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ABSTRACT

This examination of the processes in reading comprehension is divided into seven categories. "Theoretical Foundations" reviews some of the research conducted by Bruner, Piaget, and Bloom in the areas of cognition or comprehension processes of young children. "Development of a Spiraling Reading Curriculum" examines a spiraling taxonomy of reading skills and appreciations based on an emphasis on the interrelatedness of the four communication processes of listening, speaking, reading, and writing. "Background of the Research Design" discusses conceptual vocabulary, linguistic comprehension, cognitive and affective comprehension, early comprehension skills reinforcement, comprehension through discussion based on literature listening, and comprehension assessment--readiness level. "Field Testing a Spiraling Reading Curriculum" discusses validating group testing for assessment, experimental classrooms, and the total spiraling diagnostic-prescriptive model. "The Research Design: A Study of Comprehension Processes in a School with a Spiraling, Diagnostic-Prescriptive Reading Curriculum" presents a research study conducted in a suburban area near Los Angeles, the results (with seven tables of findings), and conclusions and recommendations. A bibliography is included. (WR)

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PROCESSES IN READING COMPREHENSION

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Theoretical Foundations

There have been many analyses of the processes of comprehension. For most researchers, the terms "cognitive functioning" or "intelligence" are very related to comprehension - or understanding.

Bruner

Bruner's work during the past decades has been a search for cognitive strategies which imply comprehension in its broadest meanings. His book, Beyond the Information Given (1973) is a collection of his own typical and benchmark researches. In it, he brings the reader to his central thesis that the ordinary human being, in collecting, sorting, and storing active-experiential, representational, and symbolic data, should be always seeking to go "beyond the information given".

Thus he believes that the literal level of comprehension is never fully useful for most of mankind. Inferences, exterpolations, conclusions,

summaries, generalizations become the means by which man brings order to his world. And the symbolization of experience which we call language represents a supreme process of doing so.

Piaget

Piaget (1926) (1928) (1952) also has inquired into the cognition or comprehension processes of young children. In intensively studying them, he observes that they appear to move through specifically delineated stages with flexible time-boundaries during which they comprehend experience in discretely different ways.

Both Piaget and Bruner include problem-solving as the best medium for developing insight and choosing value systems, which processes are at the very heart of comprehension.

Bloom

Benjamin Bloom (1956) in his Taxonomy of Educational Objectives: Cognitive Domain and jointly with Krathwohl, the Affective Domain (1956) also lay groundwork for curriculum builders in providing a model for a sequential development of objectives embodying skills and appreciations as a framework for almost any field of endeavor.

Challenges

Bruner challenges the psychologist to aid curriculum planners to develop "vivid games, story-making episodes or construction projects" to give avenues for children to express creative or divergent thinking.

In his book Toward a Theory of Instruction (1966), Bruner deplores the notion of readiness as waiting, rather than providing opportunities for its nurture. He challenges educators to translate all skill and content areas into early beginnings of a spiraling curriculum by placing emphasis on doing, by providing development of appropriate imagery, and by promoting symbolic verbal encoding. He joins Bloom in exhorting educators to include concurrent evaluation as an integral part of curriculum.

Development of a Spiraling Reading Curriculum

The writer, moved by classroom experience and such challenges, developed over the past decade a spiraling Taxonomy of Reading Skills and Appreciations with a network of experiments to try its feasibility and use in public school settings.

Skill Strands

The six skill and appreciation strands of the Taxonomy are (1) Conceptual Vocabulary; (2) Perceptual Vocabulary; (3) Linguistic Comprehension; (5) Adaptive Skills; (6) Location and Study Skills.

In the development of the Taxonomy, there was great emphasis on the inter-relatedness of the four basic communication processes of listening, speaking, reading, and writing. There is ongoing emphasis in providing basic listening, speaking, and manipulative experience with graphic representation and print in all of the processes involved in communication.

Many objectives implying experiences in the Taxonomy are not amenable to pencil-paper testing. Those which were amenable were placed in sequential order with check or testing points cutting across all skill strands at each of the thirteen levels - thus providing insurance of balance in the teaching of reading.

Background of the Research Design

In the present research segment, Conceptual Vocabulary, Linguistic Comprehension, and Cognitive and Affective Comprehension have been focal points of consideration.

Conceptual Vocabulary

In planning the curriculum for conceptual vocabulary skills the following goals were included. Experiencing: (1) Spoken Class and Structure Words from Subsequent Level Reading Vocabulary; (2) Pictures Representing Words; (3) Printed Words as Labels; (4) Words Describing

Feelings; (5) Thinking Processes Related to Meanings of Common Words and Phrases; (6) Precision and Specificity with Words; (7) Typographical Clues to Meaning; (8) Figurative, Idiomatic and Colloquial Expressions; (9) Words Relating to Specific Subject Areas.

Linguistic Comprehension

Linguistic Comprehension included these goals: Experiencing: (1) Kernel Sentence Patterns; (2) Use of Class Words and Phrases; (3) Use of Structure Words and Phrases; (4) Sentence-transformations.

Cognitive and Affective Comprehension

Cognitive and Affective Comprehension included these goals: Utilizing: (1) Basic Meanings of Sentences and Paragraphs; (2) Organization of Material Read; (3) Analysis; (4) Synthesis; (5) Evaluation, and (6) Creative Response.

In constructing the experimental edition of these tests, the objectives and subobjectives under each of the goals were carefully worked out. Items were developed, tried in research schools, then revised from suggestions of research school representatives at quarterly meetings at the University of Southern California.

Early Comprehension Skill Reinforcement

It is part of the philosophy of the program that comprehension is the ultimate and real goal of reading. Since this is accepted, comprehension skills are not delayed for mastery of sight words and structural and phonics analysis skills, but are developed concurrently.

In order that even young children might participate in deeper level comprehension processes before achieving ability to read print, great emphasis was placed on using the comprehension processes associated with reading in interpreting aural and pictorial information.

Comprehension Through Discussion, Based on Literature Listening

For these purposes as well as the tremendous motivational force involved, a literature appreciation learning station was a strong part of the model, supplementing the teacher's daily reading-discussion of stories.

At this station, children at kindergarten and all following levels listened to interesting stories. The station was part of a group of six learning stations which emphasized particular modalities or processes in which varied reading-language skills might be reinforced.

After listening to the story, the children were provided activities or discussion with the teacher at the teacher-directed station. Such activities were simpler models of concept-building and comprehension objectives which they would later use in reading print. Objectives from the Conceptual Vocabulary strand were included as well as those from Linguistic Comprehension and Affective and Cognitive Comprehension.

Comprehension Assessment - Readiness Levels

Assessment at this level of listening was informal, involving direct teacher observation. But through research there were identified for use in the non-experimental edition in Levels 1-3 (representing readiness), four subtests on Listening Comprehension: Seeing relationships, Following verbal directions, Remembering important details, and Placing events in sequence.

There is also testing of the meanings and relationships of words at the Readiness level. Tested conceptual vocabulary objectives, spread through the three levels, are: Pictures representing nouns; Pictures representing adjectives; Classifying pictures according to meaning; Pictures representing verbs; Pictures representing prepositions; and Selecting pictures related through meanings. (These then are in addition to tests in auditory and visual perception and memory, and letter identification.)

Comprehension Assessment

Grade One:

When the child reaches Level 4, at which time he is reading connected discourse for the first time, he is tested for comprehension of what he has read. In levels 4-7 the following comprehension objectives are tested:

Level 4: Selecting meanings for words in context;

Level 5: Following written directions;

Level 6: Remembering important details; Distinguishing fact from fancy; Predicting outcomes;

Level 7: Remembering important details, and Placing events in sequence. Thus, while there is main emphasis on literal comprehension and the organization of meanings, there is at least a beginning in interpretive processes.

With the progression of levels, there is an increase of the higher-level thinking skills to be tested.

Comprehension Assessment

Grade Two:

At level 8: Identifying main ideas, Placing events in sequence; Recognizing important details; Distinguishing fact from fancy, and Predicting outcomes.

At level 9: Selecting meanings for words in context; Recognizing important details; Selecting key words of a simple passage.

At level 10: Classifying characters, ideas, and actions; Place relationships; Generalizing from descriptive details; Obtaining intended meaning from charts; Drawing inferences; Selecting topic sentence of a simple passage.

Comprehension Assessment

Grade Three:

Level 11: Identifying main ideas; Cause and effect relationships; Predicting outcomes; Summarizing main points of a simple passage.

Level 12: Remembering important details; Recognizing important details; Comparisons and contrasts; Drawing inferences; Emotive and informative expressions; Making observations of author's purpose; Distinguishing fact from opinion; Recognizing implied assumptions.

Level 13: Classifying characters, ideas, and actions; Marshaling supporting details for a main idea; Interpreting figurative language; Time relationships; Generalizing from descriptive details; Obtaining intended meanings from maps; Selecting correct definition to fit context; Organizing details under main ideas.

Projections for Grade 4

In the experimental edition of levels 14, 15, 16 which are being placed in research schools in Fall, 1974, there is included the same type of spiraling curriculum with frequent reviews, and movement toward problem-solving leading to habits of critical and creative thinking. There is special emphasis in comprehension and conceptual understanding of passages and words related to the Content Fields.

Field Testing a Spiraling Reading Curriculum

Validating Group Testing for Assessment

In Barstow in 1966-67 the author consummated a research project in anticipation of future needs of developing focused reading instruction through use of relevant assessment measures. 250 first-graders were given a battery of author-developed group tests designed to screen for potential reading problems. There was special emphasis on a format which children could easily follow. Areas tested were auditory discrimination and memory;

visual discrimination for figures, letters, words, and phrases; classification tasks; and organizing information heard in a story. The same children were tested individually in these areas: (1) a Wepman-like auditory discrimination test; (2) the Frostig Test of Visual Perception; (3) The Peabody Picture Vocabulary Test; (4) the Wide Range Reading Test; and (5) number of words used in a taped response to a stimulus picture.

An analysis of correlations with teachers' grades and ratings, and performance on the Stanford Reading Achievement Test at the end of the year produced the findings that the group tests had been just as predictive of reading success as had the individual tests. (Ransom, 1968)

Experimental Classrooms

In 1967-68 another part of undergirding research was done. Nine second-grade experimental classrooms and nine control classrooms were compared. The experimental classrooms were given a preliminary version of the prescriptive model plan, with no ongoing diagnostic measures.

The teachers were given the computer-numbered Ransom Taxonomy; 13 file boxes of skill materials of varied modalities coded to the Taxonomy; hardware for learning stations, including a tape recorder, Language Master, filmstrip projector, and, if needed, a record player. One survey test was used at the beginning of the school year.

The control group used its customary basal, three-group-reading approach. A research assistant worked at intervals with all schools. At the conclusion of the year, no significant differences were found between experimental and control schools.

The Total Spiraling Diagnostic-Prescriptive Model

A total spiraling curriculum, with ongoing diagnostic as well as prescriptive components, was initiated at a school of high residential mobility in the Pacoima (Los Angeles) area. This model included these

important features: (1) A Taxonomy of Reading Skills; (2) Central storage of materials of many modalities keyed to the Taxonomy; (3) A criterion-referenced testing plan to be used at least each ten weeks for determining skill and appreciation needs of children at levels 1-13 (roughly, grades K-3), with post tests informally done; (4) Individual and group profiles at each level, showing which skills were or were not needed in individuals and by groups; (5) Complete flexibility of children's movement through levels; (6) A reading resource teacher who took charge of coding all of the resources of the school and helping teachers organize one-third of the class at a given time to work at (7) learning stations on skills which needed reinforcement. All children were also rotated through a literature appreciation listening station, with follow-up centering on thinking skills.

This school became a demonstration center which had hundreds of visitors. The stability of success of the plan became apparent by Spring, 1971. As programs spread, new centers became focal points for training personnel from additional schools. Four school workshops were held in Summer, 1972, for purposes of training the 250 teachers and resource teachers enrolled. All workshops were planned by the author and coordinated by school resource teachers who had been using the program for at least a year. By Fall, 1973, the system had spread to 72 experimental schools.

In the concluding section of this paper, there is presented a study of comprehension processes from data received from a research school which started using the experimental program in October, 1972.

The Research Design: A Study of Comprehension Processes in a School with a Spiraling, Diagnostic-Prescriptive Reading Curriculum

This research study uses information from a research school in a suburban area of Los Angeles. There were optimal conditions for establishing the program. The reading resource teacher, having a master's degree in

Reading, had learned the dimensions of her role from a special workshop at the University of Southern California. The district director of curriculum, other personnal, and parents studied all features of the program. They elected to use the experimental edition in two schools, beginning in Fall, 1972.

One of these schools was selected for this study. The school population was composed of a variety of ethnic and socio-economic levels. About 27% of the children came from homes in which Spanish was the only language spoken. About 28% of the families were at poverty levels, receiving public assistance. Of these, half had English as a second language and half had nglish as a first language. About 10% of the EFL population were at a high socio-economic level. A few ESL families were refugees from Cuba, having good socio-economic position. The rest of both ESL and EFL children were in the middle-class category.

There was an ESL program in the school, with one teacher and two full-time aides. ESL children from kindergarten and first grades were taken to an ESL class for one-half hour of work each day. The ESL teacher and aides planned to use materials which were suggested by the new taxonomy and curriculum.

The school population had relatively high residential mobility. Of the 216 children from grades 1, 2, and 3, tested in October, 1972, there were data for only 117 EFL children from all three testing periods used in the study.

The resource teachers began setting up a resource room and coding all of their materials to the new taxonomy in Summer, 1972. Pre-tests were first administered in October, 1972, and were administered three times each year. With criterion for single-skill sub-tests set at 80%, a profile was made for each child, indicating skills in which he needed work. Group profiles were made for purposes of instructional planning. Post-tests were informally administered after reinforcement work in several modalities was completed for a specific skill.

The tests being analyzed in this study were administered in October, 1972, to all children in Grades 1-3; in October, 1973, to all children in Grades 1-4; and in May, 1974, to all children in Grades K-4.

Research Hypotheses

1. There are significant differences between proportions of older children in lower level tests in October, 1972, October, 1973, and May, 1974.

2. There are significant differences between EFL and ESL children in scores on Ransom Program Readiness tests (October, 1972, October, 1973, May, 1974).

3. There are significant differences between EFL and ESL children in comprehension scores at all grade levels of the Ransom Program, October, 1972, October, 1973, and May, 1974.

4. There are noticeable changes in correlations of other subskill scores with comprehension scores from October, 1972, to October, 1973, to May, 1974.

Hypothesis One

Tables 1, 2, 3, and 4 show percentages of children in various grades as tested in all levels of the tests. In October, 1972, all children are "bunched" at least one grade level below expectancy. It is obvious that there is a noticeable shift in May, 1974, toward higher placement levels which are approaching appropriate grade levels.

Hypothesis Two

Table 5 shows the means, standard deviations, and levels of significance of the t-tests performed on mean scores of ESL and EFL children in readiness subtests. It is noted that all subtests and total scores of ESL and EFL children are significantly different, beyond the .001 level of confidence, favoring children for whom English was the first language.

Table 1

LEVELS OF PRE-TEST READING PERFORMANCE BY GRADES AND TESTING DATES

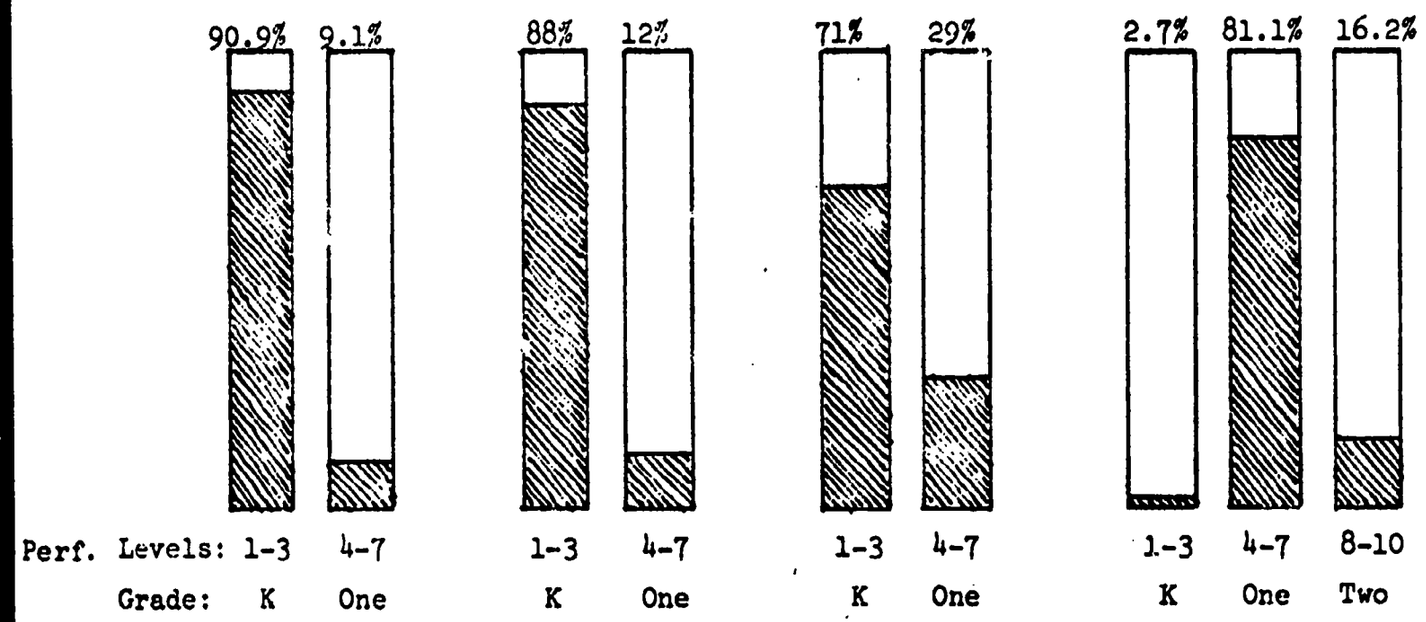

Table 2

LEVELS OF PRE-TEST READING PERFORMANCE BY GRADES AND TESTING DATES

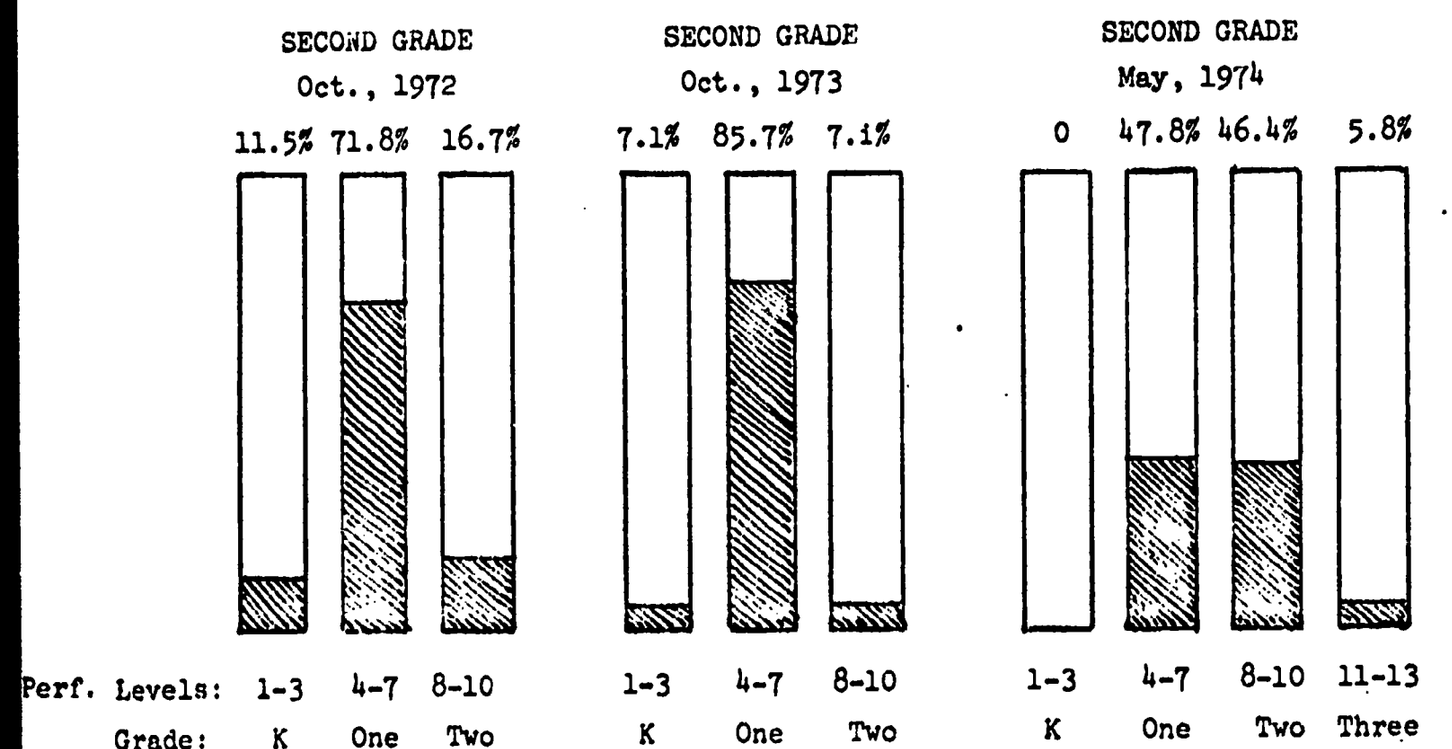

Table 3

LEVELS OF PRE-TEST READING PERFORMANCE BY GRADES AND TESTING DATES

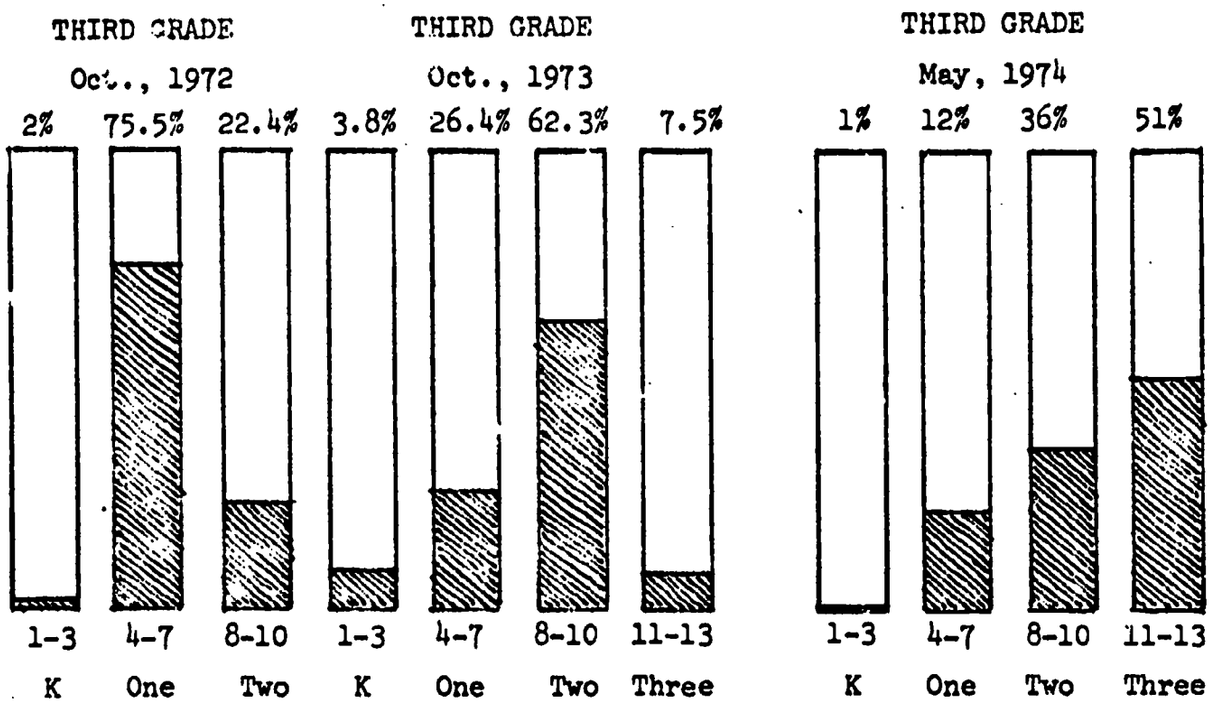

Table 4

LEVELS OF PRE-TEST READING PERFORMANCE BY GRADES AND TESTING DATES

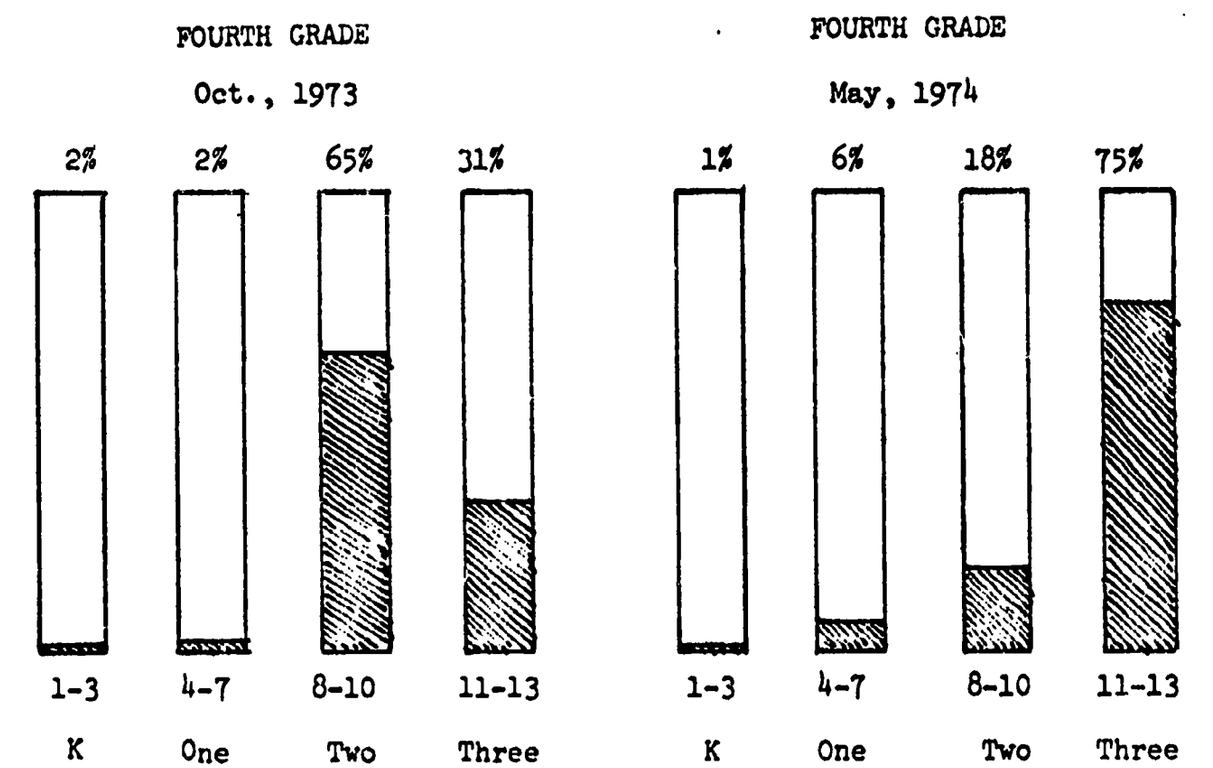

TABLE 5

MEANS OF READINESS SCORES, OCTOBER, 1972

	N		Mean	SD	T Value	Significance
Conceptual Vocabulary	28	ESL	4.18	1.83	3.05	.004 **
		EFL	6.14	2.88		
Auditory Discrimination	28	ESL	15.43	9.43	3.14	.003 **
		EFL	24.39	11.82		
Visual Discrimination	28	ESL	9.50	4.90	3.51	.001 *
		EFL	14.86	6.41		
Total	28	ESL	29.14	15.30	2.89	.006 **
		EFL	43.82	22.12		

* Significant at or above the .001 level of confidence

** Significant at or above the .006 level of confidence

Hypothesis Three

Table 6 shows the means, standard deviations, and significance levels of T Tests of mean scores on comprehension tests at all grade levels for October, 1972, October, 1973, and May, 1974.

TABLE 6
ESL AND EFL MEAN SCORES ON COMPREHENSION SUBTESTS
IN OCTOBER, 1972, OCTOBER, 1973, AND MAY, 1974

Grade: Readiness Level Only

		N	Mean	SD	T Value	Level of Significance
Oct. 1972	Total Score	28	ESL 29.14 EFL 43.82	15.30 22.12	2.89	.006*
Oct. 1973	Compre-hension	24	ESL 24.21 EFL 37.63	13.69 16.65	3.05	.004*
May 1974	Compre-hension	24	ESL 12.33 EFL 18.88	6.90 9.47	2.74	.009*

Grade 2

		N	Mean	SD	T Value	Level of Significance
Oct. 1972	Compre-hension	16	ESL 16.81 EFL 17.06	7.35 8.91	.09	.93 (NS)
Oct. 1973	Compre-hension	19	ESL 14.53 EFL 24.00	4.58 11.03	3.46	.002*
May 1974	Compre-hension	20	ESL 23.35 EFL 18.80	11.58 9.22	1.37	.178 (NS)

Grade 3

		N	Mean	SD	T Value	Level of Significance
Oct. 1972	Compre-hension	13	ESL 13.08 EFL 21.92	7.44 10.20	2.53	.019*
Oct. 1973	Compre-hension	17	ESL 20.88 EFL 19.18	7.14 8.86	.62	.541 (NS)
May 1974	Compre-hension	29	ESL 18.79 EFL 15.48	16.01 5.59	1.05	.300 (NS)

Grade 4

		N	Mean	SD	T Value	Level of Significance
Oct. 1973	Compre-hension	14	ESL 14.29 EFL 14.78	2.59 3.17	.48	.632 (NS)
May 1974	Compre-hension	16	ESL 16.25 EFL 13.88	6.02 2.83	1.43	.168 (NS)

* Statistically significant (NS) Nonsignificant

Examination of the data needs clarification. There is a discernible pattern except for Grade 2. In Grade 2, 1972, no significant differences exist in any subtests between ESL and EFL children. The same condition holds true for the same age level when they are tested in 1973 (Grade 3). This may be due to an intensive first-grade ESL program promoted in Summer, 1972.

Otherwise, it appears that the trend is for highly significant differences at readiness and first grade levels. These differences seem to be discernible also at first testing in Grade 3.

But after a year or two years' use of this program - testing children for appropriate instructional levels immediately upon school entrance, and providing appropriate and varied instructional experiences - the slight differences in comprehension scores of EFL and ESL children are non-significant.

Hypothesis Four

Table 7 shows Pearson-Product Moment correlations between comprehension and vocabulary, comprehension and sight words, comprehension and phonics, and comprehension and structural analysis in 1972, 1973, and 1974.

TABLE 7
PEARSON-PRODUCT MOMENT CORRELATIONS
WITH COMPREHENSION SCORES

	Vocabulary and Comprehension	Sight Words and Comprehension	Phonics Analysis and Comprehension	Structural Analysis and Comprehension
1972	.70	.63	.75	.25
1973	.47	.46	.59	.45
1974	.47	.40	.42	.45

There is extremely high correlation of most of the combinations of subtests in the first year of testing (.70, .63, .75, .25). At the second testing the correlations, though significant, are sharply reduced (.47, .46, .59, .45). And at the third test, data reveal even lower correlations

(.47, .40, .42, .45). These data reflect the fact that children have not remained as tightly "bunched" at levels and skills as they were in the beginning. Focused reading instruction with learning experiences tailored to children's needs have greatly increased the variability and decreased the amount of variance accounted for by the skill strand correlations.

Conclusions and Recommendations

The use of a spiraling taxonomy in reading for building a diagnostic-prescriptive program has been described.

Implications for the role of comprehension processes are varied. It seems that provision of comprehension tasks at listening levels, and finding levels for needed instruction helped children who had English as a second language progress rapidly after a very difficult start. After experiencing significantly lower test scores than EFL children in all tests, they moved in May, 1974, to no significant differences of scores on comprehension tests in second, third, and fourth grades.

The very low starting level of all children in 1972 seems also to be changed. With specific goals and objectives of auditory and visual perception, vocabulary enrichment, listening comprehension, and letter recognition in kindergarten, added to social, play, and language experiences, the children should henceforth move more rapidly into reading skills, and progress from one level to the next in a comfortable way.

Stressing literature comprehension and using test results as blueprints for instruction seem to have helped the children in this research school approach appropriate levels and start closing the gap between expectancy and performance within all grades.

It is recommended that ongoing research center around the long-range effect of this type of program on attitudes and comprehension scores of children from several types of schools.

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