate number of LD students, and that their teachers used PIRK.

4. The two districts selected for this study met the criteria. One district had used PIRK since 1986. The other district volunteered as a control because of interest in using PIRK.

5. Administrators, teachers, and parents were informed by letters (see Appendix A) of the value and purpose of the intended research with assurance that confidentiality and high ethical standards would be maintained. Permission was provided to conduct the research.

6. A pretest-posttest control group design with matching was initially designed, but later changed to a posttest-only control group design with matching by age in order to investigate the effects of PIRK on the reading scores of LD students. The design was changed because the control groups were not given the pretest. The Pro-ed Diagnostic Achievement Battery (DAB) (Newcomer, 1984) was selected to assess reading, word knowledge and comprehension, listening, speaking, written vocabulary, and spelling of LD students in both the PIRK groups and the control groups in elementary resource rooms.

7. The four LD teachers who had used PIRK consistently as a major part of their language arts program in primary and intermediate resource rooms were selected by the administrators to participate in the PIRK study. These four teachers were invited and accepted the invitation to participate. Three LD teachers not using PIRK were selected by the administrators in the control district. The three teachers were invited and accepted the invitation to participate in this study in primary and intermediate resource rooms.

8. Twenty-three students were selected by the administrators in the district using PIRK to participate in this study. The criteria for selection were that the students used PIRK as the major part of their language arts programs, and had used PIRK for at least 1 year. Six of the 23 students did not meet the criteria for LD classification, and were removed from the sample. Three LD students moved from the district leaving a total of 14 LD students in the PIRK sample. There were seven primary and seven intermediate LD students in four resource rooms using PIRK. The 23 students in the original PIRK group were matched by age with 21 LD students from primary and intermediate resource rooms in the control district not using PIRK. Eight control students were removed from the sample who had been matched to eight of the nine students who were removed from the PIRK sample.

9. The questionnaires and interview questions were based on the review of the literature on research, theory, and practice in teaching reading to LD students. Two sets of interview questions were constructed. One set provided information about the two participating districts' population and each district's criteria for identifying LD students. The other set collected from the PIRK group each teacher's thoughts and feelings about using PIRK, such as its effectiveness, student interest, attention and on-task behavior, and also whether PIRK was cost-effective. The questionnaire showed information in both districts about teachers' language arts programs, time allocated and spent on activities, specific methods in teaching reading, phonics and word

recognition, spelling, writing, speaking, and listening both with PIRK and without PIRK (see Appendix A).

10. The questionnaire and interview questions were constructed based on the review of the literature for the dissertation proposal. The questions were related to time on task and student attention, interest, and hyperactivity when using PIRK and not using PIRK. The questionnaires and interview questions were reviewed by the district's administrators and teachers using PIRK to gain their input about clarity of the questions. Further research on teaching reading in the early grades indicated a need for more specific questions about the teaching of phonics and language arts. The questions were then revised and expanded, reviewed by the administrators in the two participating districts, and accepted.

11. Administrators answered interview questions about district and population characteristics, and the criteria used for identifying LD students.

12. Teachers completed the questionnaires and answered the interview questions.

13. Student growth in reading and language arts in both the PIRK groups and in the control groups was assessed by the teachers and administrators in the natural setting. They used the Pro-ed DAB, scored the tests, and provided the test data for analysis.

14. Questionnaires and interviews, the DAB posttest scores, and reading achievement scores from student records were collected from the PIRK groups and from the control groups. DAB pretests were collected from the groups using PIRK. The control district

did not do DAB pretests. Both districts provided initial reading test scores to be used as a baseline in growth charts.

15. The collected data were analyzed, compared, and interpreted. The data on the questionnaires were sorted by categories of research questions. The categories included a meaning or code emphasis, time allocated, and time spent in language arts activities; methods used in teaching phonics and word recognition, connected reading, listening, speaking, writing, and spelling; criterion testing, student interest, attending, and on-task classroom behaviors with PIRK and without PIRK. The data from the interview questions were sorted into categories of teacher and student enjoyment in using PIRK, and whether PIRK was cost-effective.

16. The Pro-ed DAB posttest scores of the PIRK and the control groups were analyzed and compared on measures of achievement in reading, writing, word knowledge, and reading comprehension, spelling, and listening. Comparisons were made between the primary and intermediate groups using PIRK, and between the PIRK groups and the control groups not using PIRK. The groups were compared using the DAB posttest raw scores and percentiles. Students using PIRK were compared with age-matched controls. The groups were described with group means and percentiles.

17. A report of this research was provided to the administrators and the teachers in the control district and in the district using PIRK. An interview was conducted with administrators for feedback on the report. Suggestions were made for the improvement and implementation of PIRK.

18.   PIRK was evaluated using the research questions and answers, and
      the standards of evaluation: utility, feasibility, propriety,
      accuracy, and need for improvement.

Methodology

This evaluative study included both qualitative and quantitative
research methodologies. The qualitative data included questionnaires
and interview questions (see Appendix B). The interview questions
provided information about the two districts' size, socioeconomic status
(SES), culture, location, and criteria and procedure for identifying
dyslexic and LD students, and also provided teachers' feelings about
using PIRK, their perceptions of its effects on student classroom
behaviors, and whether PIRK was cost-effective. Questionnaires provided
information about teachers' reading and language arts programs and the
methods used in teaching phonics and word recognition.

The PIRK components were identified and examined by reviewing
current theory, research, and practice of teaching reading to all
students, and what more is needed in teaching reading to LD students.
The identified PIRK components were knowledge-facts and concepts,
procedure, metacognitive, cognitive processes, and motivation.

The quantitative part of the methodology was a posttest-only
control group design with matching. The control district was unable to
match by reading scores due to differences between the tests in use.
Both the PIRK and the control groups were in resource room placement.
The PIRK groups were formed based on students using PIRK as a major part
of their language arts program. The Pro-ed DAB measures of achievement
in listening, speaking, reading, writing, and spelling were used to

examine the effects of PIRK when used with primary and intermediate LD
students in resource rooms.

This evaluative study examined the outcomes of using PIRK for the
development of word recognition as a support for comprehension, and then
compared the test results with control groups not using PIRK. A
posttest-only control group design with matching provided data for
comparing the scores of the PIRK groups with that of the control groups
in the two districts.

The sample consisted of a total of 27 LD students. There were 14
students in the PIRK groups, 7 were primary and 7 were intermediate.
There were 13 students in the control groups, 6 were primary and 7 were
intermediate. The age range was 7 to 13 years.

The PIRK Reading Program

PIRK was developed interactively with LD students who had not
learned to read in the primary grades. The purpose of its development
was to assist students in the recognition of words as a support for
comprehension. PIRK was described in Chapter One and its components are
examined in Chapter Four. The author of PIRK provided workshops for
teachers and administrators in the use of PIRK. The workshops were 1 to
3 hours long. One hour was required for a general orientation to PIRK,
and 2 to 3 hours of the workshop were required for an in-depth
orientation to PIRK, hands-on experience with the PIRK materials and
procedures, theoretical foundations, a description and analysis of the
research data, and answers to teachers' and administrators' questions.
The 1-hour orientation workshop consisted of an introduction to PIRK,
its purpose and use, and the kinds of results that can be expected with

the different types of students using PIRK. The PIRK procedure and
organization, the testing and placement, the criterion testing, and the
standardized test results were interwoven in a hands-on experience with
the PIRK materials. The 2- to 3-hour workshop extended the 1-hour
workshop to include a more in-depth orientation to the theoretical
foundations and the research data. A short break allowed teachers to
interact and discuss their perceptions and interpretations of PIRK and
its use. The teachers then formed groups based on similar type of
class, students, and language arts program in use. The hands-on
experience with PIRK procedure and materials was focused on the needs of
the group, and the needs of individual teachers and their students. The
needs were addressed by group discussions and questions answered.

The Control Reading Program

The control district resource rooms used the tutorial approach to
individualized instruction with content mastery of the regular
curriculum along with whole language strategies, phonic drill, and basal
readers. Each student progressed through the curriculum at his/her own
individual pace and achievement level in primary and intermediate
resource rooms.

Participants

Numerous districts in Texas implemented PIRK in the 1980s in their
learning disability resource rooms and classrooms. Two districts
volunteered to participate in this study. The district using PIRK had
implemented the revised PIRK in 1986, and the primary PIRK in 1989. The
other district had implemented PIRK in a middle school and volunteered

the primary and intermediate resource rooms to serve as the controls. The two districts were similar in location, culture, SES, and size. The district using PIRK had an elementary school population of 2,034, and the LD population was 247 or 12% of the total. The control district had an elementary school population of 2,050, and the LD population was 165 or 8% of the total. In the district using PIRK, four LD teachers who used PIRK as the major part of their language arts program accepted the invitation to participate in this study. In the control district, three of the six LD teachers in resource rooms accepted the invitation to participate as controls.

Both the district using PIRK and the control district used the ability/achievement discrepancy criteria for identifying LD students. The district using PIRK used a criteria for LD students of the WISC-R performance score 16 points higher than the vocabulary score, and reading achievement was more than two grades below agemates. The control district's criteria for LD students were that the Kaufman Assessment Battery for Children (KAB-C) (Kaufman & Kaufman, 1983) score must be one standard deviation below the WISC-R score, and the KAB-C reading score must be 18 months below agemates.

Procedures

The most critical aspect of the whole research process was the sampling procedure so that assumptions can be made that the sample is representative of the population from which it was drawn on those variables relevant to the research. Generalizing to the whole larger LD population was based on the description of the samples (Borg & Gall, 1983).

In the district using PIRK, four teachers who had used PIRK as a major part of their reading and language arts program were invited and accepted the invitation to participate in this study. The 23 students who were selected from the four teachers' resource rooms had used PIRK as the major part of their reading and language arts program for at least 1 year. The 23 students using PIRK were matched by chronological age with LD students not using PIRK in the control district. Age and standard scores, or percentiles, provide a better frame of reference than grade level for interpreting research results with LD children (Johnson, 1988). However, the control district was able to match the control students by age only.

The Sample

This evaluative study included four teachers from primary and intermediate resource rooms in the district using PIRK, and three teachers in primary and intermediate resource rooms not using PIRK in the control district. The administrators in the district using PIRK selected four teachers because they had used PIRK consistently as a major part of their language arts program. The teachers were invited and accepted the invitation to participate in the PIRK study. The principals selected 23 students from the four participating teachers' resource rooms. The criteria for the selection was that each of the students must be in the PIRK program for at least 1 year. The 23 students who had used PIRK for at least 1 year as a major part of their language arts program were selected from the four participating teachers' resource rooms.

The PIRK groups. There were 23 students who used PIRK as a major part of their language arts program. Three LD students moved, and six

of the 23 students were not classified as LD and were removed from the sample. This left a total of 14 students, nine boys and five girls, seven primary and seven intermediate. In one resource room only, PIRK was used with all of the students, and the other language arts were taught by the regular classroom teacher. In two of the other three resource rooms, the LD student used PIRK along with the other language arts, and in one resource room, the participating student was tutored in content mastery of the curriculum and used PIRK in the regular classroom.

The control groups. The control group was formed by matching by age 21 LD students to 21 of the 23 students in the PIRK group. Seven students were removed from the control groups who had been matched with the nine students who were removed from the PIRK group. This left a total of 13 LD students. There were five boys and eight girls, six primary and seven intermediate students (see Table 1).

Table 1

Sample Groups (Experimental and Controls), and Subgroups (Primary and Intermediate, Boys and Girls)

	Groups		
Subgroups	Experimental	Controls	Total
Level			
Primary	7	6	13
Intermediate	7	7	14
Sex			
Boys	9	5	14
Girls	5	8	13

Teacher B had a larger number of students in the sample than the other three teachers because all of her students were selected to participate in this study. She used PIRK only as a major part of the student's language arts program (see Table 2).

Table 2

Participants by Groups and Teachers

| | Groups | | |
Teachers	Experimental	Controls	Total
Teacher A	1	-	1
Teacher B	10	-	10
Teacher C	1	-	1
Teacher D	2	-	2
Teacher E	-	5	5
Teacher F	-	6	6
Teacher G	-	2	2
Totals	14	13	27

Instrumentation

This evaluation study included both qualitative and quantitative information. Qualitative information was provided by using questionnaires and interview questions. The questionnaires provided information about how PIRK fits into different teachers' language arts programs for LD students. The questions were based on research related to effective teaching and the amount and type of phonics needed for the most efficient and effective development of word recognition as a support for comprehension. The interview questions gave information

about teachers' thoughts and feelings about using PIRK, and their perceptions of PIRK's effectiveness. Quantitative information was provided from the Pro-ed DAB (Newcomer, 1984) in reading, writing, spelling, listening, speaking, and vocabulary. Questionnaires provided information on the reading and language arts program used by each teacher in the PIRK groups and in the control groups. The areas spanned code or meaning emphasis in the instruction of reading, phonics and word recognition, listening, speaking, vocabulary, writing and spelling, effective teaching, student interest, attention, and time on task. The interview questions allowed for teachers to express their thoughts and feelings about PIRK, and to express their perceptions of what was needed for improvement. Questionnaire and interview questions were piloted with teachers and administrators in the distrist using PIRK, and revised and accepted by the two districts.

The Pro-ed DAB was being used in the district using PIRK. The control district was interested in using DAB and agreed to use it in this study. The initial reading scores from standardized reading tests provided by both the district using PIRK and the control district were used as a baseline in reading growth profiles and comparisons between groups. The SRA Survey of Basic Skills (SRA-SBS) provided the initial scores for the control groups. The Pro-ed DAB and the Woodcock-Johnson Test of Achievement (Woodcock & Bonner-Johnson, 1989, 1990) provided the initial scores for the PIRK groups.

Achievement Testing

The Pro-ed DAB (Newcomer, 1984) was designed specifically for use with LD students to determine growth in reading, spoken language and written language, and standardized with national norms of percentiles

and standard scores. The DAB was used to assess achievement in listening, speaking, reading, writing, and spelling; and composites of spoken and written language.

DAB examined achievement in areas delineated in P.L. 94-142 in one or more of the following areas: basic reading skills, listening comprehension, reading comprehension, verbal expression, written expression, and mathematics calculation and reasoning. The diagnosis of a learning disability required assessment in each of these areas. A diagnostic test was required to pinpoint children's specific weaknesses and reveal areas where remedial instruction was needed.

DAB was developed because of a need for an individual achievement test for use with LD students. The DAB was designed to overcome the problems that LD students have with group tests in the reading of instructions and of test content. The problems of group tests were that the examiner cannot determine whether the child's difficulties were caused by deficits in the content being measured or from an inability to read. And further, DAB overcame the problems of group tests that do not: (a) involve expressive spoken language, or the ability to recall as well as recognize information; or (b) take into account confusions with directions and poor test-taking skills, the motivation of the LD child, or the child's anxiety about taking the test.

The purposes of DAB were: (1) to identify learning disability students who may profit from supplemental or remedial help; (b) to diagnose the component strengths and weaknesses that individual students possess; (c) to evaluate students' progress in specific areas related to intervention programs, and to determine if the program should be modi-

fied; and (d) to serve as an instrument for measurement in research studies with elementary LD children.

The DAB test model was developed to reflect the following principles, constructs, and components. Principles were reflected in: (a) a review of commonly used curricula and teaching programs, the scope and sequence of skills in specific academic areas, and word lists which were analyzed for vocabulary level for listening and reading subtests; (b) a measure of 12 aspects of academic skills through varied formats with tasks that tap the abilities most representative of the major constructs underlying the test; and (c) an item analysis to determine which items to retain and include in the subtests. The items were designed to reflect achievement areas delineated by P.L. 94-142. A construct refers to the attributes of concepts being measured, spoken language, written language, and mathematics. The five major components described in the DAB manual included listening and speaking under spoken language, reading and writing under written language, and mathematics.

The statistical procedures used in the construction of the test included item analysis, standardization procedures, normative information, reliability, and validity. The item analysis procedure gleaned the most useful subtest items from about twice the number of items actually needed and was given to a sample of 220 children aged 6 to 14 years. Each item was analyzed with respect to its discrimination power and difficulty, or the percentage of children who pass each item. The items became less difficult as the children increase in age.

The standardization procedures included the demographic characteristics of the sample which were 1,534 children in 13 states, relative to sex, place of residence, race, geographic distribution, and

occupation of parents; and normative information standard scores and percentiles. Percentiles were used for explaining test findings. The standard scores for subtests were derived from a cumulative frequency distribution of raw scores at each age interval with a mean of 10, and a standard deviation of 3, and these were compared across the age intervals. The standard scores for the DAB components and constructs were determined by adding the standard scores for the subtests. The standard score distribution was assigned a mean of 100, and a standard deviation of 15. Grade and age equivalents were not included.

The DAB was reliable (r = .92-.99), valid (age, r = .65-.85; grade, r = .65-.84), and nationally standardized with norms on LD and non-LD children. The degree of reliability indicated the level of confidence that one may have in the test results, and reflected what was real and what was not real due to chance. The reliability was an estimate of the amount of error variance of its scores related to content sampling, time sampling, and difference between scores. The content or internal consistency coefficients for the DAB subtests and for the composite scores exceeded .80, except at the 13-year level, and the subtest characteristics. The time sampling included two testings compared for correlation and determined the similarity between the test results for stability or constancy over time (Newcomb & Curtis, 1984).

The degree of validity described the extent that DAB measured what it presumed to measure. The DAB included three types of validity-construct, criterion-related, and content which were described above. Criterion-related validity was studied by correlating the DAB subtests scores with other well-known tests which included correlating: (a) Listening with the Durrell Analysis of Reading Difficulty, (b)

Characteristics with Test of Language Development (TOLD), (c) Synonyms with the Oral Vocabulary Subtest and Grammatic Completion with the Grammatic Completion Subtest, Test of Language Development-Primary (TOLD-P), (d) Reading Comprehension with the Passage Comprehension Subtest on the Woodcock Reading Mastery Test, (e) Alphabet/Word Knowledge with Word Recognition Subtest on the Wide Range Achievement Test (WRAT), (f) Spelling and Vocabulary with the Spelling and Vocabulary Subtests, and (g) Punctuation and Capitalization Subtests with the Style Subtest on the Test of Written Language (TOWL).

The construct validity was related to the degree that the underlying traits were identified and the extent to which they reflect the theoretical model on which it was based. Four basic constructs appeared to underlie and were correlated with the DAB; these included relationships to chronological age and school experience, subtest inter-correlations—the measure of similar constructs, relationship to intelligence—DAB was correlated with the Slosson Intelligence Test or the Otis-Lennon Quick Score Test, and group differentiation—between normal learning and impaired learning. The results appeared to support the DAB measures as measures of learned information and evidence of the test's construct validity.

The DAB provided a composite of scores in a profile of listening, speaking, reading, and writing with subtests in story comprehension, meaning, synonyms, grammatic completion-morphology, alphabet/word knowledge-phonics and word recognition, reading comprehension, capitalization and punctuation, and spelling and vocabulary.

Listening. Subtest 1: Story Comprehension. The examiner read aloud brief stories and asked the student to answer questions about the

stories. Subtest 2: Characteristics. The examiner required students to listen to a brief statement and to answer whether the statement was true or false. The student interpreted each sentence by applying relational-meaning theory, the knowledge of the characteristics of objects or events, and the cognitive categories to which they belong.

Speaking. Subtest 3: Synonyms. The examiner said a word and the child supplied a word that has the same meaning and required both receptive and expressive abilities, but was primarily expressive semantic skills. The student must understand the meaning conveyed by the word and have the ability to produce a different word similar in meaning. Subtest 4: Grammatic Completion. The examiner read unfinished sentences and the student supplied the missing morphological form. The examiner also measured the ability to understand the use certain common morphological forms in English. The items required knowledge of possessives, plurals, verb tenses, comparative and superlative adjectives, and measured syntactical aspects of spoken language.

Reading. Subtest 5: Alphabet/Word Knowledge. Students identified letters and words that were different from another similar in appearance, pointed to letters presented by the examiner, named letters and recognized words beginning and ending with specific speech sounds, and said aloud written words that increased in difficulty. Alphabet/word knowledge measured letter and phonics knowledge, and word recognition. Subtest 6: Reading Comprehension (RC) required the student to read short stories silently and to answer a series of questions about them.

Writing. Subtest 7: Capitalization and Punctuation. The examiner gave the student a paragraph with a variety of errors in capitalization

and punctuation, and the student must correct the errors by inserting the correct capitals and punctuation marks. Subtest 8: Spelling. The examiner dictated 20 words as the student wrote and spelled each word. Subtest 11: Written Vocabulary. The examiner gave the student three pictures to examine that represented a modified version of a classic fable and wrote a story based on the pictures that have a beginning, middle, and ending.

The DAB provided two profiles of composite scores: (a) the ten subtest scores were raw scores, percentiles, and standard scores; and (b) the subtest standard scores, their sums and quotients; composites of subtest standard scores in the major categories of listening, speaking, reading and writing, and spoken and written language.

Initial Reading Tests

The tests used for identifying LD students provided initial reading scores. The Pro-ed DAB and the Woodcock Johnson Revised Test of Achievement (WJ-R) provided the initial scores for the primary and the intermediate students in the district using PIRK. The SRA Survey of Basic Skills (SBS) provided the initial scores for the students in the control district. Standard scores and percentiles were provided by all three tests.

The SRA-SBS (Science Research Associates, 1984, 1985, 1987) was a norm-referenced, standardized test with criterion-referenced features. It described students' performances on a test with raw scores, percentiles, stanines, grade equivalents, and normal curve equivalents (NCE). The NCEs are represented on a scale from 1 through 99 and are based on an equal interval scale so that the difference between two successive scores on the scale has the same meaning throughout the

scale. A growth scale values (GSV) chart for tracing students' educational growth was provided with five curves depicting the national norm group and four levels of standard deviations, two above and two below the mean. Students' NCEs on different tests can be directly compared, and the NCEs on different groups of students on the same test can also be compared by averaging the scores for the groups. The SRA-SBS was designed to survey students' general academic achievements in basic curriculum areas of reading, language arts, and mathematics for grades K-12 on grade levels and on functional levels.

The Woodcock-Johnson Test of Achievement (WJ-R) was reliable and valid. The internal consistency reliability coefficients were in the mid .90s for the clusters and in the high .80s to low .90s for the individual tests. Concurrent validity studies showed correlations in the .60 to .70 range when the WJ-R was compared to other tests of achievement. The new norms were obtained with over 6,300 subjects reflecting today's population. Alternate forms facilitated pre/posttesting. The WJ-R measured basic reading skills and reading comprehension and basic writing skills, written expression, punctuation, spelling, usage, and handwriting measures. It examined basic skills and the application of those skills. The standard battery of nine tests provided achievement scores in reading, written language and knowledge, and samples of written expression.

Data Analysis

The quantitative data were analyzed with descriptive and inferential statistics. The qualitative analysis focused on the first two research questions: Question 1. How does PIRK fit into current

literature on teaching reading to LD students?, and Question 2. What are teachers' perceptions of PIRK's effects on student behaviors during PIRK activities and other reading and language arts activities?

The PIRK groups were matched with the control groups by age in resource room placement. The teacher questionnaires and interview questions from the PIRK groups were compared with those of control groups by the language arts program, the teaching strategies used, the time allocated and spent on each activity, whether a meaning or code emphasis, and teachers' perceptions of student interest, attending, and academic-related classroom behaviors.

Qualitative Data Analysis

Questionnaires from the two PIRK groups were examined and compared with the two control groups from PIRK groups, and interview questions in primary and intermediate resource rooms. Items on the questionnaire (see Appendix A) included: (a) a code or meaning emphasis; (b) the time allocated for language arts instruction, and the time spent in each activity in reading-connected text and in phonics, handwriting, spelling, and writing and listening to stories; (c) the strategies used in relation to the needs of the LD students; and (d) students' classroom behaviors of interest, attention, success and mastery, persistence on-task, self-monitoring, and ability to function in small groups with teacher and peers. The telephone interview questions (see Appendix B) provided information from both districts about criteria for identifying LD students and subtypes, the total district population, the total LD population, and the procedure used in selecting the sample. The teacher interview questions provided information related to teachers' thoughts

and feelings about using PIRK, what they liked and disliked about PIRK, areas of strength and weakness, and whether PIRK was cost-effective.

Tables were constructed to illustrate research questions 1 and 2. Tables 3 to 7 showed where PIRK fits in the current literature, and the major concepts organized in Wong's (1988) model: knowledge, cognitive process, and motivation. Table 9 showed the teachers' perceptions of PIRK's effect on students' classroom behaviors, the time spent in each of the language arts activities, and Table 10 showed the teaching strategies used by each of the four teachers.

Similarities and differences on the questionnaires and the interview questions were analyzed for patterns that emerged. The patterns were then related to students' scores and analyzed as to what might explain differences between the groups.

Qualitative data from the questionnaires and interviews were placed into categories in tables for an analysis of similarities, differences, and their relationships to students' scores. The tables included teaching strategies, time allocated to language arts, student time in each activity, teachers' perceptions of student's interest, and success in using PIRK and in other language arts activities. A search was made for patterns in specific aspects of each teacher's language arts program and strategies used. The patterns were explained and related to each of the primary and intermediate groups. Comparisons were also made between the primary and intermediate groups. The primary and intermediate groups using PIRK were compared with the primary and intermediate control groups.

Quantitative Data Analysis

The quantitative data focused on the third research question. The PIRK and the control groups were compared on the DAB measures of achievement in reading, writing, spelling, and listening. Quantitative data were examined for growth in reading and language arts with PIRK and without PIRK in Question 3: What are the effects of the PIRK reading program on the development of reading and language arts skills in LD students, and compared with LD control groups?

Meanings of the data were examined, interpreted, explained, and inferences were made in relation to the purpose of the research and the research questions. The posttest-only control group design with matching was used to examine the scores in reading of the PIRK groups compared with the control groups (Huck, Cormier, & Bounds, 1974; Kirk, 1987).

The data yielded by the posttest-only control group design with matching were analyzed by doing a t-test comparison of the means of the DAB posttest scores and subscores, and the composite scores of the PIRK groups and the control groups. The DAB posttest generated information that was used to describe constructs that underlie the dependent variables; namely, the subtest scores under the major categories of spoken and written language. The DAB subtest scores were analyzed for differences between the PIRK primary and intermediate groups in resource rooms, and between the PIRK and control groups in primary and intermediate resource rooms.

Tables and figures were used to describe the effects of PIRK on reading and language arts skills, word knowledge and reading comprehension, listening, writing, and spelling of the primary and

intermediate PIRK groups and compared with the control groups. Meanings of the data were interpreted and explained, and inferences were made in relation to the purpose of the research and on the outcomes of teaching reading to LD students with PIRK and without PIRK.

The qualitative and quantitative data were cross-checked to find overlapping information in support of validity. Conclusions were drawn based on the information provided from this study.

A report of this research was provided to the administrators and teachers using PIRK, followed by a telephone interview for feedback on the report. A request was made for perceptions of how PIRK might be improved.

PIRK was evaluated using the research information, and the standards of evaluation, utility, feasibility, propriety, accuracy, and need for improvement.

CHAPTER FOUR

ANALYSIS OF THE DATA

This dissertation evaluation study was designed to evaluate the
PIRK reading program as it was being used with learning disability
children in resource rooms. The first purpose was to examine how the
PIRK reading program fits the current literature on teaching reading to
LD students. A second purpose was to assess the in-depth perceptions of
long-term users of PIRK with respect to its effect on student reading,
attention, and academic-related on-task classroom behaviors. The third
purpose was to examine the effects of PIRK on a sample of LD students in
primary and intermediate resource rooms, and to compare the reading and
language arts scores of LD children using PIRK with those not using
PIRK.

The researcher looked at the needs of elementary school children
and also at the specific needs of LD children for learning to read in
the early grades. This task was accomplished by reviewing the pertinent
literature and by examining the PIRK components in light of current
theory, research, and practice.

The study used questionnaires to assess teachers' perceptions of
the PIRK reading program effects on student reading, academic-related
on-task classroom behaviors, and on their language arts programs.
District and population characteristics, and teachers' thoughts about
using PIRK were provided through interview questions.

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This study also examined the reading and language arts scores of LD children using PIRK and a control group not using PIRK in resource rooms, using the posttest-only control group with matching design.

The PIRK reading program components were evaluated in light of current theory, research, and practice. Data were collected and used to evaluate PIRK within the standards of educational programs, projects, and materials; namely, for utility, feasibility, propriety, accuracy, and need for improvement.

Research Questions

The evaluation was made on the outcomes of the use of PIRK with a sample of LD children in resource rooms in Texas. The evaluator-investigator addressed the research questions through both qualitative and quantitative measures.

Research Question 1

How does PIRK fit into the current literature on teaching reading to LD students?

The PIRK reading program was developed and used in the 1960s, 1970s, and 1980s for the development of word recognition with LD children. This review examined the PIRK components in light of current theory, research, and practice in teaching reading to elementary school children, and specifically to LD children.

The first question identified the PIRK components in relation to the components proposed by Wong (1991): knowledge-facts or concepts, procedural knowledge, and metacognitive knowledge, cognitive process, and motivation.

The PIRK reading program goal was to assist LD students to develop word recognition quickly and effectively, to enable them to catch up with their non-LD peers, and to provide opportunities for success both in learning to read and also in the regular classroom. The purpose of the PIRK materials, organization, and procedure was to allow students to take charge of their own learning in enjoyable activities. The PIRK materials were organized by phonograms and syllables in word families. Letter names were used in place of phonemes for identifying letter sounds in words in order to bypass LD student problems with discriminating and blending phonemes. The PIRK systematic whole-word approach to phonics allowed the student to follow a procedure for organizing the task and analyzing words, to sort and match phonograms, to read rhyming words, and to copy, spell, name, and write each letter, and pronounce each word. The procedure provided for guided practice, positive teacher feedback on accuracy, and ongoing success. The complex skill of reading requires the coordination of a number of interrelated sources of information in the process of constructing meaning from texts (Anderson et al., 1985).

The Needs of Elementary Children

Anderson et al. (1985) believed that children need systematic reading instruction as soon as they can sit still in their seats and follow simple directions. Children need experience with oral and printed language and experiences with writing. Reading as part of language development in listening, speaking, and writing builds on oral language. Reading comprehension is based on vocabulary, knowledge about the world, talking about the knowledge in thoughtful discussion of their experiences, and stories read to them. Adams (1990) explained the

critical factor in fluent word reading was the ability to recognize letters, spelling patterns, and whole words, visually, effortlessly, and automatically. Comprehension, the central goal of reading instruction, depended on this ability. She defined comprehension as actively searching the overlap among words for syntactic and semantic coherence, and depended on speed and automaticity of word recognition. Adams believed that school failures could be reduced by instruction in letter and word recognition in preschool, kindergarten, and first grade.

Research has indicated that systematic phonics instruction resulted in comprehension skills that were comparable to, and word recognition and spelling skills that were significantly better than, instruction without phonics. The findings were as valid for children with low reading-readiness profiles as well as for those with average or better profiles. Systematic code instruction alongside a meaning emphasis and language instruction resulted in superior reading achievement overall (Adams, 1990; Anderson et al., 1985; Chall, 1990; Strickland, 1990).

Smith (1985) did not argue against phonics, but argued that children should be expected to learn phonics when they could make sense of the instruction. Adams (1990) stressed that the proper amount of phonics was critical to students' potential development and required a sequenced coverage of individual elements and their interrelations with continuous evaluation of student's mastery. Research supported the use of sound-to-letter correspondence with illustrations of the primary parts of a syllable, the onsets and rimes, and with the names of letters and accurate spelling, as a faster way of learning letter-to-sound correspondences than teaching letters with phoneme sounds. Adams

cautioned that excess phonics may be a burden to children. Anderson et al. (1985) stressed that phonics instruction should be completed by the end of the second grade, except in cases of special needs. Reading-coherent and interesting texts that contain clues to pronunciation and meaning adds to reading fluency in reciprocal support between word identification and reading comprehension.

Strickland (1990) believed the evidence supported a whole language and integrated language arts approach with direct instruction in spelling-to-sound correspondences. Chall's (1990) research on children at risk, low income children, and those with learning disabilities indicated that in beginning reading, the direct teaching of phonological aspects of language, how sounds relate to words, resulted in better reading and spelling. The strongest factor was literacy (reading/ writing), and the strongest loadings were accuracy in decoding and word recognition. Gough and Walsh (1991) emphasized the sound-letter relationship, the ability to translate a string of letters into phonological form, and to decode with the rule mechanism as the basis, along with word knowledge, to form reading ability in English.

The Needs of LD Students

Adams (1990) emphasized the need for programs that were maximally effective, minimally time consuming, and optimally suited to the needs of particular students. While LD children needed more phonics, too much phonics wasted time and was not effective. The evidence indicated that LD children tended to pronounce the first letter of a word, but had difficulty with subsequent letters, and more so with vowels than with consonants. Torgesen (1991) concluded that children may need more intensive instruction than other poor learners in order to master

beginning reading skills. However, they tend to be able to comprehend a wide variety of materials once they overcome decoding problems and develop word recognition. Johnson (1988) explained that LD children need early intervention and prevention with a code emphasis in teaching reading, spelling, and writing, using the phonological and morphological structure of language, vocabulary, syntax, and semantics, in order to alleviate processing problems and emotional overlay. Chall (1990) explained that LD children need word recognition and phonics which correlates higher with reading comprehension than word meanings, but beyond the primary grades, word meanings, cognition, and language are more highly correlated with comprehension. At sixth or seventh grade and beyond, word meanings are more crucial. Also, instruction in comprehension strategies were found to increase comprehension among the third graders, and found to be effective with third grade and fifth grade students (Anderson, 1975).

Knowledge-Facts or Concepts

Two types of knowledge strongly related to early reading success all the way through grade 12 are the alphabetic principle of sound-to-letter correspondence and phonemic awareness tasks of phonemic segmentation and manipulation. The knowledge of letters and phonemic awareness were critical to beginning reading. Letter knowledge and phoneme discrimination were causally related to reading acquisition and central consequences of phonic instruction.

Rhyme detection was found to have a highly significant relation to later reading achievement. Knowledge of nursery rhymes was strongly and specifically related to the development of more abstract phonological skills and emergent literacy. Children found it easy to learn to read

words by use of rhyming phonograms, while short vowel sounds were difficult for children to learn. Phonograms offer a means of teaching children to analyze the sounds of syllables with letter names to establish letter-sound correspondences by the letter's position in a syllable, in spelling patterns, thus developing word recognition.

Adams (1990) explained that the issues were whether to teach short vowels or long vowels first, and whether to teach phonemes or letter names. Rules are used best only to explain and apply, not to memorize, but to guide practice in sound-letter relationships and word recognition. These abstract concepts must be illustrated in mapping single consonants to phonemes in short two or three letter words in order to establish the alphabet principle. The ability to discriminate between phonemes was of the essence. Only those children who could produce phonemes in isolation could blend them. It was not the working knowledge of phonemes, the ability to hear the difference between two phonemes, nor distinctly to produce them that was significant. It was the conscious analytic knowledge.

Letter names provide a label for a new concept by bonding together all of one's experiences to recognize the applications of the concept in its various occurrences. The names of letters contain phonemes which promote much faster learning of letter-sound correspondences than do learning letters and phonemes. Also, letter names are a means to recognize letters for the identification of words not covered in letter-sound instruction.

The goal of teaching phonics is to enable students to read connected text independently. Reading connected text should begin "as soon as the variety of explicitly taught generalizations is sufficient

to permit the generation of meaningful text from them" (Adams, 1990, p. 273). Children need to learn the rewards of information and enjoyment of reading. Beginning in third grade children need instruction in comprehension strategies (Anderson et al., 1985).

The following six tables compare what PIRK does with what the literature said is needed for elementary school children, and what more is needed for LD children in learning to read. The tables are organized by the identified PIRK components of knowledge-facts and concepts (see Table 3), procedural knowledge (see Table 4), and metacognitive knowledge (see Table 5), cognitive process-language and perception, memory and attention (see Table 6), motivation (see Table 7), and instruction (Table 8).

PIRK knowledge-facts and concepts. The PIRK knowledge component provides a code emphasis, along with meanings added to word roots, prefixes, and suffixes, phonology, morphology, vocabulary, and semantics in upper levels, but no syntax. PIRK provides facts and concepts about words using whole words and their onsets and rimes, and syllables, in a systematic sequenced coverage of individual phonic elements and their relationships of how sounds relate to words. The sounds are illustrated with the onset and rimes, rhyming phonograms and words, spelling patterns, and letter names. Rules are acquired inductively, and used in guided practice only if needed. The PIRK is a simple-to-complex organization of phonic elements and their relationships, using the whole word and its onset and rime, or syllables placed on a card within groups of words on cards, having the same or contrasting rimes, phonograms, or syllables, for the development of organization and analytic knowledge, phonemic awareness in rhyming phonograms, and knowledge of the

Table 3

Knowledge: Facts and Concepts

What the Literature Said	PIRK Facts and Concepts
Phonics: A systematic sequence coverage of individual phonic elements and their relationships of how sounds relate to words.	Phonics: A systematic sequenced coverage of individual phonic elements and their relationships of how sounds relate to words.
Avoid excess phonics with continuous evaluation of student's mastery.	Avoid excess phonics with continuous evaluation of student's mastery.
Analytic knowledge of words, syllables, spelling patterns.	Analytic knowledge of words, syllables, spelling patterns.
Phonemic awareness, rhyming phonograms, spelling patterns.	Phonemic awareness, rhyming phonograms, spelling patterns.
The alphabetic principle, onsets and rimes, and letter names.	The alphabetic principle, onsets and rimes, and letter names.
Rules in guided practice.	Rules inductively and in guided practice when needed.
Code with meaning emphasis. LD students need code emphasis, phonology, morphology, syntax, vocabulary, semantics.	Meaning with code emphasis, phonology, morphology, vocabulary, semantics, no syntax.
Literacy, reading and writing. Coding and word recognition, followed by word meanings and vocabulary beyond primary grades through grades 6 and 7.	Reading and writing words, decoding, and word recognition. Word meanings in upper PIRK levels limited to word roots, prefixes, and suffices. PIRK may need to add vocabulary meanings in sentences.
Connected reading, comprehension strategies.	An adjunct to connected reading, and comprehension strategies.

alphabetic principle of how sounds relate to letters and words. PIRK is used as an adjunct to connected reading and comprehension strategies.

Knowledge-Procedure

Adams (1990) stressed activities requiring children to attend to individual letters and words; their sequence and sounds, should be included in all beginning reading programs, along with reading and writing connected text. Tunmer et al. (1988) found that children's cognitive ability to perform classic logical and analytical tasks-classification, seriation, and conservation of quantity strongly predicted reading achievement, and were strongly and causally related to both linguistic awareness and concepts about print and reading achievement. Children who performed poorly on tests of both phonemic awareness and logical/analytical abilities remained significantly behind. It was the ability to analyze the sounds structure of syllables that made learning to read much easier. Language games and activities designed to develop linguistic awareness were recommended by Adams (1990) and Tunmer et al. (1988).

Adams (1990) agreed with Treiman's (1988) idea of a teaching approach using onsets and rhymes as units. Children were taught to divide spoken words into syllables and the word into its onset and its rhyme; to analyze onsets and correspondences between individual letters and phonemes by having them compare and contrast the onsets and rhymes, and to spell words organized in word families. Treiman's research indicated a developmental progression from awareness of syllables alone, to awareness of syllables, onsets and rhymes, and finally to awareness of syllables, onsets and rhymes, and single phonemes. Bradley and Bryant (1991) supported Treiman's (1988) theory of the onset and rhyme

approach to training phonological awareness. Their research indicated that phonological categorization was superior to semantic categorization and strongly attested to a causal relationship to success in reading and spelling.

Writing, copying, and tracing letters were found to assist children's ability to recognize the letters visually. Children usually name the letter as they print it, which binds the visual, motor, and phonological images of the letter together all at once. Research supported copying, writing, and naming letters and words, and practice in analyzing, organizing, classifying, and categorizing words and phonic elements for the development of word recognition (Adams, 1990).

Strickland (1990) supported a whole language and integrated language arts with direct instruction of phonics in context. Children need independent reading in whole books to learn the letter and sound patterns taught in the context of "real" reading and writing (Goodman, 1985). Children need to learn phonics only to the extent they can make sense of the instruction (Smith, 1985).

The needs of ID students. Johnson (1988) stressed the need for early intervention for ID students, with a focus on the best approaches for teaching the code with automaticity, and an increased rate of learning and time on task.

The procedural knowledge needed by all children, and what more is needed by ID children, are compared with the PIRK procedure in Table 4.

Table 4

Knowledge-Procedure

What the Literature Said	The PIRK Three-Step Procedure
Whole language with integrated language arts. Phonics in a meaningful context of reading in whole books, writing sound-letter patterns that make sense to students. Independent reading.	Whole word phonics, reading, writing, and spelling words and letter patterns. Integrated language arts at the word level. An adjunct to reading whole books and independent study.
Direct instruction. Language games and activities organized in word families by phonograms for word analysis that requires children to attend to individual letters and words, their sequence and sounds, along with reading and writing connected text.	Direct instruction. A language game organized in word families by phonograms for word analysis that requires children to attend to individual letters and words, their sequence and sounds, along with reading and writing connected text.
Phonological categorization: Classify, compare, and contrast. Divide words into syllables, focus on vowels. Onsets and rhymes as units. Rhyming. Letter-sound correspondence. Letter names to bind experiences with letter sounds, spell, name, write, and copy or trace letters and words.	Phonological categorization: Classify, sort and match rhymes, phonograms, or syllables, focus on vowels. Blend onsets with rhymes, and read rhyming words. Letter-sound matching, use letter names to bind letters with sounds, spell, name, write and copy or trace letters and words.
LD students need intensive instruction with a code emphasis and a focus on the most effective approaches for teaching the code with automaticity, increase rate of learning and time on task on appropriate pace, and reduced unit size.	The Primary PIRK provides early intensive instruction with a code emphasis and a focus on the most effective approaches supported by research for teaching the code with automaticity, an increased rate of learning, time on task at individual's pace, small units.

PIRK knowledge-procedure. The PIRK procedure uses whole words for the instruction of phonic knowledge, and integrates language arts by reading and writing spelling patterns and words in a three-step procedure, using a language game organized by phonograms in word families for direct instruction in word analysis, comparing and contrasting onsets and rhymes. The students sort and match rhymes, phonograms, and syllables with a focus on vowels; blend onsets and rimes, and read rhyming words for phonological categorization; use letter names for matching sounds to letters, and seriation-spell, name, write, and copy or trace letters and words. The primary PIRK provides early intervention using the most effective approach supported by research for teaching the code at the individual's pace, with an increased rate of learning and time on task in small unit size. PIRK is used as an adjunct to reading whole books and independent reading.

Knowledge-Metacognitive

Wong (1991) explained two aspects of metacognition: knowledge about cognition, and the regulation of cognition to direct, guide, and govern successful learning; and efficient reading and studying, using strategies of categorizing and verbal rehearsal. Swanson and Cooney (1991) defined executive function as a cognitive activity that determines the order in which processes are performed, and the executive and search processes that individuals learn in order to organize and retrieve information. Learning disabled children have difficulty with checking, planning, and monitoring the control processes.

Metacognitive knowledge of what all children need and what more LD children need are compared with what PIRK does, and shown in Table 5.

Table 5

Knowledge-Metacognitive

What the Literature Said	What PIRK Does
Knowledge about cognition and regulation of cognition to direct, guide, and govern successful learning, and the use of strategies for organizing the task, categorizing, and verbal rehearsal. The use of executive function to determine the order in which processes are performed. Control of the task. Executive search processes organize and retrieve information, planning, and monitoring.	Trains students to regulate cognition, to direct, guide, and govern their own successful learning, using strategies for organizing the task, categorizing, and verbal rehearsal, to use executive function to follow the order in which processes are performed and control the task, uses executive search processes, to organize and retrieve information, follows the procedure, and self-monitors.

PIRK knowledge-metacognitive. PIRK uses concrete objects, words on cards, to orient students to the PIRK task, a procedure to direct, guide, and govern their own successful learning, by using strategies for organizing the task, categorizing words, and verbal rehearsal. Students control the task, engage their executive function in the search processes to organize and retrieve information, to self-monitor in following the PIRK procedure, to use correct models of the word for accurate practice in copying, writing, and spelling, and to read rhyming words to the teacher for checking accuracy.

Cognitive Process

A key to fluent reading appeared to be the development of word recognition. Reading disability was determined to be a failure at the word level in the phonological-core deficit for most children and in an orthographic-core deficit for a smaller number of children. These deficits can develop into generalized cognitive, behavioral, and motivational problems (Stanovich, 1988, 1990).

Across populations and ages, it seemed clear that word attack and word recognition skills, memory abilities, and higher order language facility all contributed to individual differences in reading fluency (Levy & Carr, 1990). Decoding and word recognition, based on the sound-letter relationship, knowledge of language, listening ability, and intelligence, all form reading ability (Gough & Walsh, 1991). However, the cognitive development level of seriation and classification were more strongly related to learning to read than verbal intelligence (Tunmer et al., 1988). From fourth grade through high school, the research indicated stronger and higher correlations with cognition and language than with word recognition and phonics (Chall, 1990).

The phonological processing deficits were with sound segments at the phoneme level, the inefficient use of the phonological codes in short-term memory, the categorical perception of certain phonemes, all of which seemed to be the basis of difficulty in learning sound-to-letter correspondences, and the speed of naming letters and words. Poor readers were less able to use phonetic structure as a means of holding material in short-term memory. The evidence indicated a problem with integrating the phonemes in letter sequences (Mann, 1991; Wong, 1991).

The orthographic-core deficits may occur separately or along with the phonological-core deficits. These children had difficulties with written language: reading, spelling, handwriting, and written composition, and receptive and expressive language processes (Willows, 1991). These early visual processing deficits may have some direct causal role in the perception, discrimination, and analysis of the visual features of letters and words that may affect the speed of processing words. Reading-disabled LD children were found to be less accurate and slower in their visual recognition performance. The deficit appeared to be at the level of initial visual perception, and could be a factor in the difficulties with differentiating between similar letters and words, in analyzing and remembering the spelling patterns in words, and in the speed of processing.

Proficient word reading as a perceptual skill depended on the effortless visual recognition of letters, words, and frequent spelling patterns, and the direct linkage of these patterns in memory to the speech patterns and meanings to which they pertain. It was the ease, fluency, and letter naming speed that was a strong predictor of success and a strong correlate of reading achievement among beginners. Letter perception, the visual discrimination, and recognition of individual letters were strongly and causally related to success in beginning reading (Adams, 1990).

Chalfant (1987) described learning problems as dysfunctions in the ability to receive, categorize, and integrate information, attach sounds to letters and words, and to understand and use language. Kirk (1987) defined the needs of LD students by information processing deficits, the intrinsic, within the child, developmental disabilities in memory,

perception, attention, thinking, and language, which were manifested in disabilities in reading, spelling, handwriting, and written expression. Kirk recommended a process-task approach that integrated remediation of the process dysfunction while teaching content. Johnson (1988) stressed the need for automaticity in learning to read, spell, and write. Teaching approaches should include strategies, techniques, and principles to facilitate the acquisition, manipulation, integration, storage, and retrieval of information with an analytic, reflective style.

Emergent literacy was described as the ongoing development of language in listening, speaking, reading, and writing in oral language and print (Strickland, 1990). An integrated language perspective uses oral and written language across the curriculum integrating the curricular areas of social studies, science, art, music, and mathematics (Pappas et al., 1990).

Language and perception. Language as one of the most complex of all human functions requires the integration of sensory, perceptual, cognitive, and linguistic functions. Tallal (1988) explained that when one or more of these functions do not develop normally, language development is delayed or disordered. The research demonstrated relationships between phonological development in perception and production of speech sounds and language development. Language-impaired children were specifically impaired in their ability to discriminate as well as sequence rapidly presented nonverbal stimuli, and thus remember them. Their major difficulty was in the processes of identifying, discriminating, and using auditory stimuli. Their other problems were with visual recognition, cross-modal sensory integration, tactile

sensation, and the specific temporal perceptual motor mechanism was impaired, and this disrupted phoneme perception. Reading-impaired children with oral language disorders, and specific decoding and phonics deficits manifested a similar pattern of deficits. Developmental language disorders and developmental reading disorders may result from the same underlying neurological deficit, a temporal mechanism that disrupts phoneme perception and production, resulting in delayed language and in delayed reading acquisition.

What LD children need. Johnson (1988) supported language development for LD children along with reading tasks based on processing problems of linguistic and phonological awareness, segmenting and rhyming, receptive and expression language, automatic word recognition, and handwriting and spelling. Spelling as a linguistic process, not simply a skill requiring memory, requires an analysis of language into its component parts, which is referred to as linguistic and phonological awareness of the structure of language and morphological knowledge. The reader-speller, as a multilevel information processor, used numerous knowledge levels of graphemic, phonemic, morphemic, semantic, and word origins. The basic core of spelling instruction should include the 1,000 most common words, along with words that students misspell in their writing. Text production problems of getting language onto paper included rate of writing, handwriting, spelling, vocabulary, and syntax. Graham et al. (1991) suggested activities using games in tracing, copying, and writing letters and words, saying word parts and words during copying to develop writing fluency. Sentence production activities are needed in arranging and rearranging word cards to form sentences.

Attention and memory. Disorders were in short attention span, impulsivity, and over-activity, and also in the subtle cues in social interactions that may not be interpreted correctly. Conte (1991) found that children with such disorders learned less efficiently when materials were presented at slow rates rather than at more rapid rates. However, excessive arousal may lead to anxiety and disorganization. Learning disabled children may have task or situation-specific attentional problems due to stress from other specific dysfunctions. Felton and Wood's (1990) studies indicated that their attention deficits were related to rote verbal learning and memory deficits in confrontational naming, rapid automatized naming, and phonological awareness, but not on memory for lists or narrative material, or in visual memory. These cognitive deficits associated with reading disability were consistent across samples, developmental levels, and definitions and subtypes of reading disability.

A large body of evidence indicated that deficits in a verbal form of working memory were associated with reading problems and its source was in language processing. Phonological processes were the limiting factor in working memory capacity, and were the causal links between underlying phonological awareness, verbal working memory, and lexical access. Naming or lexical access was defined as retrieval of phonological labels in response to visual stimuli. Verbal memory, phonological perception, speech production, and lexical access were linked to reading ability. Poor readers were found to be deficient in phonological processing. This limited the efficient use of working memory, but nonverbal memory processes were served by separate cognitive functions that were related to deficits in phonological awareness.

Brady's (1991) studies of memory development and memory deficits in poor readers suggested that inefficiency of phonological coding may be the basis for their memory problems. His research determined that LD children can be taught to organize information into common categories, rehearse the category names, and orient their attention with objects and procedures through the use of concrete materials. It was found that LD students can do as well as non-LD students when instructed to organize information.

Learning disabled children were found to have problems in how information was received, transformed, elaborated, stored, retrieved, and used. Swanson and Cooney (1991) focused on short-term memory and executive processes. They found that LD and NLD children were capable at the encoding stage of word recognition, but that LD children required more time to conduct a memory search and relied on smaller sub-word components in the decoding process. LD children did not use verbal rehearsal, organizational strategies in rehearsing several items, or elaborative processing of words in analysis or comparison of words. Their memory process problems were in storage and retrieval, of rehearsing and organizing, and of integrating verbal and visual codes. Cognitive process, needed by all children and specifically needed by LD children, is compared with the PIRK process and shown in Table 6.

Table 6

Cognitive Process: Attention and Memory, Language and Perception

What the Literature Said	PIRK Process
Process-task approach integrating the remediation of dysfunction with teaching content.	A process-task to integrate remediation of dysfunction with teaching content (phonics, word attack skills, word structures, word recognition, and word meanings).
Memory development, strategies and executive functions, analysis and comparison, organize auditory and visual information into categories, rehearse the category names.	Memory development, strategies, and executive functions, analysis and comparison, organizes auditory-visual information into categories, rehearse the category names.
Orient attention with objects.	Orients attention with objects.
Use procedures with concrete materials.	Uses procedures with concrete materials.
Attention problems if materials presented at rates not too fast or too slow.	Student manages task at his or her own pace, not too fast or too slow.
Language development. The integration of sensory, perceptual cognitive, and linguistic functions.	Language development in the integration of perceptual, linguistic, sensory, and cognitive functions.
Phonological development of perception and production of speech sounds, discriminate and sequence auditory, visual, and tactile stimuli.	Phonological development of perception and production of speech, discriminate, and sequence auditory, visual, and tactile stimuli.

The PIRK process. The PIRK process-task approach remediates dysfunction by training cognitive processes while teaching content. Cognitive processes are engaged as the child attends to the task, organizes words on cards, analyzes, compares, and contrasts, sorts and matches rhymes, phonograms, or syllables; reads rhyming words to the teacher for feedback on accuracy, and copies, writes or traces, spells, names each letter as it is written, and names-pronounces each word.

Children's attention is engaged with the PIRK materials, concrete objects of words on cards, and in the four-step procedure of structured activities; and maintained as children manage the learning task and process at their own pace, that is neither too fast nor too slow.

Children's language and perceptual processes are engaged in the activities of identifying, discriminating, and sequencing both auditory and visual stimuli using words, compared and contrasted, sorted and matched by rhymes, phonograms, and syllables, reading rhyming groups having similar and contrasting sounds with a focus on the vowel. The words are copied with the letters named containing phonemes in correct sequence, and words are read, pronounced, or named in lexical access activities. Phonological and linguistic awareness are engaged in the task of word analysis, segmenting, and rhyming, in receptive and expressive language activities, and practiced for automaticity in word recognition. Language processes are engaged on levels of graphemic, phonemic, morphemic, semantic, word origins, and vocabulary.

The child's memory processes, verbal memory, and lexical access are practiced, and verbal and visual codes are integrated in the tasks of organizing and rehearsing category names in rhyming words, and in sequencing and naming letters and words.

Motivation

Schunk (1990) noted the relationship between self-efficacy and motivation that may be effected by positive feedback from teachers on student achievement, and which motivates them to persist on task. A sense of learning efficacy helps to sustain task motivation as they observe their own progress. Task variables found to affect motivation were opportunity to learn, to experience success, and to gain feedback of success. Students who perceive value in a learning task tended to be willing to expend the needed effort. The motivation needed by LD children is compared with what PIRK provides in Table 7.

Table 7

Motivation

What the Literature Said	What PIRK Provides
Motivation related to self-efficacy, effected by positive feedback from teachers on student achievement, which motivates them to persist on task.	Motivation related to self-efficacy, effected by positive feedback from teachers on student achievement, which motivates them to persist on task.
Task motivation sustained by a sense of learning efficacy by observing their own progress.	Task motivation sustained by a sense of learning efficacy in observing their own progress.
Opportunity to learn and experience success, so that student sees value of the task.	Opportunity to learn and experience success, so that student sees value of the task.

PIRK motivation. The PIRK reading program was developed interactively with LD students in activities that the students like to do, and in which they experienced success. The purpose was to make the

task enjoyable and meaningful from the child's point of view, and to engage the child in ongoing successes in small task units, in simple to complex increments. Motivation and self-efficacy were effected as the students took charge of the task, persisted on the task, observed their own learning and success, and followed the PIRK procedure. The procedure allowed for teacher feedback of success to students as they read rhyming words, and read the criterion tests for each level. The students experienced success, working on individual tasks, at their own pace, in small groups, and shared materials.

Reading Theory

The developmental model of word recognition and naming was based on the connectionist's parallel distributed processing approach to understanding perception, cognition, learning. Levy and Carr's (1990) component process analyses of reading and its development explained the relationships among reading processes and reading ability. The major deficits were explained as phonological processing, but orthographic deficits also contributed in some cases to reading failure, and the two factors appeared to be interdependent during development. Memory span appeared to lie with integrative processes in language comprehension which compensated to some extent for poor word recognition, but was not sufficient to overcome it. Word recognition, memory, and language comprehension all contribute to reading fluency and reading comprehension.

The PIRK knowledge and processing components seemed to fit the two reading theories: (a) the developmental model of word recognition and naming that was based on the connectionist's parallel distributed processing approach to understanding perception, cognition, and

learning; and (b) the component process analyses of reading and its development in the relationships among reading processes and reading ability, which explained the interdependent development of phonological and orthographic processes and their deficits, and how word recognition, memory, and language comprehension all contribute to reading fluency and comprehension.

Theory of Instruction

Bos and Vaughn (1988) explained information processing theory as it related to interactive teaching in an active learning environment, modified to facilitate LD student attention and perception to critical differences in stimuli; to use teaching strategies to keep informative active in working memory, so as to facilitate its storage and organization in long-term memory; and to use executive functions to coordinate learning and memory strategies. Strategies that assisted storage in long-term memory were verbal rehearsal, chunking, or grouping, and elaborating by relating new to known information.

Direct instruction focused on engaged time-on-task in activities that were neither too difficult nor too easy, but at each student's skill level, with minimal time lost in transitions between tasks. The materials were arranged for student access, and students were held accountable for their own work. Expectations were made clear, help was provided when needed, and the work was checked. Strategies and procedures were taught with guided practice, in a small task, easy-to-difficult sequence, and with teacher feedback on accuracy of student responses. Individualized small-group instruction provided practice with fast-pacing, but without rushing. Student progress was monitored

with observation and tests, and students were motivated by success,

praise, and pride in their work (see Table 8).

Table 8

Direct Instruction

What the Literature Said	What PIRK Provides
Engaged time-on-task in materials at each student's skill level.	Engaged time-on-task in materials at each student's skill level.
Student access to materials minimal time lost between tasks. Student accountable for own work.	Student access to materials minimal time lost between tasks. Student accountable for own work.
Expectations and teacher's role are made clear, help is provided when needed, work is checked.	Expectations and teacher's role are made clear, help is provided when needed, work is checked.
Strategies and procedures are taught with guided practice, in a small task, easy-to-difficult sequence, with teacher feedback on accuracy of student responses.	Strategies and procedures are taught with guided practice, in a small task, easy-to-difficult sequence, with teacher feedback on accuracy of student responses.
Individualized small group instruction, practice with fast-pacing without rushing.	Individualized small group instruction, practice with fast-pacing without rushing.
Student progress is monitored with observation and tests.	Student progress is monitored with observation and tests.
Students are motivated by success, praise, and pride in their work.	Students are motivated by success, praise, and pride in their work.

The PIRK reading program includes both interactive teaching and direct teaching of phonics for the development of word recognition (see Table 9). PIRK involved information processing in interactive teaching

in an active learning environment modified to facilitate LD student

attention, and perception to critical differences in stimuli. PIRK uses

teaching strategies to keep information active in working memory, to

facilitate its storage and organization in long-term memory. The

strategies used are verbal rehearsal, chunking or grouping, and

elaborating by relating new to known information. PIRK also uses

executive functions to coordinate learning and memory strategies.

Table 9

Interactive Instruction

What the Literature Said	What PIRK Provides
Interactive teaching in an active learning environment modified to facilitate LD student attention and perception.	Interactive teaching in an active learning environment modified to facilitate LD student attention and perception.
Strategies to keep information active in working memory to facilitate its storage and organization in long-term memory.	Strategies to keep information active in working memory to facilitate its storage and organization in long-term memory.
Use executive functions to coordinate learning and memory strategies to chunk, group, and elaborate by relating new to known information.	Use of executive functions to coordinate learning and memory strategies to chunk, group, and elaborate by relating new to known information.

It further uses direct instruction and focuses on engaged time-on-task

in activities that are neither too difficult nor too easy, but at each

student's skill level. The criterion tests are used to place a student

at the level for most efficient and effective learning. PIRK materials

are arranged for student access, with minimal time lost in transitions between tasks, and students are held accountable for their work, work on their own, following the PIRK procedure. The teacher's time is free to monitor students and to listen to students read rhyming words, and to give help when needed, in guided practice, in small task, easy-to-difficult sequence, and teacher feedback on accuracy of student responses. Individualized small group instruction provides practice with fast-pacing, yet without rushing.

Effective Teaching

Effective teaching research included aspects of both interactive teaching and direct teaching in mastery learning of the curriculum. Effective teachers provided students with opportunity to learn. They made their expectations and teaching role clear, maximized time-on-task, and minimized time lost in getting organized and making transitions. Their time was spent in student-teacher interaction, monitoring student progress, providing assistance, and promoting student self-regulated learning and autonomy.

The PIRK reading program provides teachers and students with materials and a procedure structured for effective teaching and opportunity to learn. Student expectations and teacher's role are made clear, with time spent in student-teacher interaction, monitoring student progress, maximum time-on-task, and minimal time lost, in promoting student self-regulated learning and autonomy.

Summary

Research Question 1 examined how PIRK fit into the current literature on teaching reading to all children and specifically to LD children. The PIRK reading program components were identified using

Wong's (1988) model: Knowledge-facts or concepts, procedural knowledge, and metacognitive knowledge; cognitive process-attention and memory, and language and perception; and motivation. Tables were constructed to illustrate what the literature said was needed by all children in learning to read, and what more was needed by LD children. These were compared with the PIRK identified components.

The need for phonics was supported in the research as an effective approach for the development of word recognition as a support for comprehension. Anderson et al. (1985) believed that children need systematic reading instruction as soon as they can sit still and follow directions. They need experiences with oral and printed language and writing. Phonics instruction should be finished by the end of second grade, and comprehension strategies taught beginning with third grade. Children need to learn phonics in a context that makes sense to them (Smith, 1985). LD children need more intensive phonics instruction to overcome their decoding problems and develop word recognition. The critical factor in fluent word reading is the ability to recognize letters, spelling patterns, and whole words, visually, effortlessly, and automatically. Systematic code instruction, alongside a meaning emphasis and language instruction, resulted in superior reading achievement. Adams (1990) emphasized the need for programs that were maximally effective, minimally time-consuming, and optimally suited to the needs of particular students. She believed that school failures could be reduced by instruction in letter and word recognition in preschool, kindergarten, and first grade. Johnson (1988) stressed the need for early intervention and prevention with a code emphasis for LD children in teaching reading, spelling, and writing. Goodman (1985)

stressed that children need independent reading in whole books to learn the letter and sound patterns in the context of "real" reading and writing.

Knowledge: Facts or Concepts

Research supported phonics knowledge facts and concepts in beginning reading instruction for the development of word knowledge and word recognition. Children need a systematic sequenced coverage of individual interrelated phonic elements of how sounds relate to words. The three types of phonic knowledge are: (1) the alphabetic principle of letter to sound correspondence, illustrated by onsets and rhymes and letter names; (2) phonemic awareness in the context of rhyming phonograms; and (3) analytic knowledge of words, syllables and spelling patterns. LD children need a code emphasis with knowledge of phonology, morphology, semantics, vocabulary, and syntax. The PIRK knowledge component of phonic facts and concepts provides for the needs of all children, and the needs of LD children as a support for comprehension. PIRK does not provide connected reading in whole text. PIRK is used as an adjunct to reading stories, whole books, basal readers, and writing stories.

Knowledge: Procedure

Research supported integrated language arts and direct instruction with language games and activities organized in word families by phonograms for word analysis. The activities for developing knowledge include: (a) phonological categorization, classify, compare and contrast syllables, phonograms, onsets and rhymes as units, and rhyming, with a focus on vowels; (b) letter-to-sound correspondence using letter names to bind experiences with letter sounds; and (c) seriation, spell, name,

and write or trace letters and words. LD children need early intervention with the best approaches for teaching the code, rate of learning, time on task, and reduced unit size.

The primary PIRK provides early intervention with the most effective approaches supported by research for teaching the code, increased rate of learning and time on task in small unit size; and a procedure for developing knowledge that includes: (a) phonological categorization, classify, compare and contrast syllables, phonograms, onsets, and rhymes as units, and rhyming, with a focus on vowels; (b) letter-to-sound correspondence using letter names to bind experiences with letter sounds; and (c) seriation, spell, name, and write or trace letters and words. PIRK was developed interactively with LD students based on activities they liked and persisted in doing.

Knowledge: Metacognitive

The two aspects of metacognitive are knowledge about cognition, and the regulation of cognition to direct, guide, and govern successful learning, such as strategies of categorizing and verbal rehearsal. LD children have problems with checking, planning, and monitoring the control processes. The PIRK use of concrete objects, words on cards, assist students to orient to the task, to direct, guide, and govern their own successful learning, and to use strategies for organizing and categorizing words, and verbal rehearsal. The student controls the task, self-monitors, and uses the correct models of the words for accuracy, and the PIRK procedure for practice.

Cognitive Process

A key to fluent reading appeared to be word recognition. Reading disability was determined to be failure at the word level in the

phonological-core deficit of the perception and integration of phonemes and their use in short-term memory for most children; and in the ortho-graphic-core deficit of the perception, discrimination, analysis, and recognition of the visual features of letters and words for a small number of children. These deficits can develop into generalized cognitive, behavior, and motivational problems. Learning problems were described as dysfunctions in the ability to receive, categorize, and integrate information, to understand and use language. Learning disabled children need a process-task approach that integrates remediation of the process dysfunction while teaching content. They need to develop automaticity in learning to read, spell, and write words.

The purpose of the PIRK reading program was to develop word recognition while remediating LD children's deficits in phonological perception and integration of the sounds in words; in orthographic perception, discrimination, analysis, and recognition of the visual features of letters and words; and to integrate these two processing functions while teaching phonics, spelling patterns, and the structure of words and their meaning. The goal was to develop automaticity in learning to read, spell, and write words.

Language and perception. Language requires the integration of sensory, perceptual, cognitive, and linguistic functions. Research has demonstrated relationships between phonological development in perception and production of speech sounds and language development. Language impaired children have dysfunctions in discriminating and sequencing rapidly presented nonverbal stimuli, and memory of them, with a major difficulty with identifying, discriminating, and using auditory

stimuli. Their other problems were with visual recognition, sensory integration, tactile sensation, and phoneme perception. Learning disabled children need language development along with reading tasks that are based on linguistic and phonological awareness, receptive and expressive language, segmenting and rhyming, word recognition, handwriting, and spelling. Emergent literacy is the ongoing development of language in listening, speaking, reading, and writing.

Attention and memory. Attention and memory were found to be related. Attention deficits are related to rote verbal learning and memory deficits in naming and phonological awareness. These children learned best when material was presented at the right pace. They learned less when material was presented at slow rates, but material presented too fast may lead to anxiety and disorganization.

Deficits in a verbal form of working memory were associated with reading problems and deficits in language and phonological processes of naming and lexical access, the language response to visual stimuli. Learning disabled children did not use verbal rehearsal, organization, analysis, or comparison. They need tasks to organize information into categories, rehearsal of category names, and to orient their attention with objects and procedures using concrete materials.

The PIRK process components engaged the child in the processes of attention, perception, memory, and language tasks of attending, organizing, rehearsing, reading, spelling, and writing words in spelling patterns practiced for mastery and automaticity toward word recognition. PIRK allows children to control the learning task progressing at their own pace, neither too fast, nor too slow.

Motivation

Motivation is related to self-efficacy and effected by positive
feedback from teachers on student achievement, which motivates them to
persist on task. A sense of learning efficacy helps to sustain
motivation as they observe their own progress.

The PIRK reading program provides a structure that allows the
teacher to give positive feedback on children's accuracy as they read
rhyming words, and a procedure as well as criterion tests that assist
students to observe their own learning.

Reading Theory

The two reading theories that seemed to explain the PIRK knowledge
and processing components were the developmental model of word
recognition and naming, based on the parallel distributed processing;
and the component process analyses of reading and its development, the
interdependent development of phonological and orthographic processes
and their deficits, and how word recognition, memory, and language
comprehension all contribute to reading fluency and comprehension.

Theory of Instruction

The PIRK reading program includes theory of interactive teaching
in an active learning environment modified to facilitate LD student
attention and perception to critical differences in stimuli; and which
uses executive function to coordinate learning and memory strategies of
organization and verbal rehearsal. PIRK also uses theory of direct
instruction which focuses on student access to materials, time-on-task,
activities at each student's skill level, and minimal time lost in
transitions between tasks. Students are accountable for their work and
work on their own in guided practice, in small task, easy-to-difficult

sequence. Teacher feedback is provided on student accuracy, in small group instruction, fast-pacing, and student's are motivated by success, praise, and pride in their work.

PIRK provides materials and procedures structured for effective teaching and learning phonics and practice for the development of word recognition, memory, and language comprehension.

Research Question 2

What are teachers' perceptions of PIRK's effect on student academic-related behaviors during PIRK activities and other reading and language arts activities?

Four teachers, who used PIRK as a major part of their reading program, were selected for the PIRK sample. Questionnaires and interview questions elicited teachers' perceptions of PIRK's effect on student interest, attending, and on-task classroom behaviors (see Appendix B). Results are summarized in Table 10. The four teachers in this study reported that students attended to the PIRK task and achieved success. Teachers A, B, and C reported that students were able to persist in using PIRK with 90% to 100% accuracy in word identification, and decoding, and in reading connected text; except Teacher B reported 75% to 85% accuracy in upper PIRK levels. Teacher D did not test until after Level IV and reported 70% to 80% accuracy in decoding and in reading connected text. Students were able to cooperate in small groups, share materials, take turns, monitor their own work, complete the task, and do the next task without frustration when using PIRK. The four teachers perceived students as not showing interest when using PIRK especially after third grade. Teachers A and C perceived improved

Table 10

Teacher Perceptions of PIRK Effects on Student Classroom Behaviors

Teachers N = 4 (A, B, C, D)	Positive	Negative	Unsure
Student attending to PIRK task	4		
Success in using PIRK procedure	4		
Cooperate in small groups	4		
share materials, take turns	4		
Monitor own work, following PIRK procedure without frustration	4		
Monitor own work in other language arts activities	2	2	
Control random movements when using PIRK	4		
Control random movements in other language arts activities	3	1	
Accuracy in decoding 90% to 100%	3	1	
Social-emotional improvement	2		2
Student interest when using PIRK		4	

student socioemotional functioning with teachers and peers when using PIRK and other language arts activities, while Teachers B and D were unsure. There may have been some carry-over of the PIRK metacognitive training to other language arts activities. Two teachers reported their students were able to monitor their own work in other language arts activities, but two reported that their students were unable to do so.

Language Arts Programs

Teachers described their reading and language arts programs, and answered questions about code or meaning emphasis, time spent in each activity, teaching strategies, and feelings of effectiveness. Their reading and language arts programs are summarized in Tables 11 and 12.

Table 11

Time on Task*

Teachers	A	B	C	D
PIRK	2.5-3	2.5	1.5-2	1.0-1.25
Reading text	1.5-2		2.5-3	1.0-1.25
Spelling	1.0-1.5		1.0-1.5	1.0-1.5
Phonics (besides PIRK)			.5-1	.25-.5
Handwriting	.25-.5		.5-.75	.05-.75
Listening to stories	.75-1		1.0-1.5	.25-.5
Writing stories	.75-1		1.0-1.5	.75-.25

* Hours spent in each activity each week. Total time in language
  arts varied from 2 to 3+ hours each day. Time spent in PIRK
  varied from 1 to 3 hours each week.

Table 12

Teaching Strategies

Teachers	A	B	C	D
Names of letters		X	X	X
Phoneme sound of letters	X		X	X
Phonemic drill			X	X
Copy words name letters	X	X	X	
Copy words use phonemes			X	
Sound out words	X		X	X
Write stories and use invented spellings	X		X	X
Correct own spellings	X			
Read their stories to others	X		X	X
Word usages in context	X		X	X
Use of context cues	X		X	X
Word definitions			X	X
Assessment-continuous and for mastery	X	X	X	

Teachers B, and D emphasized the code, and Teacher C emphasized both code and meaning with whole language, but A did not indicate an emphasis. Teacher A used a content mastery approach in tutoring students in the regular curriculum, and the students used PIRK in the regular classroom along with the regular reading program. She felt that the (classroom) teachers needed to create excitement in the use of PIRK for student enjoyment. Teacher B used PIRK but the other language arts were taught in the classroom. She added PIRK words on paper for homework and extra reinforcement. She also had difficulty keeping students interested in PIRK, and the extra paperwork was stressful. Extra reinforcement using PIRK words for homework or worksheets are unnecessary and create "excess phonics," and may in part explain students' boredom.

Teaching strategies used in PIRK and in other language arts by Teachers A, C, and D involved students in the following activities with letters and sounds: letter names and phonemes when printing or writing, sounding-out words when reading connected text, writing stories with invented spellings, and correcting their own spellings. Students were instructed in sentence structure, punctuation, vocabulary meanings in context, context cues, and word definitions. Teachers C and D used phonemic drill. Teacher D allowed students to copy words and sub-vocalize, and to name letters or phonemes when printing or writing. Teacher B followed the PIRK procedure and guidelines. Students copied or traced and spelled, named letters and words, and they did not use drill in phonemes. She indicated that students had phonic drill in the regular classroom, and used phonemes to sound out words, used letter names to spell and copy words, wrote stories with invented spellings,

corrected own spellings, read their stories to others, and read other stories. The students were taught word usages in context, use of context cues, and word definitions.

Teaching Effectiveness

All four teachers believed that PIRK assisted with effective teaching in the following ways: PIRK structured learning in a positive, orderly environment, maintained high expectations for success and high success rates, modeled skills, and assisted active teaching with guided practice and feedback, with 90% to 100% mastery. Teacher B reported student accuracy at 75% to 85% on upper PIRK levels. Teacher D did not use the criterion tests until after level IV, with 70% to 80% mastery. She used the language master and computer for practice with Dolch words to 100% mastery. Most of the Dolch words also appear in PIRK.

Teacher B felt that "PIRK had a tremendous impact on the majority of students I have worked with. Some words seem too much for elementary. I was impressed with the early level PIRK....We have seen scores go up and children reach levels equal to grade level. I like the simplicity of PIRK. It is easy to teach and learn." Teacher D liked the PIRK structure and repetition, and believed that consistency in use was a key to its successful implementation. The four teachers thought that PIRK had a positive influence on student self-monitoring, and students were able to control random movements in PIRK. Teachers A and D thought that PIRK was cost-effective, and B thought that PIRK was cost-effective over the long-run due to student success.

<center>Research Question 3</center>

What are the effects of the PIRK reading program on the

development of reading and language arts skills in LD students in

resource rooms, as compared with LD control groups?

The Participants

The district using PIRK and the control district used different

discrepancy formulas to determine LD resource room placement. The

district using PIRK used the criterion of reading achievement more than

two grades below agemates. The control district used the criterion of

reading achievement 18 months below agemates.

The sample consisted of two groups and four subgroups. The PIRK

subgroups were primary and intermediate LD students in resource rooms.

The PIRK groups contained 14 students, with seven primary and seven

intermediate, 9 boys and five girls. The control groups contained 13 LD

students, with six primary and seven intermediate, five boys and eight

girls. There were four teachers in the PIRK groups and three teachers

in the control groups. The PIRK primary and intermediate groups used

the revised PIRK since 1986. The primary group began using the new

primary PIRK in January 1991 with a total of 6 months instruction before

the posttest in October 1991.

Posttest Measures

The experimental groups using PIRK and the control groups were

given the Pro-ed DAB. The DAB test was given to the PIRK group as a

pretest in the last 2 weeks of January 1991, and it was given again in

the first 2 weeks of October 1991. The DAB test was given to the

control groups in the last 2 weeks of January 1992. No pretest was

given to the control groups. The DAB provided scores and percentiles

for each student in reading, word knowledge, reading comprehension, spelling, written vocabulary, and listening. The PIRK and control groups were compared at primary and intermediate levels.

Statement of Hypotheses

Ho1: There will be no differences between the scores in reading, word knowledge, and reading comprehension made by the LD students using PIRK and the LD students not using PIRK.

The posttest mean scores in word knowledge for the primary PIRK group exceeded the mean scores for the controls as illustrated in Table 13. The mean score in word knowledge for the primary PIRK group was 38.143 and the control mean score was 27.833. The mean score in reading comprehension for the primary PIRK group was 12.857 and the control mean score was 10.833. The mean score in reading for the primary PIRK group was 56.000 and the control group mean was 38.667. A simple t-test was used on the data to test the effects of the PIRK treatment vs. controls. The t-test resulted in a significant effect in word knowledge (t = 2.029, p = .067); no effect in reading comprehension (t = .479, p = .549); and no effect in reading (t = 1.402, p = .189). The level of significance was set at .10 due to the small sample size. The null hypothesis was therefore rejected for the primary group in word knowledge (p = .067); but it was not rejected for reading comprehension (p = .549) nor for reading (p = .189). The differences between the mean scores for the intermediate PIRK group and the control group were small. The null hypothesis was therefore not rejected for the intermediate groups in word knowledge, reading comprehension, and reading.

Table 13

Comparison of the Primary and Intermediate PIRK Groups with the Control
Groups in Word Knowledge, Reading Comprehension, and Reading Assessed by
Group Means

	PIRK Groups		Control Groups			
Primary (N = 13)	(N = 7)		(N = 6)			
Intermediate (N=14)	(N = 7)		(N = 7)			
	Mean	SD	Mean	SD	t	p
Primary Groups						
Word Knowledge	38.143	3.338	27.833	13.045	2.029	.067
Reading Comprehension	12.857	4.451	10.833	9.946	.479	.549
Reading	51.000	7.616	38.667	21.924	1.402	.189
Intermediate Group						
Word Knowledge	44.286	6.550	44.142			
Reading Comprehension	20.714	3.302	17.857	4.375	1.279	.193
Reading	63.571	11.163	62.000	10.066	.277	.787

The difficulty of getting a significant p value is related to the small number of students in the sample. The original number of 11 primary students in the PIRK group resulted in significant differences in word knowledge, reading comprehension, and reading (see Appendix E). The non-LD students that were removed from the PIRK group were reading disabled students who received remedial instruction in PIRK.

Ho2: There will be no differences between the scores in spelling made by LD students using PIRK, and LD students not using PIRK.

The mean scores in spelling for the PIRK groups were similar to the mean scores for the control groups as illustrated in Table 14. The mean scores in spelling were 2.714 for the primary PIRK group and 2.000

for the controls; and 6.571 for the intermediate PIRK group and 6.000
for the controls. The null hypothesis was therefore not rejected for
either the primary or the intermediate groups in spelling.

Ho3:   There will be no differences between the scores in writing made by
       LD students using PIRK, and LD students not using PIRK.

The mean scores in writing for the primary and the intermediate
PIRK groups were similar to the controls as illustrated in Table 14.
The mean scores in writing were 4.714 for the primary PIRK group, and
4.167 for the control; and 10.714 for the intermediate PIRK group, and
10.857 for the controls. The null hypothesis was not rejected for the
primary and the intermediate groups in writing.

Table 14

Comparison of the Primary and Intermediate PIRK Groups With the Controls
in Spelling, Writing, and Listening Assessed by Group Means

	PIRK Groups			Control Groups		
Primary (N = 13)	(N = 7)			(N = 6)		
Intermediate (N = 14)	(N = 7)			(N = 7)		
	Mean	SD	Mean	SD	t	p
Primary						
Spelling	2.714	1.254	2.000	1.414	.966	.355
Writing	4.714	2.215	4.167	4.355	.293	.775
Listening	42.429	9.778	37.167	16.339	.718	.488
Intermediate						
Spelling	6.571	2.820	6.000	2.708	.387	.706
Writing	10.714	3.094	10.857	2.673	.092	.928
Listening	53.143	6.309	42.000	8.583	2.768	.017

Ho4: There will be no differences between the scores in listening made

by LD students using PIRK, and by LD students not using PIRK.

The posttest mean scores in listening for the intermediate PIRK

groups exceeded the controls as illustrated in Table 14. The mean

scores in listening were 42.429 for the primary PIRK group, and 37.167

for the controls, and the t-test, t = .718, p = .488. The mean scores

in listening were 53.143 for the intermediate PIRK group, and 42.000 for

the controls, and the t-test, t = 2.768, p = .017. The null hypothesis

was therefore rejected for the intermediate group, but it was not

rejected for the primary group in listening. The significant effect p =

.017 for the intermediate PIRK group may reflect the effects of PIRK on

the development of auditory discrimination, which makes it possible for

the student to discriminate clearly between words in the language

stream, and understand them. The language heard is no longer "garbled,"

and the meanings come through clear.

Percentiles

The percentile ranks for the primary PIRK group were higher than

the controls in word knowledge and in reading comprehension as

illustrated in Table 15, but there was no real analysis performed. The

ranges of the percentile ranks for the primary PIRK group was 4

percentile ranks higher than the control in word knowledge, 2 to 75 for

the primary PIRK group and 1 to 9 for the control. The range of

percentile ranks in reading comprehension was higher than controls, 1 to

75 for the primary PIRK group and 1 to 63 for the controls. There was

one outlier in the primary PIRK group. The first grade student's

pretest score in word knowledge was 16 at the 9th percentile, and the

posttest score was 38 at the 75th percentile. The same student's

reading comprehension pretest score was 1 at the 9th percentile, and the posttest score was 14 at the 75th percentile. This first grade student started in the new primary PIRK, and did not make the transition from the revised PIRK which the other students in the primary PIRK group had done. The differences between the new primary PIRK and the revised PIRK may have been a source for the differences between the outlier score and the other scores. Another source may have been the student's higher rate of learning.

Table 15

The Percentile Rank of Each Score in Word Knowledge and in Reading Comprehension for the Primary and the Intermediate PIRK Groups and the Control Groups

Percentile Rank of the Primary PIRK Group (N = 7) and
Controls (N = 6) and the Intermediate PIRK Group (N = 7)
and Controls (N = 7)

Primary Groups				Intermediate Groups			
Word Knowledge		Reading Comp.		Word Knowledge		Reading Comp.	
PIRK %	Control %	PIRK %	Control %	PIRK %	Control %	PIRK %	Control %
75		75					
		63					
						37,37	37
25		25				25	
		16	16	16		16	16
9,9	9	9		9		9,9	9
5,5	5	5	5,5	5	5,5,5	5	5,5
2	2,2	2		2,2,2	2,2		2
	1,1	1	1,1	1	1,1		1

National Means

The Pro-ed DAB provided a table of national means for all children and for LD children in age groups of 6 to 7, 8 to 9, and 10 to 11. These mean scores provided a view of how PIRK scores compared with the national means.

The PIRK mean scores were higher than the LD national mean (LDNM) in the three age groups, and were higher than the national mean (NM) for all children except in listening for ages 6 to 7 (see Table 16). For ages 6 to 7, the PIRK mean score was higher than the LDNM by 26.7, and higher than the NM by 6.5 in word knowledge; and the PIRK mean score was higher than the LDNM by 8, and the NM by 0.7 in reading comprehension. The PIRK mean socres were higher than both the LDNM and the NM by 2.5 in spelling, and by 4.5 in writing. The PIRK mean score was higher than the LDNM by 6.6 in listening.

Table 16

Comparison of the PIRK Group Means (PM) with the LD National Means (LDNM) and the National Means (NM) for All Children on the Pro-ed DAB Scores in Word Knowledge, Reading Comprehension, Spelling, Writing and Listening

Ages	6-7			8-9			10-11		
	PM	LDNM	NM	PM	LDNM	NM	PM	LDNM	NM
Word Knowledge	35.0	8.3	28.5	39.8	31.9	45.1	42.4	36.9	56.2
Reading Comprehension	8.5	0.5	7.8	15.4	11.9	20.7	22.2	14.8	25.9
Spelling	2.5	0	0	3.4	2.7	7.3	5.1	3.2	12.8
Writing	4.5	0	0	6.1	5.7	10.3	8.4	4.2	17.1
Listening	15.5	8.9	15.7	24.0	18.0	23.5	25.7	18.3	27.6

Summary

Four teachers used PIRK as a major part of their reading program. Three emphasized neither code nor meaning, and one teacher emphasized code. One tutored in content mastery of the curriculum, and PIRK was used in the regular classroom. Three teachers used PIRK for 1 to 3 hours each week, and one used PIRK for 2.5 hours each week. Two teachers added phonemic drill, and three teachers taught phoneme sounds along with letter names. One teacher used only the PIRK procedure and guidelines, letter names without drill on phonemes.

Teachers' perceptions of PIRK's effect on student behaviors were positive in 26 of the 30 responses. All four teachers agreed that students were able to attend to the PIRK task without frustration, and to use the PIRK procedure with success, cooperate in small groups, share materials and take turns, self-monitor, and control random movements, but two teachers reported students were unable to control random movements in other language arts activities. Three teachers' students achieved 90% to 100% accuracy in decoding except for 75% to 85% in upper PIRK levels, with continuous assessment and practice for mastery, while one teacher's students achieved 70% to 80% accuracy in decoding and in reading connected text without using continuous assessment and practice for mastery. All of the teachers reported that students did not show interest in using PIRK, but some students seemed bored, especially after third grade. Two teachers perceived socioemotional improvement in students using PIRK and in other language arts activities, while two teachers were unsure. The four teachers agreed that PIRK assisted with their effective teaching by providing structured learning in a positive learning environment, high expectations for success, with a high rate of

success, and modeled skills in active teaching with guided practice and feedback.

The effects of the PIRK program on the development of reading and language arts skills were tested on a sample of 14 LD students, seven primary and seven intermediate, nine boys and five girls. The two groups using PIRK were compared with six primary and seven intermediate, five boys and eight girls not using PIRK. The primary group used the new primary PIRK for 6 months before the posttest. The Pro-ed DAB was given to the PIRK groups in the first 2 weeks of October 1991, and to the control groups in the last 2 weeks of January 1992, allowing an additional 2 months instruction time for the controls.

The PIRK groups were compared with the controls at primary and intermediate levels (see Table 13). Four hypotheses were tested using a simple t-test on reading, word knowledge, and reading comprehension, spelling, writing, and listening. The mean scores for the primary PIRK group exceeded the controls in word knowledge, reading comprehension, reading, spelling, and listening, but with a significant effect (t = .067) only in word knowledge. The mean scores for the intermediate PIRK group slightly exceeded the controls in reading comprehension and reading, in spelling, writing, and listening, but with a significant effect (t = .017) only in listening (see Appendix E for the larger primary group including non-LD reading disabled students).

The comparison of the PIRK groups with the controls on range of percentile ranks (see Table 15) showed that in word knowledge the primary PIRK group range of percentile ranks of 2 to 75 was higher in 4 ranks than the control group range of percentile ranks of 1 to 9, and the intermediate PIRK group range of percentile ranks of 1 to 16 was

higher in 3 ranks than the control group percentile ranks of 1 to 5.
The range of percentile ranks in reading comprehension of the primary
PIRK group of 2 to 75 was higher in 3 ranks than the control percentile
group ranks of 1 to 63, and the intermediate PIRK group range of
percentile ranks of 5 to 37 was also higher in 3 ranks than the control
group rank of 1 to 37.

The comparison of the PIRK mean scores (FM) with the LD national
mean (LDNM) and the national mean (NM) for all children (see Table 16)
showed that the PIRK group mean for ages 6 to 7 were higher than the LD
national mean, and also the national mean for all children on the DAB
subtests except for listening. The PIRK group means where higher than
exceeded the LD national mean on all DAB subtests for ages 8 to 9 and 10
to 11.

The results of the comparisons of group scores were disappointing.
Both the district using PIRK and the control district were unable to
follow the pretest-posttest control group with matching design, and the
PIRK groups and the control groups were really not equivalent. The
district using PIRK was unable to do random sampling. The control
district was unable to give the pretest, or to match students by reading
scores. Also, the criteria for LD placement were different in the two
districts. The criteria in the district using PIRK was that students
must be 2 years behind their peers, and in the control district students
must be 18 months behind peers in achievement. The loss of six students
from the PIRK groups also reduced the number of matched controls. The
small sample made it difficult to get a difference between groups at a
statistically significant level (see Appendix E).

The gender differences between the PIRK groups and controls may have had some influence on the scores. There were four girls and three boys in the primary PIRK group, and two girls and four boys in the control group. There were six boys and one girl in the intermediate PIRK group and six girls and one boy in the control group.

Studies of gender differences over the past three decades have shown that reading disabled children and adults are similar to controls, and reading disabled males tended to have higher verbal and performance scores on the Wechsler, but lower scores reading recognition and spelling than reading disabled females (DeFries, Wadsworth, & Gillis, 1990). Another study of gender differences research showed minimal gender differences, but females tended to be verbally superior, and males tended to have superior visual-spatial ability (Vogel & Walsh, 1987).

Teacher B, who followed the PIRK guidelines thought "PIRK had a tremendous impact on the majority of students" she had worked with. She was impressed with the early levels in PIRK. Scores go up and children reach levels equal to grade level....Some words seemed too much for elementary" students.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Leaders in the field of education have called for reading programs that are maximally effective, minimally time-consuming, and optimally suited to the needs of students. The purpose of this dissertation evaluation study was to examine how the PIRK reading program fits into the literature on teaching reading to learning diabled students. The second purpose was to assess the perceptions of long-term users of PIRK with respect to its effect on student reading and academic-related classroom behaviors. The third purpose was to examine the effects of PIRK on a sample of LD students in primary and intermediate resource rooms, and to compare the reading and language arts scores of LD children using PIRK with those not using PIRK.

Methodology

An evaluative study was designed to gather information and to analyze and describe the significant characteristics of the PIRK reading program. This evaluative study examined the PIRK components by reviewing the current literature on theory, research, and practice in teaching reading to all students, and what more was needed in teaching reading to LD students. This study examined the effects of PIRK on LD student achievement in reading and language arts, and the students' academic-related classroom behaviors when using PIRK, and in other

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language arts activities. Descriptions of teachers' language arts programs and teaching strategies provided information about the context in which PIRK was used in order to facilitate judgments about the extent of the transfer of the outcomes to similar contexts. The data sources contain different perspectives, different methods, and different investigators to cross-check data and interpretations with inter-subject agreement (Guba & Lincoln, 1987).

Questionnaires and interview questions elicited information about teachers' language arts programs and teaching strategies and also their perceptions and thoughts about using PIRK and its effects on LD student on-task classroom behavior, interest, and attention. The data were illustrated in tables.

A posttest-only control group design with matching by age was used to compare the reading, word recognition, reading comprehension, writing, spelling, listening scores of LD students using PIRK and LD students not using PIRK in resource rooms. The seven primary and seven intermediate LD students using PIRK were matched by age with six primary and seven intermediate LD control students not using PIRK. The sample contained a total of 27 LD students, 14 LD students using PIRK, and 13 LD students not using PIRK. The 14 LD students using PIRK were in four resource rooms with four teachers. The 13 students in the control groups were in three resource rooms with three teachers. The Pro-ed DAB was used to assess the effects of PIRK on student achievement in reading, word knowledge, and reading comprehension, spelling, writing, and listening. The mean scores of the groups using PIRK were compared with the mean scores of the control groups not using PIRK. A simple t-test was used to test the effects of PIRK as compared with the controls.

Comparisons were made among the different language arts programs and teaching strategies used with the PIRK groups. The language arts programs and teaching strategies, the groups' mean scores and percentile ranks, the PIRK mean scores, the national mean, and the LD national mean, by age groups, were illustrated in tables.

The three research questions guided the review of the literature, and an examination of the qualitative and quantitative data. This study examined the PIRK components by reviewing the current literature on theory, research, and practice in teaching reading to LD children, and by using the research data collected.

The Context, Input, Process, Product (CIPP) approach to evaluation was used to examine, improve, and make PIRK work better for its users. In order to determine needed changes, context evaluation identified the strengths and weaknesses of PIRK from (a) the literature, (b) the perceptions of current users of PIRK, and (c) the LD student achievement scores in reading and in language arts. User perceptions of PIRK helped to determine the overall needed improvement of PIRK. Process evaluation (what was intended) used information about the context and implementation of PIRK. Product evaluation measured, analyzed, and interpreted the effects of PIRK and whether the needs of the users were met. PIRK was evaluated by using standards of educational programs, projects, and materials such as utility, feasibility, propriety, accuracy and the need for improvement.

The CIPP principles of sound evaluation used to judge this study, are: (a) credibility as internal validity and truth value; (b) transferability as thick description and generalizability; (c) dependability as reliability, consistency, and replicability; and (d)

confirmability as neutrality, intersubjectivity agreement and
triangulation, objectivity, and credibility.

Research Results

The research is summarized in three sections based on the
following three research questions:

1. How does PIRK fit into current literature on teaching reading to
    LD students?

2. What are teachers' perceptions and thoughts of PIRK's effect on
    student behaviors during PIRK activities and other reading and
    language arts activities?

3. What are the effects of the PIRK reading program on the
    development of reading and language arts skills in LD students as
    compared with LD control groups?

Research Question 1: How Does PIRK Fit Into the Current Literature on Teaching Reading to LD Students?

Research Question 1 examined how PIRK fits into the current
literature on teaching reading to all children and also what more is
needed in teaching LD children to read. The PIRK reading program
components were identified by using Wong's (1988) instructional model:
Knowledge-facts or concepts, procedural knowledge, metacognitive
knowledge, cognitive processes, and motivation. Tables were constructed
to illustrate literature disclosures on the needs of children in
learning to read and also what more was needed by LD children. Then,
these were compared with what PIRK does.

The need for phonics was supported by research as a very effective
approach to develop word recognition as a support for comprehension.

"The problem is not phonics instruction—all students, whether their preschool reading preparation is high, low, or in-between, need to learn about spellings, sounds, and their relationships" (p. 120). Low aptitude children do not learn sound-letter relationships by reading, but learn them as they are taught. "Indeed, in reading achievement the gap between good and poor readers grows wider each year" (p. 114). Their knowledge of spelling-sound patterns may be hastened by "the use of onsets and rimes" (Stahl, Osborn, & Lehr, 1990, p. 126). LD children may need more intensive phonics instruction to overcome their decoding problems and to develop word recognition. The critical factor in fluent word reading was determined to be the ability to recognize letters, spelling patterns, and whole words, visually, effortlessly, and automatically. Systematic code instruction, alongside a meaning emphasis and language instruction, resulted in superior reading achievement overall. LD children need a code emphasis in teaching reading, spelling, and writing to overcome their problems with decoding (Johnson, 1988; Felton & Wood, 1991; Torgeson, 1990).

Adams (1990) emphasized the need for programs that were maximally effective, minimally time-consuming, and optimally suited to the needs of particular students. She believed that school failures could be reduced by instruction in letter and word recognition in preschool, kindergarten, and first grade.

The PIRK reading program was developed (a) to be maximally effective and minimally time-consuming, (b) to be optimally suited to the needs of LD students in learning to decode and recognize words, and (c) to overcome their problems in phoneme perception and letter recognition, word analysis, attention, and academic-related behavior.

The purpose of the primary PIRK was to provide early instruction in
letters and words and their sounds to help LD children to learn to
recognize letters and words, and to read, write, and spell words as a
support for reading comprehension. The goal of the primary PIRK was to
prevent reading failure in the primary grades, and related learning
disabilities. The goal of the revised PIRK was to assist LD students
with word recognition as fast and efficient as possible, as a support
for reading comprehension and listening, writing, and spelling. PIRK
was structured to provide students with stress-free activities they
valued and found interesting, that would provide ongoing success with
positive feedback on their achievement, and that would help them
overcome their problems in interest, attention, memory, perception,
language functions, and random movement with academic-related classroom
behaviors.

Anderson et al. (1985) believed that children can begin systematic
reading instruction in kindergarten, and need experiences with oral and
printed language, and early opportunities to write. Children need to
learn letters and sounds, the different meanings of a word, reading
along in whole books, the functions of reading and writing, the use of
handwriting practice "to apply and extend their knowledge of letter-
sound correspondences" (p. 34), and "phonics instruction should have
been completed by the end of the second grade...except in cases of
diagnosed individual needs" (p. 43). The reading of coherent and
meaningful texts containing clues to pronunciation and meaning, adds to
reading fluency in a "reciprocal relationship between word
identification and comprehension" (p. 44). The direct instruction of
comprehension strategies was found to increase comprehension among

students who could identify words, and was effective with third and fifth grade students.

Goodman (1986) defined whole language as a philosophy of curriculum, learning, teaching, and language. Whole language unified and integrated oral and written language development with thinking and building knowledge. It redefined reading and writing as processes for making sense out of and through written language, and the learner as someone who is already launched on the road to literacy before school begins. Goodman explained language is learned from the "whole generalized meaning, to specific meanings of words and word parts, letters, sounds, phrases, and sentences learned in the context of whole real language" (p. 9). It starts where learners are in language and knowledge and builds from there, and children discover the alphabet principle, the relationships between letter patterns and sound patterns when they learn to write. Strickland (1990) believed the evidence supported "a whole language and integrated language arts approach with some direct instruction, in context, in spelling-to-sound correspondence" (p. 44). Reading and writing in literacy activities meaningful from the child's point of view, are integrated in the development of language in listening, speaking, reading, and writing in oral language and print. Smith (1985) argued that phonics instruction should be in a context that makes sense to children. Pappas et al. (1990) agreed that there was a relationship between letters and speech sounds. Short and Burke (1990) believed that children learn the sounds of words in the authoring cycle of reading, writing, editing, and publishing.

Knowledge-Facts or Concepts

Research supported phonics knowledge-facts and concepts in
beginning reading instruction as essential for the development of word
knowledge and word recognition. Adams (1990) stressed that children
need a systematic sequence coverage of individual phonic elements and
their relationships of how sounds relate to words. The three types of
phonic knowledge-facts and concepts that children need are: (a) the
alphabetic principle of letter to sound correspondence, illustrated by
onsets and rimes and letter names; (b) phonemic awareness in the context
of rhyming phonograms; and (c) analytical knowledge of words, syllables,
and spelling patterns. LD children need a code emphasis with knowledge
of phonology, morphology, semantics, vocabulary, and syntax.

The issues of phonics instruction were the use of letter names in
place of phoneme drill, and inductive rule formation by the position of
the letter in spelling patterns in place of memorizing rules.

The PIRK reading program contains a systematic sequenced coverage
of individual phonic elements, the onset and rimes, phonograms,
syllables, and how their sounds relate to words. The PIRK knowledge
component of phonic facts and concepts which provides the phonic
elements needed by children, including LD children are: (a) the alphabet
principle of letter-to-sound correspondence, illustrated by onsets and
rimes and letter names, and inductive rule knowledge by the position in
a word; (b) phonemic awareness by using rhyming words; and (c)
analytical knowledge of word structure. The PIRK approach to teaching
phonics provides the code emphasis that LD children need, and the
knowledge of phonology, morphology, semantics, and vocabulary. PIRK

does not contain the syntax nor whole text practice that LD children need. PIRK is used along with reading connected text.

Knowledge-Procedure

Research suggests an integrated language arts with the direct instruction of phonics, using language games and activities organized in word families by phonograms for word analysis. The activities suggested for developing knowledge included: (a) phonological categorization that will classify, compare, and contrast onsets and rimes as units, phonograms, syllables, and rhyming with a focus on vowels; (b) letter-to-sound correspondence using letter names to bind experiences with letter sounds; and (c) seriation, spell, name, and write or trace letters and words. LD children need early intervention with the best approaches for teaching the code, rate of learning, time-on-task, and reduced unit size.

The PIRK reading program provides early intervention for teaching the code using language game activities with increased rate of learning and time on-task in small task units. The PIRK procedure for developing word knowledge includes the essential approaches for teaching phonics. Step 1: organize, sort, analyze, and match phonograms or syllables, compare and contrast onsets and rimes with a focus on the vowel; Step 2: synthesize onsets and rimes, and read rhyming words to the teacher for feedback on accuracy; and Step 3: letter-to-sound correspondence using letter names to bind experiences with letter sounds, and seriation, spell, name, and write or trace letters and words.

Knowledge-Metacognitive

Wong (1991) explained the two aspects of metacognition, knowledge about cognition, and the regulation of cognition to direct, guide, and

govern successful learning, such as strategies of categorizing and verbal rehearsal. LD children have problems with checking, planning, and monitoring the control processes. Swanson and Cooney (1991) defined executive function as cognitive activities that determine the order in which processes are performed, and the executive and search processes that organize and retrieve information.

The PIRK procedure uses concrete objects, which are words on cards to assist students to orient to the task that enables them to direct, guide, and govern their own successful learning, using strategies for organizing and categorizing words, and verbal rehearsal (see Table 5). The student controls the task, self-monitors, and uses the correct models of the word and the teacher provides feedback to check for accuracy. The student uses the PIRK plan and procedure and the criterion tests are used to determine placement and progress through the PIRK levels with practice for mastery.

Cognitive Processes

A key to fluent reading appears to be word recognition. Reading disability was determined to be failure at the word level: (a) in the phonological-core deficit of the perception and integration of phonemes and their use in short-term memory for most children; and (b) in the orthographic-core deficit of the perception, discrimination, analysis, and recognition of the visual features of letters and words for a smaller number of children. These deficits can develop into generalized cognitive, behavioral, and motivational problems. Learning problems were described as dysfunctions in the ability to receive, categorize, and integrate information to understand and use language. Learning disabled children need a process-task approach that integrates

remediation of the processing dysfunction while teaching content, and which develops automaticity in learning to read, spell, and write words.

The purpose of the PIRK reading program was to develop word recognition along with LD children's phonological perception and integration of the sounds in words; orthographic perception, the discrimination, analysis, and recognition of the visual features of letters and words; and to integrate these two processing functions while teaching phonics, decoding, and the structure of words with meanings added. The goal of the PIRK reading program was: (a) to assist the student in the development of fully functioning processes that are able to receive, categorize, and integrate information, so that they are able to understand and use language, and to recognize words; (b) to help students learn to read, spell, and write words; and (c) to prevent or remediate cognitive, behavioral, and motivational problems.

Language and perception. Tallal (1988) explained that language requires the integration of sensory, perceptual, cognitive, and linguistic functions. Research has demonstrated relationships between phonological development in perception and production of speech sounds and language development. Language-impaired children have dysfunctions in discriminating and sequencing rapidly presented nonverbal stimuli and memory of them, and have a major difficulty with identifying, discriminating, and using auditory stimuli. Their other problems are with visual recognition, sensory integration, tactile sensation, and phoneme perception. Johnson (1988) explained that LD children need language development along with reading tasks that are based on linguistic and phonological awareness, receptive and expressive

language, segmenting and rhyming, word recognition, handwriting, and spelling.

The purpose of the PIRK reading program was to assist the child with the development and integration of sensory, perceptual, cognitive, and linguistic functions. The PIRK procedure engages student processes in discriminating and producing speech sounds. The student identifies, discriminates, and sequences auditory stimuli in phoneme perception in processes of naming letters and reading rhyming words, and in visual and tactile-kinesthetic perception in sorting, matching, and writing letters and words. These processing activities enhance linguistic and phonological awareness, and reception and expressive language.

Attention and memory. Attention and memory were found to be related, and attention deficits were related to rote verbal learning and memory deficits in naming, lexical access, and phonological awareness. Students learned best when material was presented at the right pace. They learned less when material was presented at slow rates, however, material that was presented too fast may lead to anxiety and disorganization.

Deficits in a verbal form of working memory were associated with reading problems and deficits in language and phonological processes of naming and lexical access, defined as the language response to visual stimuli. Learning disabled children did not use verbal rehearsal, organization, analysis, and comparison. They need tasks to organize information into categories, rehearsal of category names, and to orient their attention with objects and procedures using concrete materials.

The PIRK procedure uses concrete materials of words on cards to assist student attention in tasks of organization, analysis and

comparison, visual and verbal rehearsal of letters and words, and category names. The PIRK process provides the student with experiences of analysis and verbal rehearsal while it engages working memory in using the phonological processes of naming and lexical access in the language response to visual stimuli.

The PIRK process components engage the child in attention, perception, memory, and language which require the child to attend, organize, rehearse, read, spell, and write words in spelling patterns, and practice for mastery in word recognition. PIRK allows students to control the learning task and to progress at their own pace, neither too fast nor too slow for the individual student.

Motivation

Motivation was found to be related to self-efficacy, and to be effected by positive feedback from teachers on students' achievement, which motivates them to persist on-task. A sense of learning efficacy helps children to sustain motivation as they observe their own progress.

The PIRK procedure provides a structure for the teacher to give positive feedback on students' accuracy and achievement as they read rhyming words and criterion tests. Students follow the PIRK procedure and observe their own learning progress, and persist on-task.

Reading Theory

The two reading theories that seemed to explain the PIRK knowledge and processing components were: (a) the developmental model of word recognition and naming, based on the theory of parallel distributed processing; and (b) the component process analyses of reading and its development that explained the relationship among reading processes as they relate to reading ability in the interdependent development of

phonological and orthographic processes and their deficits, and how word
recognition, memory, and language comprehension all contribute to
reading fluency and comprehension across population and ages. Language
comprehension compensated to some extent for poor word recognition, but
for most poor readers, language skills could not overcome deficits in
word recognition processes.

Theory of Instruction

The PIRK reading program seemed to fit with Bos and Vaughn's
(1988) explanation of the theory of interactive teaching in an active
learning environment, modified to facilitate LD student attention and
perception of the critical differences in stimuli, and to use the
executive function to coordinate learning and memory strategies of
organization and verbal rehearsal. The PIRK reading program also fits
the theory of direct instruction that has a focus on student access to
materials, activities at each student's skill level, and time-on-task
with minimal time lost in transitions between tasks. Students are held
accountable for their work, and they work on their own in guided
practice, in small group instruction, with fast-pacing, in small task
easy-to-difficult sequence, with teacher feedback on student accuracy
and achievement. The students are motivated by success and pride in
their work.

Effective teaching. Research on effective teaching included
aspects of both interactive teaching and direct teaching in mastery
learning of the curriculum. Effective teachers provided students with
opportunity to learn. They made their teaching role and expectations
clear, they maximized time-on-task, and minimized time lost in getting
organized and making transitions. Their time was spent in student-

teacher interaction, monitoring student progress, providing assistance, and promoting student self-regulated learning and autonomy.

The PIRK reading program materials and procedures provide an opportunity for students to learn. Student expectations are made clear in the PIRK procedure and materials in the sequence of small task units, progressing in levels from simple to complex, with maximum time-on-task, and minimum time lost in getting organized and making transitions. Students control the task, self-regulate their learning, use accessible materials, follow the procedure, and persist on-task for the time allowed. Students are made aware of what they need to learn with the procedure and materials, and the teacher provides the time needed to achieve mastery of word knowledge, decoding, word recognition, and reading fluency. The teacher's role is defined by the PIRK procedure and guidelines. The time is spent in student-teacher interaction, and in monitoring student progress.

Summary of Research Question 2: What Are Teachers' Perceptions of PIRK's Effects on Student Behaviors During PIRK Activities and Other Reading and Language Arts Activities?

Four teachers with the PIRK groups used PIRK as a major part of their reading program. Questionnaires collected teachers' thoughts and perceptions of PIRK's effect on student interest, attention, and on-task classroom behaviors. Interview questions elicited teachers' thoughts about using PIRK and its cost-effectiveness. The four teachers were asked 16 questions on the questionnaire and eight interview questions.

Classroom behavior. The four teachers' perceptions of PIRK's effect on student on-task classroom behaviors were positive in 24 of the 30 responses. Teachers A, B, C, and D in the PIRK groups perceived that students were able to attend to the PIRK task without frustration, and

to use the PIRK procedure with success. Three teachers reported that students achieved success in decoding with 90% to 100% accuracy, one of the three teachers reported 75% to 85% accuracy in decoding at higher PIRK levels, and one other teacher reported only 70% to 80% accuracy in decoding when not using criterion tests until after PIRK Level IV. The four teachers perceived that students were not interested in PIRK, and seemed bored. All of the teachers reported that students were able to cooperate in small groups, share materials, take turns, monitor their own work, complete a task, and do the next task in PIRK, but two teachers reported that students were unable to monitor their own work in other language arts activities. One teacher reported that students were unable to control random movements in other language arts activities. Two teachers reported student improvement in social-emotional functioning with both teachers and peers in PIRK and in other language arts activities, but two teachers were unsure about student improvement in social-emotional functioning.

Language arts programs. The time in PIRK varied from 1 to 3 hours each week, and the time in total language arts varied from 6 to 11 hours each week. The total time in language arts for the control group varied from 6 to 10 hours each week. The code or meaning emphasis, and the teaching strategies used varied from teacher-to-teacher in the PIRK groups. The language arts program used by the teachers in the control groups were the same overall with a meaning emphasis and content mastery along with drill of phonemes. In the PIRK groups, one teacher emphasized code using PIRK only, one teacher emphasized code and meaning equally using PIRK with one whole language, and two teachers appeared to

emphasize both code and meaning using PIRK along with connected reading and other language arts.

Teaching strategies. Teacher A used tutoring in a content mastery approach of the curriculum. She taught phoneme sounds for sounding out words, students used letter names to copy words, and PIRK was used by the regular teacher in the regular classroom. Teacher B used only the PIRK procedure and strategies without phoneme drills or phonemes to sound out words. Teachers C and D used phoneme drills and phonemes for sounding out words in addition to PIRK strategies. Teacher C allowed students to use either phonemes or letter names when writing letters and words. Teachers A, C, and D taught students to use whole language strategies in writing stories with invented spellings, and reading their stories to others, and they taught word usages in context using context cues. Teachers C and D taught word definitions. Teachers A, C, and D taught handwriting. Teachers A, B, and C used continuous assessment and practice for mastery.

Teachers A, B, C, and D in the PIRK groups believed that PIRK assisted with effective teaching by structuring learning in a positive, orderly environment by maintaining high expectations for success with high success rates, and by modeling skills assisting active teaching in guided practice and feedback with 90% to 100% accuracy for most students. Teacher B, using the primary PIRK, thought PIRK had a "tremendous impact on the majority of students" resulting in a rapid rise in test scores to grade level. Three teachers believed that PIRK was cost-effective, one teacher thought its effectiveness was due to student success, and one teacher did not respond to the question.

Summary

All four teachers perceived that PIRK had a positive effect on students' classroom behaviors. Students were able to attend to and persist in the PIRK task with success and without frustration, and practice for mastery. The students were able to work in groups, share materials, take turns, monitor own work, control random movements, and complete the PIRK task. These behaviors extended to other language arts activities for some of the children, but not for other students.

Students did not appear to be frustrated, which suggests they were not placed too high and were not moving too fast. However, students did not show interest, but seemed bored, which indicates they were placed too low in PIRK, and their pace was too slow moving through PIRK. A brisk pace in the appropriate level should keep students interested and excited in the use of PIRK.

The time in PIRK varied from 1 to 3 hours each week, less than the optimum time of 3 hours each week for the most effective use of PIRK. Three of the teachers used phonic drill in place of the time needed for practice in PIRK, and which is counter-productive to progress in PIRK. Whether teachers use a code or meaning emphasis may not be as important as the mastery of the interrelated set of phonic elements and the morphology, phonology, word attack skills, decoding, and word recognition development in PIRK. The four teachers believed that PIRK assisted them with effective teaching and helped students to learn with accuracy and success, except in upper PIRK levels. They also believed that PIRK was cost-effective.

The PIRK reading program is 100% reusable. The current cost is $349 for the primary PIRK, and $489 for the revised PIRK. Both of the

kits can be used with groups of three to ten students in each class period, or as many as 50 students in 1 day with one resource teacher. PIRK will last for 5 to 10 years.

Research Question 3: What Are the Effects of the PIRK Reading Program on the Development of Reading and Language Arts Skills in LD Students and Compared With LD Control Groups?

Research Question 3 was addressed with four hypotheses statements that are summarized separately.

Hypothesis testing. The hypotheses tested the differences between the scores in reading, word recognition, and comprehension, spelling, writing, and listening made by the LD students using PIRK and LD control groups not using PIRK. The PIRK groups of 14 LD students, seven primary and seven intermediate, nine boys and five girls, were matched by age with the control groups of 13 LD students, with six primary and seven intermediate, five boys and eight girls. The primary PIRK group began using the new primary PIRK in January 1991 with 5 months instruction between pretest and posttest. The control district did not give the pretest. The PIRK groups and the control groups were compared by the posttest scores. The Pro-ed DAB was given to the PIRK group in the last 2 weeks of October 1991. The DAB was given to the control groups in the last 2 weeks of January 1992. Raw scores and percentiles were used to compare the primary PIRK groups and the control groups, and the intermediate PIRK group and the control group.

Hypothesis 1: There will be no differences between the scores in reading, word recognition, and comprehension made by the LD students using PIRK, and LD students not using PIRK. The posttest mean scores for the primary PIRK group were different from the mean scores for the primary control group in word knowledge. The mean score in word

knowledge for the primary PIRK group exceeded the primary control group by more than 10 points or 25%, and more than 2 points or 20% in reading comprehension, and 12 points or 20% in reading. A simple $\underline{t}$-test was used on the data to test the effects of the PIRK treatment vs. controls in reading, word knowledge, and reading comprehension. The $\underline{t}$-test resulted in a significant effect at the .067 level in word knowledge, but no effects in reading comprehension and reading. The alpha .10 was selected due to the small sample size, and to avoid making a Type II error in "accepting the null hypothesis when it should be rejected" (Huck et al., 1974, p. 10). Hypothesis 1 was therefore rejected for the primary group in word knowledge. The primary PIRK group could recognize significantly more letters and words than the control group that did not use PIRK. The posttest mean scores for the intermediate group using PIRK were higher than the mean scores for the control, but the differences were small. Therefore, Hypothesis 1 was not rejected for the intermediate groups in word knowledge, reading comprehension, and reading.

Hypothesis 2: There will be no differences between the scores in spelling made by LD students using PIRK and LD students not using PIRK. The mean scores for the primary and the intermediate PIRK groups were higher than the mean scores for the primary and intermediate control groups, but the differences were small. Therefore, Hypothesis 2 was not rejected for the primary and intermediate groups in spelling.

Hypothesis 3: There will be no differences between the scores in writing made by LD students using PIRK and LD students not using PIRK. The mean scores in writing for both of the PIRK groups were similar to

the control groups. Therefore, the null hypothesis was not rejected for the primary and the intermediate groups in writing.

Hypothesis 4: There will be no differences between the scores in listening made by LD students using PIRK and LD student not using PIRK. The mean scores in listening for the primary PIRK group were similar to the control group, but the mean scores for the intermediate PIRK group exceeded the mean score for the control group in listening. Hypothesis 4 was therefore rejected at the .017 level for the intermediate group, but it was not rejected for the primary group. It appears to take a longer period of time to overcome the phonological core dysfunctions in auditory discrimination and perception of speech sounds, and listening comprehension, as shown by the differences between the primary PIRK and the intermediate PIRK scores.

PIRK Percentile Ranks Compared with the Control Percentile Ranks

The range of the percentile ranks for both the primary and the intermediate PIRK groups were higher than the controls in word knowledge and in reading comprehension. The range of the percentile ranks in word knowledge was 2 to 75 for the primary PIRK group, and 1 to 9 for the control; 1 to 16 for the intermediate PIRK group, and 1 to 5 for the controls. The range of the percentile ranks in reading comprehension was 1 to 75 for the primary PIRK group and 1 to 63 for the controls; 5 to 37 for the intermediate PIRK group, and 1 to 37 for the controls. The percentile ranks in word knowledge for the primary PIRK group were far above the controls, but not as much so for the comprehension.

PIRK Mean Scores Compared with National Means

The PIRK posttest mean scores were compared by age groups with the national mean and the LD national means that were provided by the Pro-ed

DAB manual. The PIRK mean subtest scores were higher than the LD national mean on all of the subtest scores for ages 6 to 7, 8 to 9, and 10 to 11, and were higher than the national mean on all subtest scores for ages 6 to 7 except for listening (see Table 16).

The results of the comparisons of group scores were disappointing. Both the district using PIRK and the control district were unable to follow the pretest-posttest control group with matching design, and the PIRK groups and the control groups were really not equivalent. The district using PIRK was unable to do random sampling. The control district was unable to give the pretest, or to match students by reading scores, and gave the posttest 2 months later than the PIRK group's posttest. Also, the criteria for LD placement were different in the two districts. The criteria in the district using PIRK was that students must be 2 years behind their peers, and in the control district students must be 18 months behind peers in achievement. The loss of six students from the PIRK groups also reduced the number of matched controls, and left four girls and three boys in the primary PIRK group with two girls and four boys in the controls, and six boys and one girl in the intermediate PIRK group with six girls and one boy in the controls. The small sample made it difficult to get a difference between groups at a statistically significant level (see Appendix D).

Conclusions

This researcher made the following conclusions based on the analyses of the information provided in this evaluative study. The conclusions were logically linked to the data, based on the evidence that the data were accurately collected and analyzed. The conclusions

addressed the needs of the users of PIRK and confronted the issues of teaching beginning reading to LD students.

Research Question 1

Research Question 1 identified how PIRK fits into the current literature on teaching reading to LD children.

The current literature on research and theory in teaching reading indicated that all children need the ability to recognize letters, spelling patterns, and whole words visually, effortlessly, and automatically, and that LD children may need more intensive instruction to overcome their deficits in letter and word recognition. The research supported systematic code instruction alongside a meaning emphasis and language instruction which resulted in superior reading achievement overall. LD children need a code emphasis along with word knowledge of phonology, morphology, semantics, vocabulary, and syntax. Adams (1990) called for programs that were maximally effective, minimally time-consuming, and optimally suited to the needs of students. She suggested that instruction in letter and word recognition in beginning reading could reduce school failures. Anderson et al. (1985) found that children can begin systematic reading instruction in kindergarten with experience in oral and written language. Short and Burke (1990) and Goodman (1990) believed children are already on the road to literacy before they come to school. Smith (1985) and Pappas et al. (1990) observed children learn the sounds of words by reading. Johnson (1988) stressed the need for early intervention and prevention with a code emphasis for LD children in teaching reading, spelling, and writing.

The PIRK reading program provides a code emphasis needed for teaching LD children reading, spelling, and writing, along with phonology, morphology, and vocabulary for the development of word recognition as a basis for reading fluency and comprehension. PIRK provides the intensive instruction that LD children need with practice in reading, spelling, and writing words in spelling patterns to overcome their deficits in letter and word recognition. PIRK was developed interactively with LD children who enjoyed word games with materials they could manipulate which provide a meaningful context for LD children to learn phonics. PIRK provides what research and theory in teaching reading indicated that all children need, a means to develop the ability to recognize letters, spelling patterns, and whole words visually, effortlessly, and automatically. The primary PIRK was developed to prevent failures in the beginning stages of learning to read, for those children with dysfunctions that interfere with adequate literacy development before coming to school. The primary PIRK may be completed by the end of second grade by children with less severe dysfunctions who are able to move at a faster rate through the PIRK materials, and achieve the letter and word recognition needed to reduce failure. PIRK provides systematic code instruction supported by research, but not the meaning emphasis and language instruction that result in superior reading achievement overall. PIRK is used along with reading and writing stories, and whole text.

The Knowledge That Children Need in Learning to Read, and What More Is Needed By LD Children

The need for phonics was supported in research literature as a very effective approach for the development of word recognition as a

support for comprehension. LD children may need more intensive phonics instruction to overcome their decoding problems and to develop word recognition. Children need to learn letters and sounds, the different meanings of a word, reading along in whole books, the functions of reading and writing, and handwriting practice to extend their knowledge of letter-sound correspondences, all of which should be completed by the end of second grade, except in cases of special need (Anderson et al., 1985). Smith (1985) thought that phonics instruction should be in a context that makes sense to children. Adams (1990) stressed that children need a systematic sequenced coverage of individual phonic elements and their relationships of how sounds relate to words. The research supported three types of phonic knowledge: (a) the alphabetic principle of letter-to-sound correspondence, (b) phonemic awareness in rhyming, and (c) analytical knowledge of words, syllables, and spelling patterns. The issues related to the alphabet principles were whether to use phonemic drill or letter names in teaching the sound-to-letter correspondences. Adams explained that letter names contain phoneme sounds, a letter name is much easier to learn than a phoneme, and letter names provide a much faster way of learning sound-letter relationships. She stressed the importance of phonic rule knowledge, not to memorize but to illustrate the place of the letter in the onset and rime, phonogram, or syllable.

How the PIRK Knowledge Component Fits

The PIRK reading program provides the phonics knowledge that children need, as outlined by Adams (1990), which is a systematic sequenced coverage of individual phonic elements, and their interrelations of how sounds relate to words. The PIRK knowledge

component also provides what LD children need, as outlined by Johnson (1988), such as the knowledge of phonology, morphology, semantics, and vocabulary along with activities of reading, writing, and spelling; but, PIRK does not include syntax or sentence structures that LD children may need. PIRK provides phonology in the interrelated sets of phonic elements in a context that makes sense to LD children; morphology in the affixes, prefixes, suffixes, and word roots; vocabulary in the organization of words correlated with basal readers and curriculum content; and semantics in the meanings added to the word roots and affixes. The revised PIRK words need to be updated and correlated with current basal readers, and across the curricular context of science, social studies, music, and art. The upper levels need to be made less difficult. Syntax and semantics may need to be added to PIRK in the form of word meanings in sentences. PIRK also needs to be correlated with the 1,000 most common words for spelling in order to enhance its effectiveness in teaching spelling. Nursery rhymes and paragraphs with comprehension strategies at the third grade level may be needed in the primary PIRK.

PIRK knowledge-facts and concepts. PIRK provides the three types of knowledge, supported by the research, as essential in beginning reading and phonics instruction, the alphabet principle of letter-to-sound correspondences using letter names in place of phonemic drill, phonemic awareness in rhyming words, and analytical knowledge of words, phonograms, spelling patterns, onsets and rhymes letter names, and phonic rules illustrated by the letter's position in onsets and rimes and letter patterns. PIRK provides a word knowledge base for reading and writing stories and whole text.

PIRK knowledge-procedure. The PIRK procedure provides the
approach supported by research; which is an integrated language arts at
the word level with direct instruction of phonics using language games
and activities organized in word families by phonograms for word
analysis. The PIRK procedure used the approaches supported by research
for teaching the code, that increases a rate-of-learning and time-on-
task, in a reduced unit size. The PIRK procedure included activities
for developing word knowledge in the following steps: Step 1—
phonological categorization that will classify, compare, and contrast
onsets and rimes as units, phonograms, and syllables; Step 2—rhyming
phonograms, syllables, and words with a focus on vowels; and Step 3—
letter-to-sound correspondence using letter names to bind experiences
with letter sounds and seriation, spell, name, and write or trace
letters and words. PIRK does not provide instruction in comprehension
or connected reading. PIRK is used as a phonics program to teach word
knowledge and develop word recognition with LD children, as an adjunct
to connected reading and writing, and comprehension construction.

PIRK metacognitive knowledge. The PIRK reading program uses two
aspects of metacognition, explained by Wong (1991); that is, the
regulation of cognition to direct, guide, and govern one's own
successful learning, and the knowledge about cognition in the use of
strategies for organizing and categorizing words and verbal rehearsal.
The PIRK procedure helps LD children to check and monitor the control
processes, to control the task, to learn the procedure, to self-monitor
and check their work in using correct models of words on cards, to read
rhyming words, and the criterion tests to the teacher for feedback on
accuracy.

The Cognitive Processes All Children Need and What LD Children Need

All children need the ability to read words fluently. A key to fluent reading appeared to be word recognition. LD children fail at the word level in learning to read, but they are able to comprehend a wide range of reading materials when their decoding and word recognition deficits are overcome. LD children need a process-task approach that integrates the remediation of dysfunction with teaching content. Their dysfunctions and deficits are in attention, memory, perception, and language. LD students need objects to orient their attention, and procedures that use concrete materials presented at a brisk pace that is neither too fast nor too slow. They need memory development using strategies to organize and classify information into categories to rehearse category names and also verbal rehearsal. They need language development using a procedure for integrating the sensory, perceptual, linguistic, and cognitive functions; phonological development in perception and production of speech sounds in discriminating and sequencing auditory, visual, and tactile stimuli.

PIRK Cognitive Process-Task Approach

The PIRK process-task approach integrates teaching content with remediating dysfunctions. The purpose of the PIRK procedure was to orient student attention with objects and concrete materials, and to sustain their attention with the students in control of the task, working at their own pace, neither too fast nor too slow, with ongoing success in activities that were enjoyable and meaningful from the student's point of view. PIRK addressed (a) the attention deficits related to rote verbal learning and memory deficits in naming, lexical access, and phonological awareness; and (b) the deficits in a verbal

form of working memory associated with reading problems in naming and lexical access, and in the language response to visual stimuli. The PIRK procedure trains students in memory strategies that organize, classify, analyze, compare and contrast, rehearse category names with rhyming words, and write, spell, and name letters and words in spelling patterns.

The purpose of the PIRK process-task procedure was to integrate language and perception processes in the sensory, perceptual, cognitive, and linguistic functions. PIRK provides activities to assist with language development in: (a) reading rhyming words using speech production and receptive and expressive language for linguistic and phonological awareness training; (b) discriminating and sequencing auditory, visual, and tactile stimuli; and (c) segmenting, rhyming, copying, writing, spelling, and naming letters and words for training in recognition of words and spelling patterns.

Motivation in PIRK

The PIRK reading program seems to fit the concept of self-efficacy and learning-efficacy relationships to motivation. Self-efficacy was found to be related to teacher feedback on student achievement. A sense of learning efficacy helped children to sustain motivation as they observe their own progress. The purpose of the PIRK materials and procedures was to provide opportunities for LD students to learn and experience success based on activities that LD children liked and persisted in doing. Students were allowed to take charge of the task, follow the procedure, and analyze, read, write and spell words, check for accuracy with correct models of the words on cars, and read words with teacher feedback on accuracy and achievement, to complete the task

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and begin the next task. Students could observe their own progress and see the value of the task. The criterion tests assisted teachers with providing feedback on students' progress, and to determine where practice was needed for mastery. The structure of the PIRK materials and use of the criterion tests provide the correct amount of varied and controlled redundancy and practice. Added drill and practice of PIRK words on sheets, and homework becomes a burden for the students, and results in students' loss of interest and boredom.

How PIRK Fits Theories of Reading and Theories of Instruction

PIRK fits the developmental model of word recognition and naming based on the parallel distributed processing theory. PIRK also fits the component process analyses of reading and its development in the interdependent development of phonological and orthographic processes and their deficits, and how word recognition, memory, and language comprehension all contribute to reading fluency and comprehension.

The PIRK reading program clearly fits the information processing theory and interactive teaching in an active learning environment, modified to facilitate LD student attention and perception of the critical differences in stimuli, and which uses student executive functions to coordinate learning and memory strategies of organization and verbal rehearsal. The PIRK reading program also fits direct instruction theory that focused on student access to materials and activities at each student's skill level and time-on-task with minimal time lost in transitions between tasks. Students are held accountable for their work, control their work, and work on their own in guided practice, in a small group instruction with fast-pacing, in a small task, and easy-to-difficult sequence of units. Teachers provide

feedback on student accuracy and achievement. Students are motivated by ongoing success, teacher feedback on their achievement, and pride in their work.

Effective teaching. The PIRK reading program found support in the research on effective teaching which included aspects of both interactive teaching and direct teaching in mastery learning of the curriculum. Effective teachers provide students with opportunity to learn. They made their teaching role and expectations clear; they maximized time-on-tasks and minimized time lost in getting organized and making transitions. Their time was spent in student-teacher interaction, monitoring student progress, providing assistance, and promoting student self-regulated learning and autonomy.

The PIRK reading program provided an opportunity for students to learn in a procedure that made the teacher's role and expectations clear, and assisted the student to stay on task in activities essential to learning to read, write, and spell words. Students have access to the PIRK materials and follow the PIRK procedure. Students begin the task, take a packet of words, follow the procedure, complete the packet of words, and take the next packet, repeat the procedure, and then continue until the level is completed. The student then takes the criterion test to determine needed practice, completes the practice, and continues to the next level. The teacher's time is spent in student-teacher interaction, and in providing assistance when needed in listening to students read rhyming words and criterion tests, and in monitoring student accuracy and progress in PIRK. PIRK takes the place of phonic drill, in activities that are meaningful from the LD student's point of view.

Research Question 2

Research Question 2 elicited teachers' perceptions and thoughts on PIRK's effects on student classroom behaviors during PIRK activities and other reading and language arts activities.

The four teachers using PIRK as a major part of their reading and language arts programs answered questions about their thoughts and perceptions of PIRK's effect on students' interest, attention, and classroom behaviors when using PIRK and also in other language arts activities.

Attention, Interest, and On-Task Classroom Behaviors

The four teachers perceived that students were able to attend to the PIRK task and to use the PIRK procedure with success. All four teachers perceived students as being able to cooperate in small groups, share materials, take turns, monitor their own work, control random movements, complete the task, and do the next task in PIRK and in other language arts activities, with the exception that in other language arts activities, two teachers found students unable to monitor their own work, and one teacher found that students were unable to control random movements. The four teachers perceived students as being neither frustrated nor interested when using PIRK, but they seemed bored.

Language Arts Programs and Teaching Strategies

The language arts program and teaching strategies were examined for insights into how PIRK fits different contexts and what influence the context may have on PIRK's use and effectiveness. The language arts program and teaching strategies varied from teacher-to-teacher. One teacher emphasized code, one teacher emphasized code and meaning equally, and two teachers emphasized neither code nor meaning. Two

teachers used PIRK along with other language arts activities, and also use phonemes in drills and in sounding out words in addition to PIRK strategies. One teacher used PIRK with PIRK strategies only, using letter names in place of phonemes in sounding out words, and the other language arts were taught in the regular classroom. One teacher used a content mastery approach to language arts, but PIRK was used in the regular classroom and students used either phonemes or letter names when using PIRK or to sound out words in reading text. The research suggested that the phoneme drill may be a waste of time and may interfere with progress in learning sound-to-letter correspondence. The research supported the use of letter names as a faster and more effective way than the use of phonemes in learning sound-to-letter correspondence and letter patterns for decoding and for word recognition. Learning disabled children have problems with phoneme perception and sequencing of letters. Therefore, the use of phonemes may be a specific problem to LD children, and may influence their loss of interest and boredom in the use of PIRK. Students who are distractible and/or have attention problems may have difficulty using PIRK in the regular classroom.

Three teachers allowed students to use invented spellings when writing stories and then to read their stories to others; however, invented spellings may interfere with LD student progress in learning accurate spelling patterns due to their visual or auditory perception and sequencing problems.

Three teachers taught handwriting and word usages in context using context cues. One of these three teachers also taught word definitions, and one other teacher taught only word definitions, but not word usages

in content or handwriting. Research supported the use of word usages in context, words defined in sentences, and word definitions.

Three of the four teachers used continuous assessment and practice for mastery in using PIRK, but one teacher used neither continuous assessment nor practice for mastery in PIRK until after Level IV. One of the participating teachers did not use PIRK, although her students used PIRK in the regular classroom. Three of the teachers reported student achievement at 90% to 100% accuracy in decoding, and one teacher reported 70% to 80% accuracy in decoding, but she did not use the criterion tests until after Level IV. Teaching with continuous assessment of students in the PIRK procedure, the use of criterion tests, and practice for mastery seemed to be essential for a high level of student success in using PIRK. The phonic elements and their relationships in the revised PIRK Levels I to IV, and in the primary PIRK Levels I to IV must be mastered from 90% to 100% accuracy before students can continue into the upper PIRK levels successfully with the more difficult syllables and words, and which may be too difficult for some elementary LD students. The extent that students experience success may influence their interest or boredom in the use of PIRK.

One teacher reported only 75% to 85% accuracy in decoding in the upper PIRK levels. She felt that the words in Levels VI and VII were too difficult for elementary children. It appears that these two levels may need to be revised, and correlated with current intermediate basal readers and with materials across the curriculum.

PIRK and teacher effectiveness. The four teachers in the PIRK groups believed that PIRK provided effective teaching by structuring the learning tasks in a positive, orderly environment, and helping to

maintain high expectations for success. They perceived that PIRK modeled skills and assisted active teaching with guided practice and feedback. One teacher, using the primary PIRK, found that it effected a rapid increase in test scores. One teacher thought the revised PIRK upper levels were too difficult for elementary students. Three teachers believed that PIRK was cost-effective, and one teacher thought it was cost-effective due to student success. The primary PIRK appears to be cost-effective when used with small groups of three to ten students in each class period, or 15 to 50 students each day. The primary PIRK cost is $349, the materials are 100% reusable, and will last for 5 to 10 years with normal care. The cost per student would be less than $2.00 and as little as 30¢ over several years of use.

Research Question 3

Research Question 3 examined the effects of the PIRK reading program on the development of reading and language arts skills in LD students as compared with LD control groups. A sample of 14 students, seven primary and seven intermediate, who used PIRK as a major part of their reading and language arts program, was selected and matched by age with 13 controls, six primary and seven intermediate LD students not using PIRK. Four hypotheses tested the differences between the DAB scores in reading, word recognition, and reading comprehension, spelling, writing, and listening, made by the LD groups using PIRK and the LD control groups not using PIRK. The PIRK groups were given a pretest in late January 1991, with 5 to 6 months instruction time, and 8 months later they were given the posttest in early October 1991. The control groups were given the posttest 2 months later in late January

1992. The 2 months difference in testing time gave 20% more instruction time for the controls than for the PIRK groups, and which may have affected the differences in scores between the PIRK groups and the control groups. The criteria for LD placement were that student achievement be more than 2 years behind peers for the PIRK group, and 18 months behind peers in achievement for the controls. The LD placement of the controls was 6 months ahead of the PIRK groups, and this would have influenced the differences in scores between the PIRK groups and the control groups.

Raw scores and percentile ranks were used to compare the PIRK groups with the control groups. The PIRK groups were also compared with the LD national means and also with the national means that were provided by the DAB manual. The PIRK pretest scores are compared with the posttest scores (see Appendix E).

The primary PIRK group mean scores were higher than the control group mean scores on all subtests, but with a significant effect of .067 in only word knowledge. The alpha was set at .10 due to the small sample, and to avoid a Type II error of not rejecting the null hypothesis when it was false. The intermediate PIRK group mean scores were similar to the control's mean scores, except that the PIRK group mean score exceeded the control mean score in listening comprehension, with a significant effect of .017. These results showed that the primary PIRK groups that were using a variety of language arts strategies outperformed the controls using content mastery with tutoring, in word knowledge, but not at a significant level in reading comprehension, writing, spelling, and listening. The results showed that the intermediate LD students using the revised PIRK with a variety

of language arts strategies outperformed the controls using a content mastery with tutoring in listening comprehension, but not in the other subtest scores.

The intermediate PIRK group performance was similar to the controls in reading, word knowledge, reading comprehension, writing, and spelling. The control group language arts program used a meaning emphasis with phonics drills and content mastery of the curriculum with tutoring, while the PIRK groups used a variety of language arts program, with either a code emphasis, an equal emphasis on meaning and code, or no emphasis. The teaching strategies varied from no drill in phonemes, to drill in phonemes along with PIRK strategies, and from using letter names to sound out words to using either letter names or phonemes.

A visual comparison of the range of percentile ranks showed that the primary PIRK group was higher than the controls ranks in reading comprehension, and in word knowledge. The PIRK mean scores were higher than the LD national means on all DAB subtests scores for ages 6 to 7, 8 to 9, and 10 to 11, and were higher than the national mean for all students ages 6 to 7 on all of the subtest scores except for listening. Although the sample was small, the primary PIRK group's performances suggested that the primary PIRK may be very effective for early instruction and prevention of reading failures. The intermediate PIRK group performance suggested that the revised PIRK needs the upper levels made less difficult, with the words updated and correlated with science, math, social studies, music, and art.

The Overlapping Data of the Three Research Questions

The overlapping data in this study from the literature, from what teachers said, and from the test data confirmed that the PIRK reading

program was an effective approach to teaching phonics, spelling patterns, and word knowledge to primary LD children, and developing listening comprehension over time in resource rooms. An examination of how PIRK fits into the literature on teaching reading and language arts skills to children and also to LD children revealed that PIRK provides the phonics approach that children need, and also the code emphasis that LD children need. Anderson et al. (1985) believed that phonics instruction should be finished by the end of second grade, except for children with special needs. It is possible for the primary PIRK to be completed by the end of the second grade by reading-disabled students with less severe dysfunctions. PIRK was supported by research to be a very effective approach for LD children to learn to read, write, and spell, and also to help them to overcome processing dysfunctions in auditory discrimination and perception which makes spoken language comprehensible.

The results on the DAB tests were disappointing. The PIRK and controls were really not equivalent groups, due to the problems with sampling and matching. There were four girls and three boys in the primary PIRK group, but two girls and four boys in the controls, and six boys and one girl in the intermediate PIRK group, but six girls and one boy in the controls. The gender difference may have influenced the scores of the intermediate PIRK group of six boys and the controls of six girls, since females tend to score higher than males on verbal tests, reading, and spelling, but most of the variance "observed in reading-disabled children is due to individual differences within samples of males and females" (DeFries et al., 1990, p. 228). The posttest was given to the controls 2 months after it was given to the

PIRK groups. The DAB scores for the primary PIRK group indicated PIRK to be an effective approach to teaching word knowledge skills for LD children, and suggested that PIRK may be effective for early intervention and prevention of reading failure. One primary teacher was "very impressed" with the effects of the new primary PIRK, because her students' reading test scores rose rapidly to grade level in a short time. The DAB scores and the teachers' comments for the intermediate PIRK group indicated a need for improvement of the revised PIRK at the upper PIRK levels. Four teachers using PIRK thought that PIRK helped LD students to achieve mastery in word recognition at 90% to 100% accuracy for three teachers, except at the upper PIRK levels, and 70% to 80% accuracy for one teacher without using criterion tests, and helped teachers to be effective. Three teachers thought that PIRK was cost-effective, and one of the three teachers thought PIRK was cost-effective due to student success.

PIRK Strengths and Weaknesses

This evaluation study provided the following major findings and revealed the strengths and weaknesses in PIRK, and what improvements are needed to make PIRK work better for PIRK users.

1.   The PIRK reading program uses phonics described in the current literature as a very effective approach for teaching word knowledge as a support for comprehension in beginning reading, and PIRK provides a meaningful context with the code emphasis that LD children need. The revised PIRK has some meaning but needs to add more meaning emphasis that intermediate students need.

2.   The PIRK knowledge component provides the sequenced coverage of individual phonic elements and their relationships of how sounds

relate to words that children need, as well as the phonology, morphology, semantics and vocabulary, together with activities in reading, writing, and spelling that LD children need, and in activities they enjoy and persist in doing that makes sense to them. However, PIRK does not contain syntax or sentence structures, nor the connected reading and writing, or comprehension strategies that all children, as well as LD children need. PIRK needs to be used as an adjunct to reading and writing whole text. Also, improvements of PIRK to make it work better for users might include: (a) nursery rhymes and short stories in the primary PIRK correlated with the words in each level to provide a whole language context for the words experienced; (b) writing and reading own stories; and (c) comprehension strategies at grade 3. PIRK needs to be correlated with the 1,000 most common words to increase the effectiveness of PIRK with teaching spelling.

3. The knowledge-facts and concepts component contains the three types of phonics knowledge described by Adams (1990) for beginning reading instruction: (a) the alphabet principle of letter-to-sound correspondences using letter names; (b) phonemic awareness in reading rhyming words; and (c) analytical knowledge of words, phonograms, spelling patterns, onsets and rimes, letter names, and phonic rules illustrated by the letter's position in the onsets and rimes, syllables, and letter patterns. The revised PIRK words need to be updated and correlated with curricular content, along with different meanings of a word in sentences, and the upper levels expanded for a more gradual increase in difficulty.

Comprehension strategies might be included at the third grade level of the primary PIRK.

4. The PIRK knowledge-procedure component was supported by research as a very effective approach for teaching students phonic facts and concepts. The three PIRK steps: Step 1 analyze words, classify, compare, and contrast onsets and rimes, phonograms, and syllables; Step 2 synthesize onsets and rimes, and read rhyming words; Step 3 learn letter-to-sound correspondence with letter names to bind experiences with letters and sounds, and seriation, write, copy or trace, spell and name letters and words. The PIRK procedure provides the integrated language arts at the word level with direct instruction in phonics, using language games and activities organized in word families by phonograms for word analysis, and the approach for teaching the code, supported by research, that increases rate of learning, and time on-task in a reduced unit size. PIRK does not include connected reading and writing, but is used along with reading and writing stories, and whole text.

5. The PIRK knowledge-metacognitive component teaches students to regulate cognition, direct, guide, and govern their own successful learning, and teaches strategies for organizing and categorizing words, and verbal rehearsal. Students control the task, self-monitor, use correct models to check their own work, and they read words to the teacher for feedback on accuracy.

6. The PIRK cognitive process component provides the process-task approach that LD children need to overcome their processing dysfunctions in attention, memory, perception, and language. PIRK

contains the objects and concrete materials to orient LD student attention and a procedure to sustain student attention at the individual's pace, neither too fast nor too slow. Students are trained in memory strategies that organize and classify information into categories, and rehearsing category names. Language development is enhanced in the procedure that integrates the sensory, perceptual, linguistic, and cognitive functions in the perception and production of speech sounds, and in discriminating and sequencing auditory, visual, and tactile-kinesthetic stimuli. Auditory discrimination of speech sounds is developed by reading rhyming words, and by naming letters and words as they are copied, written, and spelled. The writing and reading process gives a support to the auditory image of the word and its parts, and separates one word from another. The word analysis in discriminating, sorting and matching words also gives support to the auditory discrimination of words.

7. The PIRK motivation component may enhance the self-efficacy effected by teacher feedback on student achievement, and also learning efficacy that helped children to sustain motivation as they observed their own progress and were able to see the value of the task. The problems of student lack of interest and boredom are related to (a) excess phonics drill, and reinforcement; (b) the use of PIRK worksheets created by the teacher for homework creating too much repetition; (c) slow movement through PIRK materials; and (d) the difficulty students encounter at upper PIRK levels. LD students will often say they are bored rather than admit a task is too difficult for them.

8. Effective teaching was assisted by PIRK which included aspects of both interactive teaching and direct teaching in mastery learning of phonics elements and word knowledge. PIRK structures maximized time-on-task and minimized time lost in transitions and in organization of the task. It promoted student self-regulated learning and autonomy.

Implementation

The primary PIRK could be implemented in elementary resource rooms to teach phonics, word knowledge, spelling, and writing, and to prevent reading failure, and related classroom behavior problems.

PIRK needs to be used along with reading and writing connected text. More meaning added to PIRK might increase interest and relieve boredom. Nursery rhymes and short stores would add meaning to the primary PIRK, along with comprehension strategies at third grade. The revised PIRK words need to be updated and correlated with the curricular content, along with different meanings of a word in sentences, and making the upper PIRK levels less difficult should increase student interest.

The effects of the primary and revised PIRK would be enhanced if teachers removed drill on phonemes, and used letter names instead of phonemes for sounding-out words, to allow the intermediate LD students to increase their pace in moving through PIRK and increase their learning rates, and interest in using PIRK.

This study suggested that the levels of mastery in decoding, word knowledge, word recognition, and reading comprehension in the revised PIRK upper levels could be increased by updating the words across the

curricular content, by making the upper PIRK levels less difficult, by adding different meanings to specific words in a sentence context, by shifting the code emphasis toward a meaning emphasis, and by increasing whole text independent reading as soon as possible.

Training Implications

Training for teachers should include how PIRK fits the literature on teaching phonics, decoding, and word recognition to primary children, and how PIRK fits the needs of primary and intermediate learning disabled children. The PIRK strategies and issues in teaching phonics should be discussed. The training would include hands-on experience with the PIRK procedure, a discussion of the needs of teachers and their students, and the process development related to the PIRK procedure (see Appendix E).

At the district level, PIRK should be explained in the ways it fits the district's curriculum, and how PIRK fits the total language arts in the literature, in whole language, and in basic skills approaches (see Appendix E).

Recommendations for Future Research

Further studies are needed using larger samples, and matching by LD students' diagnostic profiles of their achievement level and processing dysfunctions to gain more specific information about student benefits in the use of PIRK. A pretest-posttest control group design with matching, needs to be carried out. The test should be given to both groups at the same time. Further research is needed to collect more objective data through on-site interviews using audiotapes and

videotapes. The students need to be observed to find specifically what might be the basis for lack of interest and boredom when using PIRK, and whether it changes with different groups in different settings, total language arts programs, and the amount of phonics taught.

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Appendixes

Appendix A
Assurances of Confidentiality

Dear _____, Superintendent

My name is Lyn Shippey. I am conducting a study of the PIRK reading program as it is being used with learning disability students in elementary grades. This letter represents an invitation to participate in this study. If you would like to volunteer your district please hand out the attached letter of invitation to the principals to participate.

The purpose of this study is to determine the effects of the PIRK reading program as it is being used with basal readers and/or other langauge arts activities and compared with basal readers and/or other language arts activities without PIRK. Your voluntary participation would allow me to collect information using pretest and posttest scores. Teachers will be asked to complete questionaires concerning their experience and educational background, specific reading and language arts activities, and their feelings and perceptions and their students feelings and perceptions about their use of PIRK with other language arts activities, and their students social-emotional nonacademic behavior related to frustration and stress manifested as random movements and inabilities to attend, to listen and follow instructions, to organize and complete tasks and to persist on tasks, and in inappropriate emotional-social behavior.

If you accept the invitation to participate in this study, you will be provided with a statement of confidentiality which will guarantee protection of personal and district anonymity in all of our data collection procedures. There is no agreement written or verbal, beyond that expressed in this consent form and the statement of confidentiality form. It is the purpose of this study to not interfere with your school organizational processes or classroom instruction. Therefore, we plan to have no interaction with students or their parents. Extra clerical work will be funded by me.

If you choose to volunteer for this study, information collected will be available to the classroom teachers. Your teachers will find several of our data collection tools useful to their classroom instruction.

If you would like to volunteer your district to be a participant in this study or discuss the study with me before you volunteer, please sign this invitation, and keep a copy. Please contact me at your convenience.

Sincerely,

Lyn Shippey

I, the undersigned, understand the above explanation and, on that basis, I give consent to my voluntary participation in this research.

_____Date_____
Signature of Superintendent

_____Date_____
Signature of Lyn Shippey

Dear _____, Director of Special Education:

My name is Lyn Shippey. I am conducting a study of the PIRK reading program
as it is being used with learning disability students in elementary grades.
This letter represents an invitation to participate in this study. If you
would like to volunteer your assistance please hand out the attached letter
of invitation to the teachers selected to participate.

The purpose of this study is to evaluate the effects of the PIRK reading
program as it is being used with basal readers and language arts activities
and compared with other basal readers and language arts activities without
PIRK. Your voluntary participation would allow me to collect information
using pretest and posttest scores. Teachers will be asked to complete
questionaires concerning their experience and educational background and
specific reading and language arts activities, and their perceptions and
feelings and their students perceptions and feelings about the reading and
language arts activities in use, and their students social-emotional
nonacademic behavior related to frustration and stress manifested as
random movements and inability to attend, to listen and follow instructions,
to organize and complete tasks and to persist on tasks, and inappropriate
social-emotional behavior.

If you accept the invitation to participate in this study, you will be
provided with a statement of confidentiality which will guarantee protection
of personal and district anonymity in all of our data collection procedures.
There is no agreement written or verbal, beyond that expressed in this
consent form and the statement of confidentiality form. It is the purpose
of this study to not interfere with your school organizational processes or
classroom instruction. Therefore, we plan to have no interaction with
students or their parents. Extra clerical work will be funded by me.

If you choose to volunteer for this study, information collected will be
available to you and the classroom teachers. Your teachers will find several
of our data collection tools useful to their classroom instruction.

If you would like to volunteer your assistance and be a participant in this
study or discuss the study with me before you volunteer, please sign this
invitation, and keep a copy. Please contact me at your convenience.

Sincerely,

Lyn Shippey

I, the undersigned, understand the above explanation and, on that basis, I
give consent to my voluntary participation in this research.

_____Date_____
Signature of Director of Special Education

_____Date_____
Signature of Lyn Shippey

Dear Principal:

My name is Lyn Shippey. I am conducting a study of the PIRK reading program in elementary learning disability classrooms and resource rooms. This letter represents an invitation to you to participate in this study.

The purpose of this study is to evaluate the effects of the PIRK reading program as it is being used with basal readers and/or language arts activities and compared with the effects of basal readers and/or language arts activities without PIRK. Your voluntary participation would allow me to collect information about your reading and language arts program. We will ask your teachers to complete questionaires about their experience and educational background and conduct pretests and posttests to provide scores in reading achievement. We will ask your teachers to participate in a group audio taped interview about their feelings and perceptions about the PIRK reading program and their students' feelings and perceptions about PIRK and their social-emotional nonacademic behavior related to frustration and stress, manifested as random movements and inability to attend, to listen and follow instructions, to organize and complete tasks and to persist on tasks, and inappropriate social-emotional behavior. No personal identification of students or teachers will be made.

If you accept the invitation to participate in this study, you will be provided with a statement of confidentiality which will guarantee protection of personal and school anonymity in all of our data collection procedures. There is no agreement written or verbal, beyond that expressed in this consent form and the statement of confidentiality form. It is the purpose of this study to not interfere with your school organizational process or classroom instruction. Therefore, we plan to have no interaction with students or their parents.

If you choose to volunteer for this study, information collected will be available to you. Several of our data collection tools may be useful to your teachers in their classroom instruction.

If you would like to volunteer to be a participant in this study please sign this invitation, and keep a copy. Please give parents of the random sample a parents' consent form. Please contact me if you have any questions and return forms at your earliest convenience.

Sincerely,

Lyn Shippey

I, the undersigned, understand the above explanation and, on that basis, I give consent to my voluntary participation in this research.

_____Date_____
Signature of Principal

_____Date_____
Signature of Lyn Shippey

Dear Learning Disabilities Teacher:

My name is Lyn Shippey. I am conducting a study of the PIRK reading program in elementary learning disability classrooms and resource rooms. This letter represents an invitation to you to participate in this study.

The purpose of this study is to evaluate the effects of the PIRK reading program as it is being used with basal readers and with language arts activities and compared with the effects of basal readers and language arts activities without PIRK. Your voluntary participation would allow me to collect information about your reading and language arts activities. We will ask you to complete questionaires concerning your teaching experience and educational background and specific reading and language arts activities. We will ask you to complete questionaires and participate in a group audio taped discussion about your feelings and perceptions and your students feelings and perceptions about their reading and language arts activities in use, and their social-emotional nonacademic behavior related to frustration and stress manifested as random movements and inability to attend, to listen and follow instructions, to organize and complete tasks and to persist on tasks, and inappropriate social-emotional behavior.

If you accept the invitation to participate in this study, you will be provided with a statement of confidentiality which will guarantee protection of personal and school anonymity in all of our data collection procedures. There is no agreement written or verbal, beyond that expressed in this consent form and the statement of confidentiality form. It is the purpose of this study to not interfere with your school organizational process or classroom instruction. Therefore, we plan to have no interaction with students or their parents.

If you choose to volunteer for this study, information collected will be available to you. Several of our data collection tools may be useful to you in your classroom instruction.

If you would like to volunteer to be a participant in this study please sign this invitation, and keep a copy, and return this to your principal.

Sincerely,

Lyn Shippey

I, the undersigned, understand the above explanation and, on that basis, I give consent to my voluntary participation in this research.

_____Date_____
Signature of Learning Disabilities Teacher

_____Date_____
Signature of Lyn Shippey

Dear Parent:

Your school is participating in an evaluation of the reading program in use. Students will be doing the usual reading activities.

Your consent is needed for the release of reading test scores. No identifier will connect your students' name with the scores that are released.

Participation in this study is entirely voluntary. You may refuse to participate or withdraw at any time without jeopardy to participate in the regular reading class.

All research records will be kept completely confidential. No identity will be disclosed without consent as required by law.

_____has explained this study and answered my questions. If I have other questions I will ask_____.

There are no agreements, written or verbal, related to this study beyond that expressed in this consent form.

I, the undersigned, understand the above explanations and, on that basis, I give consent to the release of test scores with no student identifier.

_____Date_____
Signature of Parent

_____Date_____
Signature of Witness

_____Date_____
Signature of Researcher

Appendix B

Questionnaire and
Interview Questions

Questionnaire Rationale

In Becoming a Nation of Readers, Anderson's (1985) support of "phonics first and fast" influenced the office of Educational Research and Improvement to commission the Center for the Study of Reading to prepare a report on phonics. Adams was selected to prepare the report. Pearson (foreword in Adams, 1990) views Adams' report on phonics as the most complete review within a single cover of our expanding knowledge of what we know about processes and instructional practices in word and letter identification and early reading; and which can place all prior and current research on visual and auditory perception and basic reading processes within the context of Rumelhart and McClelland's (1989) work on parallel distributed processing. This rationale is based on Adams' report and where PIRK fits into current theory, research, and practice in the effective teaching of reading to learning disability students.

Program comparison studies (Adams, 1990) indicated that approaches which include (a) systematic instruction of phonics results in comprehension skills that are comparable to and word recognition and spelling skills that are significantly better than those who do not, and (b) systematic code instruction alongside meaning and language instruction, and connected reading were found to result in superior reading achievement overall (Adams, 1990, p. 49).

The emerging view of skilled word recognition, the coordinated-interactive processing of three types of information orthography, meanings, and pronunciation involves both direct visual processing-print to meaning, and phonological translation-print to sound-to-meaning as synergistic parts of the same process (Adams, 1990, p. 141).

Laboratory research studies indicate that the critical factor beneath fluent word reading is the ability to recognize letters, spelling patterns, and whole words effortlessly, automatically, and visually. The central goal of reading instruction, comprehension depends on this ability (Adams, 1990, p. 54).

Adams (1990) explains comprehension as actively searching the overlap among words for syntactic and semantic coherence and depends on speed and automaticity of word recognition (p. 413). The purpose of overlearning spelling patterns is to enable the written word to flow quickly and effortlessly from print to meaning. Each familiar word is represented as interconnected combinations of letters. Meanings of familiar words corresponds to interconnected sets of meaning elements, and its pronunciation to an interconnected complex of elementary speech sounds. These types of knowledge are intricately connected so well that skillful readers can recognize the sound, spelling, and meaning almost instantly and automatically, leaving their attention free for reflective and critical thought (p. 409).

Questionnaire

Teacher #_____Date_____Grades_____
Regular class?_____Resource room?_____Special class?_____

Evidence supports a whole language and integrated language arts approach with direct instruction in spelling to sound correspondences (Strickland's afterword in Adams, 1990, p. 333)). Perceptual and linguistic processing deficits (Tallal, 1988) may result in an inability to receive, categorize, and integrate information, and attach sounds to letters and words (Chalfant, 1987).

1. Both code and meaning must be mastered in developing reading skills (Adams, 1990, p.s 424; Chall, 1990). On the code to meaning continuum which is your emphasis?

    Code 1_____2_____3_____4_____5 Meaning.

The use of time strongly relates to achievement. distinguishes among allocated time, engaged time, and academic learning time. Academic learning time refers to student time on task that is directly related to the outcome measures being used (criterion and achievement), and in which students achieve high success rates. Allocated time is time set aside for an activity.

2. How many minutes are allocated _each_ _day_ for language arts instruction: reading including phonics, writing, spelling, listening, and speaking?

    ___60-75, ___75-90, ___90-120, ___120-150,
    ___150-180, ___more than ___180.

    Comments_____

3. How many minutes on task _each_ _week_ in language arts:

    In reading connected text? ___60-75, ___75-90, ___90-120, ___120+150,___150-180,___180, ___and in all subjects.

    In PIRK? ___60-75,___75-90,___90-120,___120-150,___150-180

    Phonics (not PIRK) ___15-30,___30-45,___45-60,___60-90.

    Handwriting? ___15-30,___30-45,___45-60,___60-90

    Spelling? ___15-30,___30-45,___45-60,___60-90.

    Writing stories? ___15-30,___ 30-45,___45-60,___60-90.

    Listening to stories? ___15-30,___30-45,___45-60,___60-90.

    Comments_____

Phonics refers to a system of teaching reading that builds on the alphabetic principle, a system with a central component of teaching correspondences between letters or groups of letters, and their pronunciations (Adams, 1990, p. 49). How much phonics is optimal is a sequenced coverage of individual elements and their interrelations, and a continuous evaluation of students level of mastery, minimally time consuming and maximally effective (Adams, 1990, p. 54).

It is common for children to voice the sound or name of each letter as they print it which helps to bind the visual, motor, and phonological images together at once (Adams, 1990 p. 355).

4. Do you teach phonics using the following strategies (with or without PIRK)?
    Names of letters? Yes___No___
    Sounds of letters-phonemes? Yes___No___
    Phonemic drill of individual sounds? Yes___No___
    Student names letters while printing/writing? Yes___No___
    Student sounds letters while printing/writing? Yes___No___
    Students read rhyming words? Yes___No___
    Students copy rhyming words? Yes___No___
    Students copy words, name letters? Yes___No___
    Students copy words, use phoneme sounds? Yes___No___
    Students copy words, subvocalize? Yes___No___
    Sounding out new words in rhyming words? Yes___No___
    Sounding out new words in reading text? Yes___No___
    Continuously assess student progress? Yes___No___
    Test students for degree of mastery after each unit?
    Yes___No___; and/or after each level? Yes___No___
    Test for automaticity after the student experiences the whole interrelated set of phonic elements? Yes___No___

    Comments_____

Reading skills grow through writing, independent writing and invented spellings, composing, refining, sharing a written text. Writing and spelling the letter order in word family patterns strengthens perceptual integrity or recognition (Adams, 1990).

5. Does your writing instruction include practice:
    In writing and spelling in word family patterns?
    Yes___No___
    In writing stories independently? Yes___No___
    Using invented spellings? Yes___No___
    Correcting their own spellings? Yes___No___
    Reading their stories to the teacher or to other students? Yes___No___
    In punctuation? Yes___No___
    In sentence structure? Yes___No___

    Comments_____

The average child comes to school with a listening and speaking. vocabulary of 24,000 words. Learning to read is simply learning a system of notation for the language the child already knows. A fifth grader is likely to encounter 24,000 unknown words in a year of reading. Independent reading fosters learning of 5 percent of word meanings or 800 to 1,200 new meanings per year. Learning vocabulary from context in meaningful reading is available to the extent they process the spelling-orthographic structure of unknown words. Attending to patterns in words develops the orthographic knowledge upon which the system depends. In a meta-analysis of relevant research on vocabulary instruction, the most effective was information about word definitions and examples of word usages in context and resulted in gains in word knowledge and gains in comprehension. Use of context cues for word meanings must be taught (Adams, 1990, p. 149-150)

6. Do you instruct students in vocabulary meanings with:
    Examples of words usages in context? Yes___No___
    Instruction in the use of context cues? Yes___NO___
    Information about word definitions? Yes___No___

In a recent review of reviews on effective schools research, Bickel and Bickel (1986) related effective teaching behaviors to the instruction of learning disability students: (a) structuring the learning process in a positive, expectant and orderly environment managing time allocated to basic skills and time on task with a high success rate; (b) modeling process or product to be learned, giving needed practice, using reinforcers to enhance students' self-concept, relating new academic learning to a student's own life, and checking for understanding; and (c) taking an active direct role in the instruction of students, introducing new concepts with detailed and redundant explanations, ample opportunity for guided practice with feedback, frequent reviews of student progress, and 90% to 100% mastery.

7. Do you think that PIRK or other program in use assists with effective teaching in the following ways:
    . Structuring learning in a positive, orderly classroom environment? Yes___No___
    Maintaining high expectations for success? Yes___No___
    Managing time on task with a high success rate? Yes__No__
    Modeling skills to be learned? Yes___No___
    Giving adequate practice? Yes___No___
    with feedback and reinforcement? Yes___No___
    Taking an active role in instruction? Yes___No___
    Introducing phonic concepts with detailed and redundant experience? Yes___No___
    Ample guided practice? Yes___No___
    Ongoing assessment of student progress? Yes___No__
    Mastery of 90% to 100% in PIRK words? Yes___No___

The materials and activities used in developing reading skills are of critical importance with sensitivity to the interests and needs of students, so they are neither bored nor frustrated (Adams, 1990, p. 5).

8. Do students exhibit:
   Interest in the use of PIRK materials? Yes___No___
   Frustration in their use of PIRK materials? Yes___No___
   Boredom in their use of PIRK materials? Yes___No___

Learning disorders are problems in the acquisition of developmental skills, academic achievement, and social and emotional development; all of which may be the result of perceptual and linguistic processing disfunctions, and difficulties in learning with frustration and stress, manifested as random movements and inabilities (a) to attend, (b) to listen and follow instructions, (c) to organize and complete tasks and to persist on tasks, and (d) to engage in appropriate emotional-social behavior. Learning disabled children are found to be off task or distractable more than nondisabled children (Pearl, 1986).

9. Are your students able to attend to:
   Phonic instruction? Yes___No___
   Drill in phonemes? Yes___No___
   Sorting word cards? Yes___No___
   Reading rhyming words? Yes___No___
   Copying rhyming words? Yes___No___
   Spelling rhyming words? Yes___No___
   Reading connected text? Yes___No___
   Sounding out words? Yes___No___

10. Are your students able to experience success:
    In phonic drill using phonemes? Yes___No___
    In reading rhyming words? Yes___No___
    In copying rhyming words? Yes___No___
    In sounding out words? Yes___No___
    In reading connected text? Yes___No___

11. Persist in the PIRK task and achieve 90% to 100% accuracy:
    In decoding? Yes___No___
    In reading connected text? Yes___No___

12 Cooperate in small groups, share materials, take turns:
   In PIRK? Yes___No___
   In other language arts activities? Yes___No___

13. Monitor own work, complete task, do next task:
    In PIRK? Yes___No___
    In other language arts activities? Yes___No___

   Comment_____

14. Control random movements in the PIRK task? Yes___No___
    in other tasks? Yes___No___

15. Improved social-emotional functioning with teachers:
    In PIRK? Yes___No___
    In other tasks? Yes___No___
    And with peers:
    In PIRK? Yes___No___
    In other tasks? Yes___ No___

In a review of research Swartz and Olson (1987) found a
number of variables contributing to teacher stress: (a) long
hours, lack of supplies, too much paperwork, huge classes,
and no planning time; (b) discipline and management of
disruptive children, teaching below average students, and
stress related to doing a good job.

16. Does PIRK help you to reduce stress:
    In helping you do a good job? Yes___No___
    And in saving time:
    In paperwork? Yes___No___
    In planning? Yes___No___
    In assessing students? Yes___No___
    In transition between classes? No___No___
    And
    In teaching below average students? Yes___No___
    In management of disruptive students? Yes_No___
    In providing adequate materials? Yes__,No___

    Comment_____

Interview Questions

I would like to know your perceptions of how PIRK has assisted you in reaching your instructional goals in reading and language arts for your learning disability students. This interview guide is to suggest areas to consider in your taped discussion as to the merits of PIRK and needed improvements. This interview is a follow-up to the questionaire and provides for the expression of your feelings and needs.

1. How do you feel about PIRK in relation to reading and language arts instruction, enjoyment in teaching, and student enjoyment in learning?

2. What do you like and dislike about PIRK?

3. What are PIRK's strengths and weaknesses?

4. What factors do you consider to be most important in the successful implementation of PIRK?

5. Do you think that PIRK is cost/effective?

   Comments_____

Appendix C

Pro-ed DAB Test Profile

The Pro-ed DAB Record of Scores

Commposites	Subtests	Raw Score	%iles	Standard Score

Listening

1. Story Comprehension

2. Characteristics

Speaking

3. Synonyms

4. Grammatic Completion

Reading

5. Alphabet letters/word knowledge

6. Reading Comprehension

Writing

7. Capitalization

8. Punctuation

9. Spelling

10. Written Vocabulary

Math

11. Math Reasoning

12. Math Caculation

Appendix D

Primary Group Comparisons Tables

Table Showing Pooled Variances *t* Test Probability Results for Independent Samples comparing PIRK and CONTROL groups with NDLs excluded.

	No.	Word Knowledge	Reading Compreh	Total Reading	Listen ing	Receptive Language	Spell ing	Total Writing	Speak ing	Expressive Language
Int PIRK	7	1.00	.193	.787	.017	.406	.706	.928	.299	.349
Int CONT	7									
Prim PIRK	7	.067	.649	.189	.488	.234	.355	.775	.875	.985
Prim CON	6									

Table Showing Pooled Variances *t* Test Probability Results for Independent Samples comparing Primary PIRK and CONTROL groups with NDLs included.

	No.	Word Knowledge	Reading Compreh	Total Reading	Listen ing	Receptive Language	Spell ing	Total Writing	Speak ing	Expressive Language
Prim PIRK	11	.015	.252	.045	.102	.045	.054	.908	.954	.355
Prim CON	9									

Table Showing *t* Test Probability Results for Paired Samples of the Primary PIRK Group

	No.	Word Knowledge	Reading Compreh	Total Reading	Listen ing	Receptive Language	Spell ing	Total Writing	Speak ing	Expressive Language
Primary PIRK	7	.063	.012	.026	.060	.002	.139	.075	.060	.017

Primary

PIRK Mean Raw Scores
N = 11

	SC	Ch	Listening	SY	GC	Speaking	WK	RC	Reading	SP	WV	Writing
	16	16	32	8	7	15	32	3	35	2	-	2
	15	12	27	8	6	14	38	14	52	3	2	5
NDL	24	20	44	8	15	23	37	14	41	3	3	6
	24	20	44	8	6	14	39	15	54	3	4	7
	23	19	41	8	12	20	43	16	59	3	-	3
NDL	27	29	55	10	6	16	38	17	55	2	1	3
	25	29	54	14	7	21	38	14	52	1	2	3
	23	28	51	12	6	18	40	15	55	5	3	8
NDL	26	23	49	14	17	31	44	18	62	4	1	5
	22	23	45	15	13	28	37	13	50	2	3	5
NDL	27	31	58	16	15	31	52	22	74	6	5	11
TOTAL	252	250	500	121	110	231	438	161	589	34	24	58
MEAN	22.9	22.7	45.45	11	10	21	39.8	14.6	53.5	3.1	2.2	5.3

Control Mean Raw Scores
N = 9

	SC	CH	Listening	SY	GC	Speaking	WK	RC	Reading	SP	WV	Writing
	6	8	14	1	4	5	6	0	6	-	-	
	7	7	14	0	2	2	7	-	7	-	-	
	15	5	20	11	11	22	34	8	42	2	-	2
NDL	18	15	33	10	4	14	22	3	25	2	-	2
	25	26	51	11	17	28	37	21	58	4	1	5
	15	24	39	9	13	22	38	17	55	3	9	12
	22	26	48	11	10	21	16	0	16	1	0	1
NDL	24	26	50	10	12	22	48	19	67	8	5	13
	25	26	51	10	14	24	35	19	54	2	3	5
TOTAL	157	163	320	73	87	160	243	87	330	22	18	40
MEAN	17.4	18.1	35.6	8.1	9.6	17.8	27.0	9.67	36.7	2.44	2.0	4.4

Appendix E

PIRK Orientation Seminar

How PIRK Fits The Whole Language Approach of
The California English-Language Arts Framework

PIRK Orientation Seminar

Outline

I. INTRODUCTION

    A. Overview of what PIRK does

II. THEORY AND RESEARCH

    A. How PIRK fits theory

    B. Research-based strategies

    C. How PIRK fits learning disabled student needs

    D. Beginning reading instruction

III. THE PIRK READING PROGRAMS

    A. Purpose

    B. Organization of materials

    C. Progress through PIRK

    D. Testing and placement

    E. PIRK procedure-process

IV. DISCUSSION GROUPS

    A. Forming questions

    B. Asking questions and responses

    C. Specific students' and group needs

    D. Teachers' needs

V. SUMMARY AND CONCLUSION

How PIRK Fits a Whole Language Curriculum
In The Primary Grades

The California English-Language Arts Framework is based
on a whole language philosophy of curriculum, and provide
guidelines for grades kindergarten through grade 12. The
following statements are taken from the program for primary
and intermediate levels. For students in the primary grades
grades, kindergarten through grade three, the primary focus
of all language activities is the understanding of meaning
and the first and most important reason for learning
language. Learning to read is focused on learning to
understand meaning from beginning reading, and learning to
write is focused on learning to compose from the first
attempts at writing. "These complex tasks are made even
more difficult at the early stages, however, by the wide
variations in readiness for both tasks among young children
entering school. As a result early language arts programs
must provide for considerable flexibility in pacing and
content of the language arts program. Students in
kindergarten through three should (a) hear good
literature read aloud daily to help them develop an
ear for written language, enlarge their vocabulary,
develop a common background of content, and build a
love of reading and rapport with those who read;...(b)
have opportunities to express themselves, to speak and
be heard, as a result they will learn to speak
confidently, listen respectfully and attentively to
others, and know they will be heard in return;.. (c)
(have teachers with) a positive repertoire of responses
to reinforce children's use of language (pp. 27-28).
Primary children are somewhere between "emerging literacy'
(rich in language background and ready to begin the study of
language in reading and writing) and 'extending literacy'
(fluent in language and ready to use it to explore many
avenues of learning and to study in many disciplines). The
language arts program (a) must be integrated, purposeful,
and constructive, and good books must be read silently
or aloud by students and teacher; (b) use common words
from the environment and from student-invented stories
also helps students learn to read more easily because
they understand the meaning before they read; and (c)
instruction in phonics during the early grades should
help students understand the relationships between
letters and sounds so that they can understand meaning.
Just as writing is a part of learning to read from the
beginning, reading is a part of learning to write.
Both skills require the ability to hear and use oral
language...Early writing programs must introduce
instruction in prewriting, drafting, revising, and
editing. And the conventions of spelling, handwriting,
grammar, and punctuation should be taught in subskills
to meet the individual student's needs and as aide to
the written communication process (pp. 27-28).

The new primary PIRK reading program fits the whole language philosophy of curriculum of the California <u>English-Language Arts Framework</u> by providing instruction in phonics during the early grades that helps children understand the relationships between letters and sounds so that they can understand meaning. The PIRK 3 step procedure allows children to direct their own learning in the manipulation of words and their sounds, (a) by the analysis of words by rimes or syllables with a focus on the vowel; (b) reading rhyming words by synthesis of the onset and rime or syllable; and (c) copying or tracing, spelling, naming each letter and word, and repeating the procedure with each word in the phonogram group. The PIRK whole word phonics is a very effective approach for teaching the sounds of words and letters to students who have low language development, low listening comprehension. and difficulty with learning the phoneme sounds. PIRK provides a multisensory experience with words and their sounds, in analyzing, synthesizing, reading, writing, and spelling words.as a basis for reading and writing stories. The new primary PIRK helps less prepared children from falling behind their classmates.

The Whole Language Approach

Groff (1991) designed a questionnaire for teachers containing I5 different conclusions about reading instruction "abstracted from the writings of the WL (whole language) approach" (p. 85). The following statements were part of the questionnaire.

The intensive and systematic teaching of phonics hinders reading comprehension" (p. 85), due to the delay in using phonics information that overloads short-term memory. "English is spelled too unpredictably for phonics to work well" (p. 85), therefore, there is no way to know when a sound-letter correspondence applies. "Children should...be taught to recognize words by 'sight' as 'wholes'...'It is easier for a reader to remember the unique appearance and pronunciation of a whole word...than to remember...syllables and spelling units' (p. 86)... "Intensive phonics teaching makes learning to recognize words hard for children" (p, 88), because reliance on phonic information in sounding out a word is difficult, and time-consuming. "Children who cannot learn phonics...must be taught by a purely 'visual' approach" (p. 87), due to the difficulty in hearing the different sounds in words. "Children should (not) learn a hierarchy of reading skills of ever-increasing difficulty (because) 'reading has no one sequence of skills (Anderson, 1985)'" (p. 88)...Children learn to read best the same way they learned to speak" (p. 86), they learn to talk in the "natural" way without being taught. "Children at age 6 do not need oral language development before being taught to read" (p. 86), if appropriate materials are used in learning to read. Finally, "workbooks and worksheets should (not) be used in reading instruction" (pp. 88-89), because the focus is on the parts not on the whole.

How PIRK Fits Whole Language

PIRK provides an effective means for children who are lagging behind their peers to experience success in learning to read, whether they receive whole language or basic skills instruction. Reading disabled and learning disabled children were found to fail in learning to read at the word level. The PIRK multisensory whole word phonics uses a visual approach to word analysis, adds reading rhyming words, and spelling and naming letters and words to integrate the sound-to-letter and sound-to-word correspondences. PIRK takes children past sounding out and identifying words to recognizing whole words, and using word analysis by applying learned syllables and spelling patterns for recognizing new words. Children learn the words in PIRK in the "natural" way they learn to talk, by manipulating words they have heard, repeating the words, and also writing and spelling the words; along with writing and reading stories, connected text, and whole books. This study has shown the problems that learning disabled children in handling more difficult words, and their problems in listening comprehension. PIRK finds where children are as in whole language "starts where learners are in language and knowledge and builds from there" (Goodman, 1985, p. 32). Children learn written language by reading and writing words in PIRK "by interacting with adults (to verify accuracy and to apply) in reading and writing situations" (Pappas, 1990, p. 21). PIRK provides opportunities for those "children identified as poor readers (who) are often deprived of opportunities to read...The cure for dyslexia is to read...(Children) learn about phonics only to the extent (and in a way) that they can make sense of the instruction" (Smith, 1985, pp. 132, 137, 140).