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ABSTRACT

The effects of the Wisconsin Prototypic System of Reading Skill Development, combined with teacher inservice training, on the performance and attitudes of primary pupils and their teachers were examined. Experimental and control subjects were students in grades 2 and 3. Teachers served as their own controls, having instructed the control a nd experimental students in subsequent years. The dependent variables were student achievement and attitudes and teacher classroom procedures and attitudes. Project-constructed instruments were a student attitude instrument, a classroom observational system, and a teacher attitude inventory. No significant differences were obtained on reading achievement scores. However, student attitudes toward recreational reading were significantly higher for the experimental group in one of the two participating schools. Teachers using the experimental program showed changes in classroom procedures during reading instructions significant at the .05 level. Teacher attitude inventory scores indicated significant improvement at the .01 level. Implications were that student variables may require more than a 1-year study to determine if they are significantly affected. A bibliography is included. (WB)

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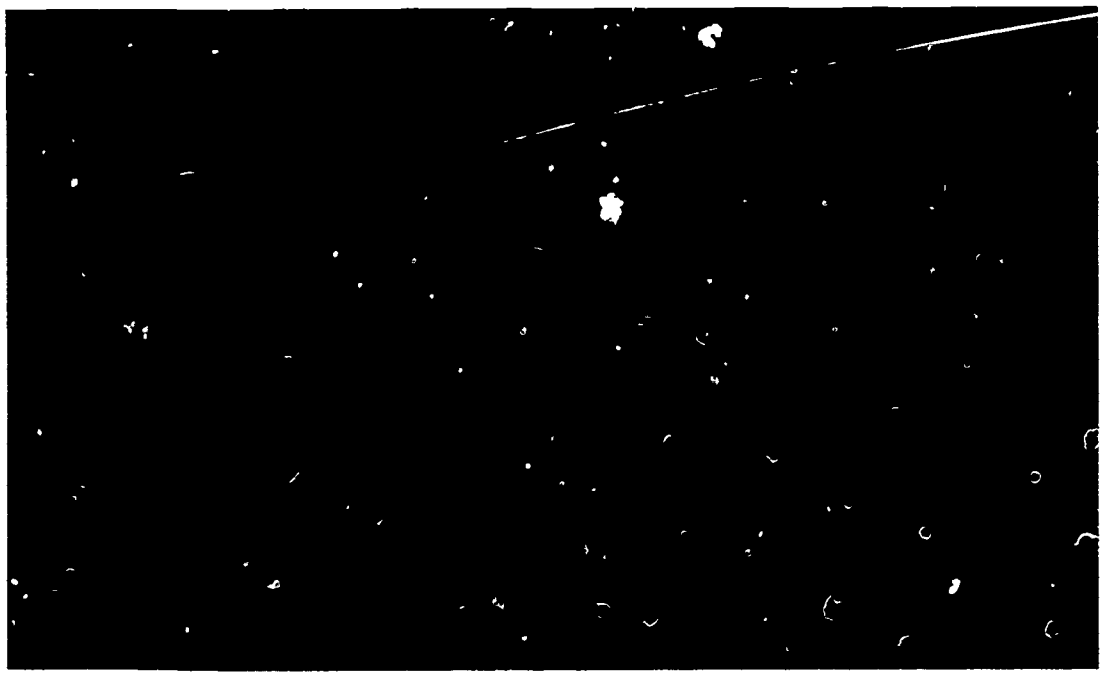

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ASSESSMENT OF A SYSTEM FOR INDIVIDUALIZING READING INSTRUCTION

Report from the Individually Guided Instruction in Elementary Reading Project

Office of Education Center No. C-03 Contract OE 5-10-154

Technical Report No. 117

ASSESSMENT OF A SYSTEM FOR INDIVIDUALIZING READING INSTRUCTION

Report from the Individually Guided Instruction in Elementary Reading Project

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Madison, Wisconsin

March 1970

This Technical Report is a doctoral dissertation reporting research supported by the Wisconsin Research and Development Center for Cognitive Learning. Since it has been approved by a University Examining Committee, it has not been reviewed by the Center. It is published by the Center as a record of some of the Center's activities and as a service to the student. The bound original is in The University of Wisconsin Memorial Library.

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STATEMENT OF FOCUS

The Wisconsin Research and Development Center for Cognitive Learning focuses on contributing to a better understanding of cognitive learning by children and youth and to the improvement of related educational practices. The strategy for research and development is comprehensive. It includes basic research to generate new knowledge about the conditions and processes of learning and about the processes of instruction, and the subsequent development of research-based instructional materials, many of which are designed for use by teachers and others for use by students. These materials are tested and refined in school settings. Throughout these operations behavioral scientists, curriculum experts, academic scholars, and school people interact, insuring that the results of Center activities are based soundly on knowledge of subject matter and cognitive learning and that they are applied to the imporvement of educational practice.

This Technical Report is from the Individually Guided Instruction in Elementary Reading Project in Program 2. General objectives of the Program are to establish rationale and strategy for developing instructional systems, to identify sequences of concepts and cognitive skills, to identify or develop instructional materials associated with the concepts and cognitive skills, and to generate new knowledge about instructional procedures. Contributing to these Program objectives, the Reading Project staff, in cooperation with area teachers, prepared a scope and sequence statement of reading skills for the elementary school as a first step in the development of an instructional program. From this outline, assessment procedures and group placement tests have been developed, and existing instructional materials have been keyed to the outline. Research is conducted to refine the program and to generate new knowledge which will be incorporated into the system.

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ABSTRACT

The study was designed to assess the effects of using the Wisconsin Prototypic System of Reading Skill Development, an experimental program which emphasizes diagnosis of reading skill development and instruction geared to individual skill needs. The prototypic system was implemented by the investigator who worked with the primary teachers of two elementary schools during the 1968-69 school year.

Children in the experimental group were second and third grade pupils during the 1968-69 school year who had teachers who had taught the same grade and achievement level during the previous year. Control subjects were those second and third grade pupils who had had the same teachers as the experimental subjects during the 1967-68 school year. The teachers were also considered as experimental subjects, the control being themselves in the fall of the 1968-69 school year before using the prototypic system.

The dependent variables were pupils' achievement and attitudes and teachers' classroom procedures and attitudes. Three instruments were designed by the investigator for use in the study: a pupil attitude inventory, a classroom observational system, and a teacher attitude inventory.

Reading achievement scores were compared by analysis of covariance. No significant differences were obtained ($p < .10$).

Pupil attitudes toward recreational reading were compared by analysis of variance, considering grade and achievement level. Significant differences were found ($p < .10$) only at one school, and significant change scores (from fall to spring) for experimental subjects in that school indicated growth in attitudes toward recreational reading.

The primary teachers using the experimental program showed changes in classroom procedures during reading instruction toward greater emphasis on individualization. The estimated true values for the fall and spring observations can be said with 95 percent certainty to be different in the increased use of supplementary materials; use of whole class groupings decreased, and the use of medium and small groups increased.

Scores on the teacher attitude inventory administered in the fall and spring were shown by an adaptation of the t test for paired comparisons to be significantly different ($p < .01$) in the predicted direction.

Two conclusions seemed warranted from the study. First, those areas most directly affected by the experimental treatment showed change--i.e., teachers' classroom procedures and attitudes toward individualizing reading instruction. Limited change only was found in pupil achievement and in pupil attitudes toward recreational reading. Second, since changes did occur in the dependent variables pertaining to teachers, using the prototypic system may be a valuable tool for inservice education to promote greater individualization of reading instruction.

Two implications were also drawn. First, changes pertaining to teachers may be all that can be expected after one year's implementation

of the prototypic system. Second, a longitudinal study should be made to determine if pupil variables would be significantly affected after use of the experimental program for more than one year.

CHAPTER I

SCOPE AND BACKGROUND OF THE STUDY

The primary purpose of this study was to examine the effects of the Wisconsin Prototypic System of Reading Skill Development on the performance and attitudes of primary pupils and their teachers. The Wisconsin Prototypic System of Reading Skill Development, which stresses continuous assessment of reading skills and subsequent teaching geared to individual needs, was implemented during the 1968-69 school year in the primary grades of two elementary schools which did not have experimental programs of instruction or administration.

The reading test and attitude scores of the experimental subjects, pupils in grades two and three, were compared to those of the control subjects, pupils who had had the same teachers as the experimental pupils in grades two and three during the previous school year. The effects of the prototypic system upon the teachers were also examined. Classroom practices and teacher attitudes toward individualizing reading instruction at the beginning and end of the 1968-69 school year were compared.

Background of the Study

In the fall of 1966, personnel from the Wisconsin Research and Development Center for Cognitive Learning embarked upon a project

with the support of the Department of Health, Education, and Welfare of the United States Office of Education under the provisions of the Cooperative Research Program. With the cooperation of local school personnel, the Prototypic Guide to Reading Skill Development in the Elementary School (Otto, Saeman, Houston, McMahan, and Wojtal, 1967) was developed.

The Guide and its accompanying set of individual assessment exercises were designed to serve as a model for the assessment of essential reading skills in the elementary school. Six general areas of reading skill development were identified: Word Attack Skills, Comprehension, Study Skills, Self-Directed Reading, Interpretive Skills, and Creative Skills. Each area was divided into five achievement levels, roughly corresponding to the following grade levels: kindergarten, first, second, third, and fourth through sixth grades.

Description of the Prototypic System

The intent of the prototypic system is to provide a flexible guide to the sequence of skill development to permit individually guided instruction in reading skill development. It is prototypic in the sense that the skill sequence is only a suggested one which may be modified according to the needs of each school. The child works with materials at his instructional level to acquire the skills that he needs to progress to more difficult material and more complex skills. Individual folders, in which the skills are outlined sequentially (Otto and Peterson, in press), provide a current record of each

individual's skill development, since the teacher checks off each skill in the child's folder as he attains mastery. The folder accompanies the child through the elementary school, providing a current and cumulative record of his reading skill mastery.

The Wisconsin Prototypic System of Reading Skill Development thus provides a skill development framework for the regular school program in reading instruction. It may function as a monitoring system to focus attention on skill acquisition, or it may become the basis of the skill development program within a completely individualized reading program. The prototypic system is intended either to complement or to become an integral part of the instructional program in reading.

In operation, a skill may be taught to the middle reading group in a basal reading program. Then an individual or group version of an assessment exercise is administered. Those children who are unable to apply the skill successfully in the exercise are grouped together temporarily for further instruction. When they exhibit mastery of the skill, this is noted in their folders, and the group is dissolved.

The advantage of this flexible approach to grouping is that the slower child is not pushed on to new skills before he has mastered the more elementary ones, nor is the faster child bored with further explanations when he has already attained mastery of a skill. Furthermore, if a child spontaneously employs a skill that has not been formally taught, he can be permitted to bypass the developmental

instruction. An additional advantage of the prototypic system is that it helps the teacher to understand the sequential development of skills and to see what skills need to be emphasized in his classroom.

Field Testing

During the 1967-68 school year the plan was tried out in four schools, and the Guide and accompanying exercises were modified according to the feedback obtained (Otto, Overview of the Wisconsin Prototypic System of Reading Instruction in the Elementary School, 1968). Two major modifications resulted.

First, since the teachers felt that they did not have adequate time for testing individuals, group assessment exercises (Wisconsin Expanding Inventory of Reading Development) were devised for each skill in the Word Attack, Comprehension, and Study Skills areas. The exercises are recommended for use at the beginning of the year, and portions may be given throughout the year to assess specific skill development. Since the directions for administration are not rigidly standardized, the teacher may be flexible in using the exercises.

Second, teachers expressed a need for a pool of materials available for use in developing the specific skills. The Compendium of Reading Materials and Teaching Techniques for the Wisconsin Prototypic System of Reading Instruction (Ellison, 1969) was made available during the second semester of the 1968-69 school year. Additional aids developed during the year by the reading project at the Research and Development Center were also available to the teachers.

Rationale and Focus

A rationale for the development of the Wisconsin Prototypic System of Reading Skill Development, in light of the related educational research, is presented first. Then the focus of the present study is considered, especially as it relates to previous research in reading. The experimental hypotheses are presented in the final section.

Rationale for the Prototypic System

It has been said that "rational curriculum planning involves the derivation of educational aims from values, educational objectives from educational aims, and learning opportunities from educational objectives" (Goodlad, 1966, p. 25). In other words, the fundamental values which influence a curriculum should be recognized and systematically explored. The resulting curriculum may then be better understood as a product of a particular value system.

An attempt is made in this section to examine some of the underlying assumptions of the Wisconsin Prototypic System of Reading Skill Development. Briefly, the assumptions on which the prototypic system is based are derived from (a) the recognition and acceptance of individual differences, with the subsequent necessity of individualizing instruction in order to cope with the differences and (b) the current educational thought concerning curriculum-making.

It is well known that children are individuals who learn in different ways and at different rates. Thus the goal of the

prototypic system is to provide assistance with the individualization of instruction in the classroom. Gates (1954), however, has described the dilemma facing the classroom teacher who sees that group instruction is inadequate for many children:

> We have less than complete information concerning how best to adjust instruction in the teaching of reading to the wide range and variety of individual needs found in a typical classroom. Reading is one of those activities so subtle that the learner requires, in most cases, a good deal of individual guidance. If teachers could instruct children one at a time, face to face, there would be probably relatively few reading failures . . . . The typical classroom, however, remains large and seems to be getting larger. The range of intellectual and other abilities found in the class is increasing rather than decreasing. Many teachers are becoming discouraged concerning the possibility of individualizing instruction . . . . There is need for research on different varieties or combinations of procedures which a typical teacher can profitably employ in a typical classroom (p. 333).

Gray (1957) discussed various means of individualizing reading instruction in the classroom. Basically, he said that individualization occurs when "wide provision is made for individual differences as an integral part of group instruction" (p. 102). He said that "good teaching" involves such practices as forming small skill groups to meet the needs of particular children and providing extra instructional time for those who are slow to grasp a skill. In essence, then, the prototypic system encourages "good teaching," for means of individualizing reading instruction within the limitations of the classroom are suggested.

Since individually guided instruction in reading skill development is the goal, a question might be raised as to how the prototypic system differs from the type of one-to-one reading instruction

described, say, by Veatch (1959,1960). While the primary concern in both approaches is that instruction be geared to the individual, not to the group as a whole, some differences exist. Veatch advocates that the basal reader system be completely eliminated, with children selecting their own books from which they are individually taught the necessary reading skills by the teacher. Olson's (1959) principles of child development -- seeking, self-selection, and self-pacing--provide the philosophical framework for the totally individualized reading program. The prototypic system, however, is not conceptualized as a complete system of reading instruction; it may be used as the basis of language-experience or individualized reading programs, or it may serve as a means for checking skill development within a basal series. Through the systematic assessment of skill development, pacing can be adjusted and additional help provided as needed. Flexible grouping for skill development is also encouraged. Instruction may occur individually, or in small groups, or in whole classes if every child is ready for the instruction. The essential difference, then, between the prototypic and individualized approaches is that the former is more flexible. Because the methods of obtaining individualization in the classroom are not rigidly specified, the prototypic system may take on a different form in every school where it is adopted.

The difference in flexibility is also the feature that distinguishes the prototypic system from Barbe's "personalized reading instruction" (1961), which may be considered a variation

of individualized reading instruction. Philosophically, Barbe's program is quite similar, for

> . . . the program is adjusted to the child, which means it may sometimes be individual in a one-to-one relationship between the child and the teacher, or it may be in a group, sometimes including every child in the class. It indicates that the individual make-up of the child is considered, without requiring him either to adjust to the interest and rate of other children in the group or to exclude the possibility that there will be children at various times who can benefit from working together and sharing both in the instruction of the teacher and one another's interest (p. 14).

Likewise, in addition to being similar philosophically, both plans use skill lists to obtain systematic skill development within a framework of an individualized approach. Barbe's lists of skills provide developmental sequences at five levels in the areas of vocabulary, word analysis and attack, comprehension, and oral and silent reading. However, Barbe's program does not aid the teacher in making assessments of skill development. The teacher is not given guidelines as to what may be considered mastery at each level, nor are assessment exercises provided. But the fundamental difference between Barbe's plan and the prototypic system is in the degree of specificity concerning how the program is to be implemented. Barbe clearly states how the instructional program in reading should function under his plan. For example, he lists as distinguishing characteristics of his program the individual conference between teacher and pupil and the self-selection by pupils of materials for reading instruction. Because his plan is more explicit in implementation, it loses some of the flexibility that characterizes the prototypic system.

Thus, while the Wisconsin Prototypic System of Reading Skill Development and leading plans for individualized reading instruction share certain underlying assumptions, they differ in the flexibility of implementation.

Educational thought concerning curriculum has also contributed to the framework for the development of the prototypic system. Tyler (1950) states that the effectiveness of learning experiences should be measured by the following criteria: continuity, sequence, and integration. The prototypic system incorporates continuity in the application of elementary skills at higher levels with more difficult materials; sequence is found in the movement from simple to more complex tasks; and integration is attempted by considering all aspects of a child's reading development (Word Attack Skills, Comprehension, Study Skills, Self-Directed Reading, Interpretive Skills, and Creative Skills) at given levels.

King and Brownell (1966) also discuss the value of sequence in curriculum planning. Although there is usually no one correct sequence of skills, a workable one must be adopted. Thus, in developing the prototypic system, the word prototypic was chosen to indicate that the skill sequence is only a model which is not thought to have some sort of a priori validity. King and Brownell, like Tyler, stress using the model as a means of reteaching important concepts at different levels in new ways with more difficult materials.

The Wisconsin Prototypic System of Reading Skill Development thus provides the teacher with a systematic way of looking at a child's reading skill development, as urged by Tyler and by King and Brownell. In the individual pupil folder the teacher is able to see what Tyler describes as the child's "vertical" development, the progress from level to level within each skill area. He can see how elementary skills are the foundation for the development of more complex skills. From the individual pupil folder he can also see what gaps exist in each child's overall reading skill development. In addition to the "vertical" development of skills, the "horizontal" development can also be easily seen. In other words, the teacher, by looking at a pupil folder, can see what strengths and weaknesses exist across the six skill areas at a given level. For example, a child may have adequate third grade mastery of word attack skills, comprehension, and study skills, but be weak in self-directed reading, interpretive skills, and creative skills. The teacher, therefore, knows what skills need to be emphasized. In contrast, from the results of the typical standardized achievement test the teacher knows only at what grade level the child is functioning--not what specific skills need to be taught.

Furthermore, the skill sequence of the prototypic system provides the framework within which progress may be assessed. The group assessment exercises correspond to the sequence of skills listed in the individual pupil folders for Word Attack Skills, Comprehension, and Study Skills. Therefore, as a child demonstrates

mastery of a given skill, the teacher can easily note this in the individual pupil folder.

In determining what constitutes mastery of a skill, however, the teacher is encouraged to use not only the information from the group assessments but also his judgment concerning the child's application of the skill in daily work. Thus, in line with Tyler's (1950) recommendations in discussing the evaluation of objectives, evaluation goes beyond the limitations of the written test. Furthermore, many of the skills cannot be evaluated by written assessments. Such skills as "the proper care of books" and "independent work habits" can be evaluated only by teacher judgment based on observation of classroom behavior.

Focus of the Study

Studies involving the comparison of pupil gains with two or more different methods of reading instruction have not proved to be very useful. The most prominent demonstration of the futility of such an approach is the group of 27 studies known as the United States Office of Education First-Grade Studies. In each of the studies two or more methods of beginning reading instruction were compared, but they did not provide unequivocal evidence of the superiority of any particular method. Among the conclusions stated in the summary report on these studies (Bond and Dykstra, 1967) is the following statement:

> Future research might well center on teacher and learning situation characteristics rather than method and materials. The tremendous range among classrooms within any method points out the importance of elements in the learning situation over

> and above the methods employed. To improve reading instruction it is necessary to train better teachers of reading rather than to expect a panacea in the form of materials (p. 211).

Furthermore, a recent report from the United States Office of Education (Hjelm, Storm, and Penney, 1969) states the following: "Comparisons of instructional approaches do not yield systematic and significant advances in our understanding of reading itself or of highly successful instruction in reading" (p. 14).

In this study, therefore, individualization of reading instruction is examined, but not within a particular methodological framework. The instructional approach is not prescribed; therefore, the prototypic system can be incorporated into any classroom regardless of the instructional methods being used. It should, in fact, be adapted to the needs of the particular school and classroom. The prototypic system, furthermore, provides a means of inservice education. It shows the teacher how to use systematic skill assessment in the classroom in order to study each child's skill development in terms of specific strengths and weaknesses rather than in terms of a general reading level. It reminds the teacher that learning must be meaningful and relevant to each child.

This study, then, is not an attempt to assess the effectiveness of a particular methodology, but instead it is an attempt to evaluate a global approach to improving reading instruction. The treatment might be classified as a type of teacher training. More exactly, it involves working with teachers to bring more individualization of reading instruction into the classroom.

Hypotheses

The purpose of this study was to assess the effects of the implementation of the Wisconsin Prototypic System of Reading Skill Development in terms of four experimental hypotheses. These hypotheses are that after one year's implementation of the Wisconsin Prototypic System of Reading Skill Development:

1. Second and third grade pupils who participated in the prototypic system (experimental subjects) will score higher on the vocabulary and comprehension subtests of standardized reading tests than will control subjects in the second and third grades.

2. Pupils in the experimental group will exhibit more positive attitudes toward reading as a recreational activity than will the control subjects.

3. Participating teachers of grades 1-3 will make more use of small instructional groupings and employ more activities that individualize instruction than they did previously.

4. Participating teachers of grades 1-3 will exhibit more positive attitudes toward the individualization of reading instruction than they did before using the prototypic system.

Chapter II

CONSTRUCTION AND DESCRIPTION OF DATA-GATHERING INSTRUMENTS

Three instruments were developed in order to assess the effects of the Wisconsin Prototypic System of Reading Skill Development. Each is discussed in terms of: (a) purpose of the instrument, (b) related research, (c) development and description of the instrument, and (d) validity and reliability.

Classroom Observational System

Purpose

A system for observing teacher activities in the classroom was needed to examine changes in teacher practices after a year's work with the prototypic system. Since the implementation of the prototypic system involves teacher-training, it was anticipated that teacher behavior in the classroom might change as a result of using the experimental treatment.

Medley and Mitzel (1963) have stated that the process "of identifying a limited range of behavior relevant to the purpose of the study and of constructing categories or items to be used by the observer" (p. 251) is essential to the development of an observational

system. The teacher behaviors considered most amenable to measurable change after using the prototypic system were (a) the type of reading instructional activities, and (b) the size of instructional groups employed. It was expected that participating teachers would increase the number of activities that individualize reading instruction and that they would make more use of small instructional groups as a result of the emphasis on temporary groupings for teaching particular skills.

Related Research

Kaplan (1969) has described a classroom observational system as "a way of identifying, ordering, and classifying behaviors for the purpose of examination, study, and evaluation" (p. 16). In developing an instrument for the present study, the intent did not include the last purpose mentioned in Kaplan's statement--that of evaluation. The function of the system was solely to record what was happening in the classroom during reading instruction.

Nor was the purpose to record the nature of the teacher's interactions with pupils. Because the systems described by Medley and Mitzel (1963) were devised primarily for the purpose of studying teacher-pupil interactions, those systems were rejected for use in this study. It was considered that teacher-pupil interactions were more a function of the teacher's rapport with the students than a result of using the prototypic system.

Rosenthal (1966) has cautioned experimenters about two effects that may bias results in using an observational system. First, bias

may enter into an observational system from the expectations of the observers. Therefore, care was taken to make the instrument as objective as possible. The categories were carefully specified in an attempt to make them mutually exclusive and exhaustive. Second, Rosenthal cautions about the "passive effect" of the experimenters--that is, the mere presence of the experimenters (or observers in this case) may have an effect on the subjects. To minimize this effect, the teachers were told that the observers were recording pupil behavior. It was hoped that the presence of the observers in the classrooms would then not radically change the behavior of the teachers.

Ryan's (1960) criteria for an observational system may be used in studying the final form of the instrument:

1. The dimensions of the criterion behavior have been specified and unequivocally defined in operational terms;
2. The observer recognizes the relevant behaviors and assesses those, and only those, characteristics;
3. The observer focuses his attention on specific actions and carefully avoids contamination of assessment by general impressions, reactions to behaviors that stand out prominently or unusual behaviors that obscure typical behavior, inferences about the meaning of behaviors, and inferences about what the behavior might be like in unobserved situations;
4. The observations are conducted with proper attention to time sampling--the observations are not too limited to provide for opportunity for occurrence of the criterion behavior;
5. The observer makes his assessments during or immediately following observation;
6. The observer makes separate assessments of each specified component of the criterion dimension considered independently;
7. The naturalness of the situation in which the criterion behavior occurs is preserved;

> 8. The observer is capable of recognizing and avoiding the influence of personal biases relative to individuals or behaviors under observation;
>
> 9. The observer conscientiously seeks to avoid various rating biases, such as the central-tendency error, the leniency error, and others;
>
> 10. Provisions are made for replication of observations and assessment by independent, similarly trained observers (pp. 41-42).

All of the criteria except number 6 were met in formulating the instrument for the present study. The sixth criterion was not met because the observer had to record the type of instructional activity and group size at the same time. Since group size is relatively easy to determine, this criterion did not seem crucial in making an effective observational system.

Development and Description of the Instrument

The type of activities engaged in by teachers during reading instruction was ascertained by observing primary classrooms in a local school. The optimal divisions for group size categories were also determined by observation. A checklist--the categories of which were as complete and as mutually exclusive as possible--was then devised on the basis of the classroom observations. The instrument was pilot tested and subsequently revised twice before being used in the present study. The categories used in the final form of the instrument are presented in Table 1.

Table 1

Categories of Teacher Behavior Included in the Classroom Observational System

Categories of Instructional Activities:

1. Teacher working with children in basals or programmed reading (possibly in conjunction with workbook or worksheet).

2. Teacher working with children in workbooks or on worksheets (ditto sheets).

3. Teacher working with children on any phase of experience charts.

4. Teacher working with children on supplementary reading (magazines, literary readers, library books, etc.).

5. Teacher reading story or discussing it.

6. Teacher working with visual materials.

7. Teacher using only chalk board as instructional device.

8. Teacher working with children using audio-visual hardware.

9. Teacher as resource person during independent work or circulating around room potentially available as resource person.

10. Teacher discussing general procedures for upcoming reading activities (whole-group focus).

11. Teacher involved in non-reading instruction activities.

12. Teacher working with children on other language arts activities--i.e., spelling, handwriting, and speaking.

13. Teacher administering formal test (excluding tests that are built into the instructional materials).

14. Teacher giving teacher-made quiz.

15. Teacher working with children on auditory discrimination or other auditory training.

Table 1 (continued)

Categories of Group Size:

Whole class.

16 or more children, but less than the whole class.

6-15 children.

2-5 children.

1 child.

No children involved.

Some of the instructional activity categories may include time when children are assembling, when materials are being distributed and collected, when board work is being used as part of the activity, or when directions are being given pertaining to the use of materials.

The observations or recordings of teacher behavior were made in the following way. When an observer entered a classroom, a stop watch was started. The observer then referred to a list of numbers from one to five taken from the Table of Random Numbers. The appropriate categories of teacher behavior were checked exactly at the end of the minute corresponding to the random number that was next on the list. For example, if the number three were next on the list of numbers from the Table of Random Numbers, the observer would record what the teacher was doing exactly at the end of the third minute after the observer entered the classroom. Since the listed numbers taken from the Table of Random Numbers ranged from one to five, the observer was always in the room at least one minute before making an observation

and never stayed in the room longer than five minutes. Before using the prototypic system, the teachers were observed eight times by the investigator and eight times by a colleague from the Wisconsin Research and Development Center. They were also observed for the same number of times by the same observers after using the xperimental program. The observers usually were not in the same classroom at the same time. On the few occasions that their visits coincided, observations were not recorded at the same time, since different lists of random numbers were being used by each observer.

Validity and Reliability

Face validity was obtained by basing the formulation of categories upon classroom observations in the primary grades. The fact that every category was used in recording observations during the pilot tests provided further evidence of face validity.

Interjudge reliability (the agreement between the two observers in marking observations at the same time) was estimated. The two observers each made 40 observations--one observation on each minute--during the second pilot test. The interjudge reliability was subsequently computed using Scott's (1955) coefficient, which is the same technique used by Flanders (1960). The formula is as follows:

$$\Pi = \frac{P_o - P_e}{1 - P_e}$$

P_o is the proportion of agreement among observers, and P_e, found by squaring the proportion in each category and summing, is the proportion of agreement expected by chance. The interjudge reliability coefficient

for the type of teacher activities in reading instruction was .95; for the size of the groups working with the teacher it was 1.00.

Teacher Attitude Inventory

Purpose

An inventory was needed to assess the attitudes of teachers toward individualizing instruction before and after using the Wisconsin Prototypic System of Reading Skill Development. Since it was anticipated that teachers might respond to an attitude inventory as they thought they should respond as teachers, and not as they actually believed, an indirect method of assessing attitudes was selected--namely, the semantic differential (Osgood, Suci, and Tannenbaum, 1967). By having the teachers react to adjectives rather than more directly as with a questionnaire, it was hoped that the intent of the instrument would not be so apparent that they would respond in ways that they perceived to be professionally desirable.

Related Research

Jackson and Messick (1967) cautioned that "indirect, disguised techniques" are sometimes necessary to obtain a valid measurement of an attitude. In fact, Weschler and Bernberg (1950) stated that "to a certain extent the value of a given technique may depend upon the manner in which it is able to disguise its true purpose and can be adjusted to fit into a variety of different situations" (p. 225). They explained the reasons that direct methods of attitude assessment are inadequate:

> A great deal of criticism has been directed against the use of certain attitude measurement techniques, especially against those based on simple scales and on direct questioning, because they deal only with manifest verbal content and fail to reach into the more comprehensive aspects of the personality. The person who is asked "point-blank" to express his feelings on a subject about which he is reticent for one reason or another may well evade the issue by providing an answer which conforms with the views of the investigator or which is sufficiently neutral to protect his psychological security. This process does not have to be conscious or intentional and many clinical studies have shown that certain attitudes, although no less real to the individual, have been suppressed for being unacceptable to his values and standards and become inaccessible to the explicit frontal approach of the various direct measurement techniques (p. 210).

They commented further on the superiority of indirect methods of assessing attitude:

> The advantage of such an "indirect" method of measurement lies in the fact that it conceals from the individual the intent of the measurement and allows him to produce his responses freely without fear of getting personally involved. Furthermore, such indirect measurement enables the experimenter to observe and measure without producing an effect on the attitude itself; in no way is the situation structured so as to force the subject consciously to reveal his bias, and the measurement consists essentially of the quantitative interpretation of responses which are considered valuable for shedding light upon the underlying attitudes (p. 211).

An adaptation of the semantic differential, an indirect method of assessing attitudes, was thus chosen for the form of the attitude inventory. Remmers (1963) has summarized several studies that have employed the semantic differential in assessing attitudes for various purposes. In his survey, however, he cautioned that a bias due to response-sets may be operating. In other words, the order of presentation of the concepts to be evaluated may influence the responses of the subject. More recently, however, Kane (1969), analyzing data

from a semantic differential instrument which included various combinations for ordering items, showed that item order is not a significant factor and that an experimenter need not worry about proximity errors.

Development and Description of the Instrument

Osgood, et al., have discussed the basic flexibility in using the semantic differential:

> Although we often refer to the semantic differential as if it were some kind of "test," having some definite set of items and a specific score, this is not the case. To the contrary. it is a very general way of getting at a certain type of information, a highly generalizable technique of measurement which must be adapted to the requirement of each research problem to which it is applied. There are no standard concepts and no standard scales; rather, the concepts and scales used in a particular study depend upon the purposes of the research (p. 76).

Two adaptions of the basic semantic differential instrument, as described by Osgood, et al., were made. First, analysis of the three factors used by Osgood, et al.--evaluation, potency, and activity--was not undertaken. It seemed more important in terms of the requirements of the study to choose scales appropriate to a unitary concept of attitude toward individualizing reading instruction than to try to measure separate factors. Furthermore, a total score was considered desirable for purposes of comparison of attitudes at the beginning and end of the school year.

The second adaptation of the semantic differential was the inclusion of the agree-disagree scale. The purpose of its inclusion was to determine if subjects would tend to respond more positively to that scale than to the other scales which consisted of adjectives. It was speculated that they would tend to give answers they perceived as desirable

(positive responses) on the agree-disagree continuum more often than on the other scales. This notion was in fact supported by the data.

The teacher attitude inventory, called the Reading Teacher Survey, thus consisted of 96 items which included 12 statements, each followed by eight scales. The teachers were asked to consider the feasibility of applying each of the 12 statements in their classrooms. They were instructed to record their responses on the eight scales following each statement. Seven of the scales consisted of adjectives picked from the adjectives used in the literature to describe individualized reading instruction. One scale provided a continuum of agreement-disagreement. The scales had seven positions, ranging from the positive to the negative extreme. The middle position could be used when the subject felt neutral or when he did not know how to respond. With the exception of asking the subjects to consider each statement in terms of their experience, the instructions were otherwise modeled after those suggested by Osgood, et al. (pp. 82-84).

The inventory was pilot tested and revised twice before it was administered to the present subjects. In the first version the statements were worded as theoretical concepts; e.g., "Each child should be permitted to move at his own pace, not at the pace of the group." The subjects of the first pilot testing--graduate students in three summer reading courses who were primarily elementary school teachers--were asked to mark their reactions to the theoretical concepts as they applied to their classrooms. It was found that the subjects tended to mark primarily the positive end of the continuum.

The test was then revised according to the suggestions of the pilot-subjects and the results of the subsequent analyses. Two different forms were devised. One was a revision of the first test in which the subjects were asked to react to theoretical concepts. In the other form, subjects were asked to react to specific examples of classroom reading instructional procedures. The examples illustrated instructional procedures that would grow out of the basic philosophy of the Wisconsin Prototypic System of Reading Skill Development. It was hoped that the format of the second form would facilitate identification of the subjects with the teacher described in the examples, encouraging them to answer more realistically in terms of their own experience rather than responding theoretically or idealistically. One example, representing a viewpoint opposed to individualization, was inserted to break a set toward positive responses.

The two forms were then administered to a group of elementary school teachers--all of whom taught reading--attending an inservice meeting prior to the beginning of the school year. Half of the group was given one form first and half the other. Upon completion of one form they were given the other. Inspection of the results of item analyses (Baker and Martin, 1968) revealed that the responses to each item were most evenly distributed on the form employing specific examples. Although the Hoyt reliability was slightly lower (.917) than on the other form (.968), the form in which theoretical concepts were used was dropped, and the one employing examples was revised in an effort to obtain more evenly distributed scores.

A further revision was made. In the two pilot testings the subjects had read the directions silently. When administering the instrument for the study, however, the investigator read them to the subjects--while they followed along on their copies--stressing important aspects of the directions. Especially emphasized was the application of the instructional procedures in the examples in their own classrooms.

The examples or statements used in the final form as well as the eight scales are listed in Table 2. The statements--except No. 5 which was inserted to break a set toward positive responses--are examples of instructional procedures that would grow out of the philosophy of the prototypic system.

Table 2

Statements and Scales Used in the Reading Teacher Survey

Statements:

1. Pete and Gary are among the best readers in their third grade class. It is feasible for the teacher to know that Pete has trouble reading social studies books while Gary who has no trouble with factual material cannot understand non-literal material.

2. Lucy, Larry, Joe, and Dick need work on recognizing final consonant sounds. Even though the teacher may work with them as a group, it may still be considered individualized instruction because each child needs to develop that skill at that time.

3. It is possible for the teacher to know that Dennis is poor in picking out the main idea of a paragraph but good at recognizing all consonant and vowel sounds.

Table 2 (continued)

4. Although Ruth is working in more than one set of materials to learn the short a sound, it is possible for the teacher to know which skill she should be taught next.

5. It is feasible for the teacher to use the same basal reader with the whole class.

6. It can be expected that a second grade teacher will know when and how to teach study skills to Gary who reads far above grade level.

7. It is feasible for Mary Lou, who has not mastered initial consonant sounds, to continue work on them although the rest of the children have mastered this skill and have moved on to new material.

8. It is feasible in a second grade classroom to provide Pete with fourth grade materials which he can read and to give Peggy pre-primer material which is appropriate for her.

9. Jim does not seem to have much interest in reading in the basal reader. The teacher can feel free to use non-basal materials to teach Jim reading skills.

10. Marjorie, David, Howard, Dorothy, and several others are working together in a small group on recognizing certain consonant blends. It is possible for the teacher to assess almost daily which children have mastered this skill and to modify teaching accordingly.

11. Jim, Dennis, Gary, Ruth, and Pete all need work on the vowel dipthongs oi and oy. It is feasible to meet with this group only as often as is necessary for their mastering these sounds in words.

12. Gary has mastered all the work taught to the class very quickly. It is feasible to allow him to start working on vowel digraphs even though the rest of the class still is working on consonant blends and vowel sounds.

Table 2 (continued)

Scales:

agree	___:___:___:___:___:___:___	disagree
ineffective	___:___:___:___:___:___:___	effective
challenging	___:___:___:___:___:___:___	unchallenging
disorganized	___:___:___:___:___:___:___	organized
dull	___:___:___:___:___:___:___	interesting
practical	___:___:___:___:___:___:___	impractical
fair	___:___:___:___:___:___:___	unfair
inefficient	___:___:___:___:___:___:___	efficient

Validity and Reliability

Face validity was demonstrated for the theoretical concepts and adjective scales of the first version. Three professors who teach courses in reading judged the concepts and scales to be relevant to measuring attitudes toward individualization of reading instruction. The examples of classroom procedures--the final form of the statements used--were likewise judged by the same professors as relevant. The adjective scales had further validity in that the adjectives were chosen from the literature describing individualized reading instruction.

An estimate of reliability or internal consistency, obtained from the Hoyt reliability coefficient from the Generalized Item Analysis Program (Baker and Martin, 1968), was .90. Green (1967) has stated that a high reliability coefficient usually indicates that the items are homogeneous and the scales unidimensional. Since the reliability coefficient for the Reading Teacher Survey is high and since, therefore, the items are highly intercorrelated, the instrument is apparently measuring one factor as was intended instead of the three factors used

by Osgood, et al. Presumably, this unitary factor is teachers' attitude toward the individualization of reading instruction.

Pupil Attitude Inventory

Purpose

The Primary Pupil Reading Attitude Inventory was developed to measure attitudes toward recreational reading. An instrument was needed that did not require reading or writing (since the intended subjects were pupils in the primary grades), that could be administered quickly to an entire classroom group, and that did not obviously reveal the intent of the instrument.

Related Research

The San Diego County Inventory of Reading Attitude (1961) is intended for use with primary children as well as with older pupils. Therefore, it was considered for use in the present study. It was not used, however, because the intent of the inventory seems obvious in the many questions concerning reading habits and attitudes. Furthermore, the administration of the inventory requires reading and writing skills unless it is given orally.

An instrument devised by Macdonald, Harris, and Rarick (1966) focuses on measuring attitudes toward reading as a school subject by using the forced-choice method with pictures. The first grade pupil is asked to choose between reading and another school activity (drawing, writing, doing paper construction work, or doing number work) by marking the picture of the activity that he prefers.

Schotanus (1967), on the other hand, developed an instrument for measuring attitudes of primary pupils toward recreational reading. A picture of a child reading is paired with each of six pictures depicting general types of recreational activities--playing actively outdoors, watching television, playing actively indoors, playing quietly indoors, playing with a pet, and helping a parent. As with the Macdonald instrument, the pupil is asked to choose the picture depicting his favorite activity.

After studying the Macdonald and Shotanus inventories, the investigator decided that a measure requiring a choice between reading and favorite recreational activities would be more rigorous than one demanding a choice between reading and other school activities. Furthermore, it seemed that the consideration of reading as a leisure-time activity would avoid reactions to the particular circumstances of reading instruction in the classroom, such as a dislike of the teacher or assignment to the lowest reading group. The Shotanus inventory was considered to be inadequate, however, because the children in the drawings are not easily identified as either boys or girls. It was believed that primary pupils would more readily identify with the children in the drawings if separate versions for boys and girls were drawn. Furthermore, in some drawings of the Shotanus inventory the child is pictured with another person. Pupils might choose a pictured activity because it involves contact with another person, and interaction with other people might function as a confounding variable.

Development and Description of the Instrument

The recreational activities to be offered as alternatives to reading were determined by individual interviews with twenty second and third grade children. This group included an equal number of boys and girls and an equal number of good and poor readers, as identified by their teachers. They were asked to name their favorite activities after school and on weekends. Nine of the most frequently named activities (excluding reading) were then depicted by an artist. Three pictures involving reading were also drawn. Separate versions for boys and girls were devised since it was believed that pictures of like-sexed children would facilitate self-identification of the primary pupil with the child in the picture. Most of the activities are the same for both sexes except for four of the non-reading activities which, although similar in type, are different for boys and girls. The pictures of the activities selected are described in Table 3.

Each of the three reading pictures was paired with each of the nine non-reading pictures, allowing the subject to choose between reading and some other activity 27 times. Thus, a score of 27 would indicate that readi g was consistently chosen over each of the nine other activities; a score of zero would indicate that reading was not chosen at all as a preferred activity. Thirteen distractors--choices between two pictures of non-reading activities listed in Table 3--were also included so that the inventory involved a total of 40 choices, 27 of which included reading. The pictures for the distractors were

randomly chosen, and the sequence of the pairs of pictures was also randomly determined.

Table 3

Description of the Pictures of Activities Used in the Primary Pupil Reading Attitude Inventory

Boy's Version	Girl's Version
Reading Activities:	Reading Activities:
1. Boy reading book in living room.	1. Girl reading book in living room.
2. Boy reading comic book on bed.	2. Girl reading comic book on bed.
3. Boy reading book outside.	3. Girl reading book outside.
Non-Reading Activities:	Non-Reading Activities:
1. Boy playing on monkey bars.	1. Girl playing on monkey bars.
2. Boy playing with toy cars and trucks.	2. Girl playing with dolls.
3. Boy riding bicycle.	3. Girl riding bicycle.
4. Boy watching T.V.	4. Girl watching T.V.
5. Boy swinging rope.	5. Girl on swing.
6. Boy drawing picture.	6. Girl drawing picture.
7. Boy building model airplane.	7. Girl making puppet.
8. Boy climbing tree.	8. Girl jumping rope.
9. Boy going swimming.	9. Girl going swimming.

In the administration of the inventory the pupils were informed that the inventory was not a test, but merely a way of finding out what children like to do after school and on weekends. The children were then shown each of the 12 pictures (three reading and nine non-reading pictures) in the boy's and girl's versions and were told what activity was represented in each picture. To prevent their changing choices, they were told to mark in crayon the picture of the activity that they preferred on each page. They were told not to consider previous choices, but to choose only between the two pictures presented on each page. As each child finished, the booklets were picked up to prevent comparisons among children.

Validity and Reliability

Although the instrument appeared to have some inherent validity since second and third grade pupils had been interviewed to determine the choice of non-reading activities, an estimate of concurrent validity was also made. A validation procedure similar to the one used in validating the San Diego County Inventory of Reading Attitude was selected. The teachers in the San Diego study were asked to select from their classrooms three students with the best attitude toward reading and three with the poorest attitude toward reading. In validating the Primary Pupil Reading Attitude Inventory, it was decided that the teachers would select the five students in their classrooms who were highest and the five who were lowest in interest in leisure-time reading.

Some criteria for selection of the students were suggested to the teachers. For example, it was suggested that children who have a high interest in recreational reading may have read more books outside of school than required, may have checked more books out of the school library, and may have discussed the books with the teacher or other students. The criteria suggested for the students who have a low interest in recreational reading were the failure to read books at home, the misuse of library periods, and the display of dislike or lack of interest when recreational reading is discussed in class.

In making the validation study, the Primary Pupil Reading Attitude Inventory was first administered to 94 second and third grade children in three classrooms. Each of the three teachers, who did not know the scores of the children on the attitude inventory, selected, using the above criteria, the five pupils who were judged to be highest in interest in leisure-time reading and the five pupils who were considered lowest. A t test for independent samples revealed a significant difference between the high and low interest groups' scores on the Primary Pupil Reading Attitude Inventory ($t = 3.39$, $p < .01$). The means and standard deviations of scores for the two groups are presented in Table 4.

Table 4

Mean Inventory Scores and Standard Deviations for Two Groups of Students Judged to Have Low and High Interest in Recreational Reading

Group	Mean	Standard Deviation	N
Low interest, as judged by teachers	5.66	5.08	15
High interest, as judged by teachers	11.00	3.46	15

The reliability of the instrument was determined in a pilot test. The inventory was administered to 73 second and third grade pupils in three classrooms not participating in the present study and re-administered to the same children one week later. The test-retest reliability coefficient (r = .906) was significant beyond the .001 level.

Chapter III

METHOD

In this chapter (1) the setting of the study is described, (2) the experimental treatment is discussed, and (3) the evaluation procedures are considered.

Setting

To provide a base-line for examining the impact of the Wisconsin Prototypic System of Reading Skill Development in the experimental schools, the instructional programs in reading that have been operating for several years should be considered. These existing programs, which provide the framework in which the prototypic system operates, are described in the following sections.

McFarland Elementary School

McFarland uses a homogeneous grouping system based upon the achievement scores from the previous spring and upon teacher judgment of students' abilities. The number of pupils in each classroom is adjusted according to the ability level of the group. The number of pupils in a classroom of children of high abilities, for example, is almost twice as great as the number in a classroom of children of the lowest ability level. The purpose of this arrangement is to provide the greatest amount of

individual attention to the students with the lowest ability and achievement levels.

The primary teachers have a limited amount of outside assistance. One teacher-aide is available to do secretarial work for the primary teachers. High school pupils belonging to Future Teachers of America occasionally assist teachers with scoring tests and recording grades.

McFarland has for several years been using Sullivan's Programmed Reading series as its basic instructional program in the elementary school. The teachers, in general, use the series according to the instructions of the author. Each child works at his own pace in the programmed texts; the children consequently may be in different books or at different places within the same book. The teacher circulates throughout the room during the reading instructional period, answering individual questions and giving individual quizzes periodically as required by the series.

Occasionally, the teachers will break the routine by some group instructional activities--primarily those involving the whole class. The activities are usually in the form of an instructional game, worksheet, or supplementary story. All teachers--to varying degrees--supplement the programmed instruction by using stories from various basal readers. The Lippincott basal series (1964) is most frequently used as the supplementary source of materials. Some teachers also use the 1956 and 1968 editions of the Scott-Foresman series, 1968 American Book Company series, 1964 Harper and Row series, Science Research Associates kits, and Reader's Digest Reading Skill Builders.

St. Bernard's School

There are three classrooms at the primary level--one second grade, one third grade, and one combined second and third grade. The students are homogeneously grouped in the sense that the students of the highest ability and achievement are placed in the combined grade.

The number of pupils in each classroom is approximately the same, being in each case slightly over 30. The teachers receive some secretarial help from the school secretary and from the mothers of the children who sometimes score tests and substitute in the classroom when the teachers attend meetings during school time.

The primary grades use Ginn's Faith and Freedom series as the basic reading instructional program. The basal series is supplemented by a phonics workbook published by Reardon, Baer, and Company. The teachers use a three-group system for reading instruction. In other words, during reading instruction the class is divided by achievement levels into three groups which tend to remain fairly stable in composition throughout the year. The groups use books of different difficulty levels within the basal series for their instructional material. In addition, sometimes reading activities involving the whole class are used.

Treatment

The experimental treatment consisted of two types of intervention. First, it involved teacher inservice training; the investigator and a colleague from the Research and Development Center worked with the teachers in implementing the Wisconsin Prototypic System of Reading Skill Development. The other aspect of the experimental treatment involved the teachers'

work with the pupils in using the prototypic system. Only the teachers worked with the pupils; the investigator had no contact with them except in administering the pupil attitude inventory. The aspect of teacher inservice training is discussed in the next section. The teachers' work with the pupils is considered in the section in which the adaptations of the prototypic system made in each school are discussed.

Inservice Training

The types of inservice sessions--excluding testing and data-gathering--are listed below in the sequence in which they occurred:

1. A general meeting was held at the end of September for all teachers and administrators in the Madison area who were using the Wisconsin Prototypic System of Reading Skill Development. The major purpose was to explain the use of the Wisconsin Expanding Inventory of Reading Development (group assessment exercises).

2. Meetings were held at each school at the end of September to give further explanations and to answer questions on the Wisconsin Expanding Inventory of Reading Development.

3. Informal contacts were made with most of the teachers during the pupil attitude testing and classroom observations. The purpose of these contacts was primarily to answer individual questions concerning the prototypic system.

4. Early in November the teachers were shown how to record the results from the Wisconsin Expanding Inventory of Reading Development in the individual pupil folders. The teachers were encouraged to combine

their judgments with the test data in evaluating the competency of each child in each skill.

5. In January grade level meetingswere held to encourage teachers to use the skill grouping obtained from the diagnostic testing and to answer further questions.

6. A final session was held in the spring to obtain the opinions of the teachers concerning the value and practicality of the Wisconsin Prototypic System of Reading Skill Development.

Local Adaptations of the Prototypic System

The aspect of the experimental treatment pertaining to the teachers' work with their pupils is discussed in this section. The teachers in both schools followed the same basic procedures in using the Wisconsin Prototypic System of Reading Skill Development. The group assessment exercises--Wisconsin Expanding Inventory of Reading Development--which corresponded to the grade level at the end of the previous year were administered by the teachers in the fall of the 1968-69 school year. The results were then recorded in each child's folder so that the teachers were able to see for each child which skills were mastered and which needed more instruction. The methods that were used to teach the necessary skills varied in the two schools, and therefore they are discussed separately for each school. Throughout the year the teachers observed the children using skills that could not be assessed by written exercises; mastery of these skills was recorded in the individual pupil folders. At the end of the school year the group assessment exercises, appropriate for each grade level, were administered by the teachers. The skills

that each child had mastered were recorded in the individual pupil folders.

In the following sections each school is considered separately since some aspects of the prototypic system varied in the two schools.

McFarland Elementary School: McFarland was included in the present study at the request of some of its teachers who were quite enthusiastic and eager to use the Wisconsin Prototypic System of Reading Skill Development. During the summer of 1968, some of the McFarland teachers revised the skill sequences and added another area called Communication Skills. The revisions were minor, mostly in the form of combining categories or eliminating some skills which were not considered essential. The individual pupil folders were subsequently revised and printed by the school district. Although just one of the primary teachers was involved in the revisions made during the summer and although they had only vague notions concerning the nature of the prototypic system, the primary teachers appeared to be interested in learning what other teachers in their school had been doing. In other words, they felt some involvement in the program since their school had already begun to adapt the skill sequences to its needs.

Their enthusiasm was also evident during the session when the results from the Wisconsin Expanding Inventory of Reading Development were to be recorded in the individual pupil folders. Before that inservice session the teachers on their own initiative had already made up lists of which children had mastered the particular skills and which children needed further work. Evidently, they had begun to use the results of

the diagnostic testing without the urging and encouragement from the investigator.

The primary teachers, also on their own initiative, started a file of materials which were keyed to each skill in the McFarland skill sequence. In response to requests for additional materials, the teachers were occasionally provided with some suggestions for activities. One teacher in the school served as a liaison with the Research and Development Center staff, providing materials for the teachers and recording their reactions. Furthermore, some of the teachers contributed materials that they had been using to the file. Thus, sharing of ideas and materials took place in a more systematic way than in previous years.

St. Bernard's School: The program was begun at St. Bernard's School at the solicitation of the investigator. The teachers were enthusiastic and cooperative in adopting the program. The school administration was particularly flexible in allowing the teachers to meet with the investigator during school hours and arranging for mothers of the children to score diagnostic tests.

Of the various aspects of the prototypic system, the teachers seemed to make the most use of the group assessment exercises. Using the results of this diagnostic testing, the teachers began to form temporary skill groups more often than during the previous year. The groups involved children not only from different reading groups but also from different classrooms. Working with children from other classrooms on a particular skill seemed to encourage the teachers to think of themselves more as a primary unit and less as isolated classroom teachers.

They began to share techniques, materials and ideas more than they did before using the prototypic system.

Evaluation Procedures

Subjects

The impact of the Wisconsin Prototypic System of Reading Skill Development was assessed in terms of its effects upon two groups of people: pupils in the second and third grades and their teachers. A description of each sample is presented below.

Pupils: The pupil sample of experimental subjects consisted of 154 children from the second and third grades of McFarland Elementary School, a school district near Madison, Wisconsin, and 65 second and third grade boys and girls from St. Bernard's School, a small parochial school in Madison. Pupils were selected for the experimental sample if they were in classrooms with teachers who had taught the same grade and ability level during the previous school year. Seven teachers at McFarland and two at St. Bernard's met these criteria and agreed to allow the children in their classrooms to be experimental subjects.

Since it was difficult to find matching schools that might provide a control group, the idea of a control year was used. It was believed that comparing the achievement and attitudes of the experimental subjects to those of children who had had the same teachers during the previous school year would show any special effects that might arise from having used the prototypic system. The control subjects, therefore, were those second and third grade children who, during the 1967-68 school year, had the same teachers as the experimental subjects did

during 1968-69. The control subjects had essentially the same instructional and administrative programs as the experimental subjects with the exception of the introduction of the prototypic system during the 1968-69 school year. The control sample consisted of 182 subjects from the McFarland Elementary School and 58 pupils from St. Bernard's School.

Although the prototypic system was implemented in the kindergarten and first grade classrooms, pupils from these grades were not included in the study because of the lack of comparable pre-test achievement data.

Teachers: All primary teachers--not just those whose pupils served as experimental subjects--in the participating schools during the 1968-69 school year were included in the sample of teachers. At McFarland Elementary School, 14 teachers taught children in the primary grades, and at St. Bernard's School there were three primary teachers.

Administration of the Assessment Instruments

The assessment instruments were administered according to the timetable presented in Table 5. The first three instruments in Table 5 were created for use in the study, and they are discussed in Chapter II. They were administered by the investigator with the assistance of a colleague from the Research and Development Center. The standardized achievement tests were administered by the teachers as part of the school testing programs. McFarland Elementary School used the Stanford Achievement Test to measure pupil achievement; St. Bernard's School used the California Achievement Tests.

Table 5

Summary of Instruments Used and Time of Administration

Instrument	Fall 1967	Spring 1968	Fall 1968	Spring 1969
Classroom Observational System			x	x
Reading Teacher Survey			x	x
Primary Pupil Reading Attitude Inventory		x	x	x
Stanford Achievement Test or California Achievement Tests	x	x	x	x

The teachers at the McFarland Elementary School administered the appropriate test batteries (according to grade level) of the Stanford Achievement Test. Only two subtests, however, were used in measuring pupil achievement in reading for the present study. The test battery and subtests used for each grade are the same for both school years (1967-68 and 1968-69) and are presented below in Table 6.

Table 6

McFarland Testing Sequence

Test Battery and Subtest	Grade 2 Fall	Grade 2 Spring	Grade 3 Fall	Grade 3 Spring
Primary I Battery: Word Reading Paragrapl. Meaning	x			
Primary II Battery: Word Meaning Paragraph Meaning		x	x	x

The test batteries of the California Achievement Tests designated as appropriate for each grade in the test manual were used at St. Bernard's School. The test batteries and subtests used in the study are listed below:

Table 7

St. Bernard's Testing Sequence

Test Battery and Subtest	Grade 2 Fall	Grade 2 Spring	Grade 3 Fall	Grade 3 Spring
Lower Primary Reading Vocabulary Reading Comprehension	x			
Upper Primary Reading Vocabulary Reading Comprehension		x	x	x

The subtests used as measures of reading achievement were selected because they appeared to test word recognition and paragraph comprehension. It was believed that the tests of word recognition would show progress in word attack skills, and that the paragraph comprehension test would reflect progress in the integrated use of reading skills.

The methods of analyzing the data gathered by the assessment instruments are presented with the results in Chapter IV.

CHAPTER IV

ANALYSES AND RESULTS

The methods of analyzing the data and the results obtained are presented with a restatement of each hypothesis.

Hypothesis 1

After one year's implementation of the Wisconsin Prototypic System of Reading Skill Development, participating second and third grade pupils (experimental subjects) will score higher on the vocabulary and comprehension subtests of standardized reading tests than will control subjects in the second and third grades.

Method of Analysis

The means of the grade equivalent scores obtained from the spring testings of the experimental and control groups on the vocabulary and comprehension subtests of standardized reading tests were compared, after adjusting for each individual's fall score, by an analysis of covariance. Grade equivalent scores were used instead of raw scores because the teachers had used different forms, which had slightly different norms, of the appropriate levels of tests during the fall testing.

Results

Mean scores of the control and experimental groups for each school

are presented in Tables 8 and 9.

Table 8

Mean Grade Equivalent Scores
Stanford Achievement Test
McFarland Elementary School

	Fall				Spring			
	Word Reading		Paragraph Meaning		Word Reading		Paragraph Meaning	
	Gr.2	Gr.3	Gr.2	Gr.3	Gr.2	Gr.3	Gr.2	Gr.3
Control	2.20	3.56	2.22	3.60	3.13	4.35	3.08	4.32
Experi-mental	2.17	3.68	2.24	3.74	3.00	4.49	2.99	4.59

Table 9

Mean Grade Equivalent Scores
California Achievement Tests
St. Bernard's School

	Fall				Spring			
	Reading Vocabulary		Reading Compre-hension		Reading Vocabulary		Reading Compre-hension	
	Gr.2	Gr.3	Gr.2	Gr.3	Gr.2	Gr.3	Gr.2	Gr.3
Control	1.98	3.68	1.78	3.71	3.71	4.37	3.71	4.20
Experi-mental	1.98	3.98	1.82	3.78	3.73	4.62	3.69	4.31

After adjusting for each pupil's fall score on the two subtests, no significant differences between the means of the experimental and control groups were obtained for either subtest at the .10 level. The results of the analyses of covariance for McFarland Elementary School

are presented in Tables 10-13.

Table 10

Analysis of Covariance
Word Reading
McFarland, Grade 2

Source	df	MS	F	p
Treatment	1	.33	.58	< .45
Error	129	.57		

Table 11

Analysis of Covariance
Paragraph Meaning
McFarland, Grade 2

Source	df	MS	F	p
Treatment	1	.44	.78	< .38
Error	129	.57		

Table 12

Analysis of Covariance
Word Reading
McFarland, Grade 3

Source	df	MS	F	p
Treatment	1	.11	.24	< .62
Error	171	.45		

Table 13

Analysis of Covariance
Paragraph Meaning
McFarland, Grade 3

Source	df	MS	F	p
Treatment	1	.84	1.93	< .17
Error	171	.44		

The results of the analyses of covariance for St. Bernard's School are presented in Tables 14-17.

Table 14

Analysis of Covariance
Reading Vocabulary
St. Bernard's, Grade 2

Source	df	MS	F	p
Treatment	1	.01	.04	< .83
Error	60	.15		

Table 15

Analysis of Covariance
Reading Comprehension
St. Bernard's, Grade 2

Source	df	MS	F	p
Treatment	1	.01	.10	< .74
Error	60	.12		

Table 16

Analysis of Covariance
Reading Vocabulary
St. Bernard's, Grade 3

Source	df	MS	F	p
Treatment	1	.18	2.44	< .12
Error	59	.07		

Table 17

Analysis of Covariance
Reading Comprehension
St. Bernard's, Grade 3

Source	df	MS	F	p
Treatment	1	.10	1.96	< .17
Error	59	.05		

Thus, the use of the Wisconsin Prototypic System of Reading Skill Development for one year apparently did not significantly affect pupil achievement.

Hypothesis 2

After one year's implementation of the Wisconsin Prototypic System of Reading Skill Development, pupils in the experimental group will

exhibit more positive attitudes toward reading as a recreational activity than will the control subjects.

Method of Analysis

The number of times each pupil chose reading over other recreational activities in the Primary Pupil Reading Attitude Inventory was counted. The means of the scores for the two groups of subjects (experimental and control) were compared by an analysis of variance. The design differed in the two schools. At the McFarland Elementary School homogeneous groups were synonomous with classrooms, each classroom representing an achievement section. There were three achievement sections (high, middle, and low) which corresponded to the three classrooms at second grade; there were four achievement sections (high, high-middle, low-middle, and low), or classrooms, at third grade. Therefore, the analyses were performed with a nested design. At St. Bernard's School, however, the children in each grade (one classroom at each grade level) were divided into three approximately equal achievement groups on the basis of fall achievement scores (vocabulary subtest). Thus, the achievement grouping was within classrooms, and the design was a crossed one. The attitude data for control and experimental subjects in both schools were thus compared by grade and by achievement group.

Results

The means and standard deviations of spring attitude scores for control and experimental subjects in each school are presented in Tables 18 and 19. Both groups took the Primary Pupil Reading Attitude Inventory in the spring of the school year under similar administration conditions.

Table 18

Means and Standard Deviations
of Spring Attitude Scores
McFarland Elementary School

	Control			Experimental		
	Mean	Standard Deviation	N	Mean	Standard Deviation	N
Grade 2:						
Section 1	8.38	4.89	29	12.00	6.92	26
Section 2	6.61	4.44	23	4.83	4.05	24
Section 3	8.95	7.30	20	6.20	4.14	15
Grade 3:						
Section 1	10.33	6.02	27	14.26	7.29	27
Section 2	9.87	6.02	31	8.38	6.07	24
Section 3	9.11	4.99	28	9.68	8.24	22
Section 4	10.00	6.13	24	11.81	7.22	16
Grand Mean	9.09		182	9.80		154

Table 19

Means and Standard Deviations
of Spring Attitude Scores
St. Bernard's School

		Control			Experimental		
		Mean	Standard Deviation	N	Mean	Standard Deviation	N
Grade 2	Group 1	8.73	4.78	11	7.42	5.82	12
	Group 2	7.22	3.34	9	12.20	6.91	10
	Group 3	7.90	7.52	10	7.54	6.90	11
Grade 3	Group 1	6.44	3.54	9	11.67	7.32	12
	Group 2	9.67	7.66	9	9.70	5.64	10
	Group 3	5.30	4.27	10	8.40	3.56	10
Grand Mean		7.55		58	9.46		65

As can be seen from Tables 18 and 19, the standard deviations are rather large. The variability of scores together with the sample size for each section preclude a strong treatment effect. Nevertheless, the results of comparing the means of control and experimental groups did disclose a treatment effect in one school in the expected direction significant beyond the .10 level. The statistical analyses and significance levels for each school are presented in Tables 20 and 21.

Table 20

Analysis of Variance
Comparison of Spring Attitude Scores of
Control and Experimental Subjects
McFarland Elementary School

Source	df	MS	F	p
Treatment (T)	1	42.14	.32	NS
Grade (G)	1	474.98	3.67	NS
T x G	1	30.99	.24	NS
Section: T x G	10	129.42	3.49	< .0003
Error	322	37.06		

Table 21

Analysis of Variance
Comparison of Spring Attitude Scores of
Control and Experimental Subjects
St. Bernard's School

Source	df	MS	F	p
Treatment (T)	1	111.79	3.24	< .07
Grade (G)	1	.74	.02	NS
Achievement Group (A)	2	59.24	1.71	NS
T x G	1	30.76	.89	NS
T x A	2	3.13	.09	NS
G x A	2	11.78	.34	NS
T x G x A	2	87.67	2.54	< .08
Error	111	34.50		

Inspection of Tables 20 and 21 reveals a significant difference ($p < .10$) between the control and experimental subjects on spring attitude test scores only at St. Bernard's School. Since a significant difference between the two groups did not exist at McFarland, the data from that school is not considered further, with the exception of showing the nature of the highly significant interaction of Treatment x Grade x Section in Figures 1 and 2. It can be seen that at McFarland the experimental treatment was apparently most effective in changing attitudes with the high achievement groups in both grades.

Although a significant difference did exist between the control and

experimental groups at St. Bernard's School, there was also a significant interaction. The mean scores of the control and experimental subjects at St. Bernard's School are presented in Figures 3 and 4 to illustrate the nature of this interaction. It appears that in second grade, Group 2--the middle achievement level--responded to the experimental treatment with more positive attitudes toward recreational reading. In the third grade, the experimental subjects in Groups 1 and 3--the high and low achievement groups--scored higher than did the control subjects.

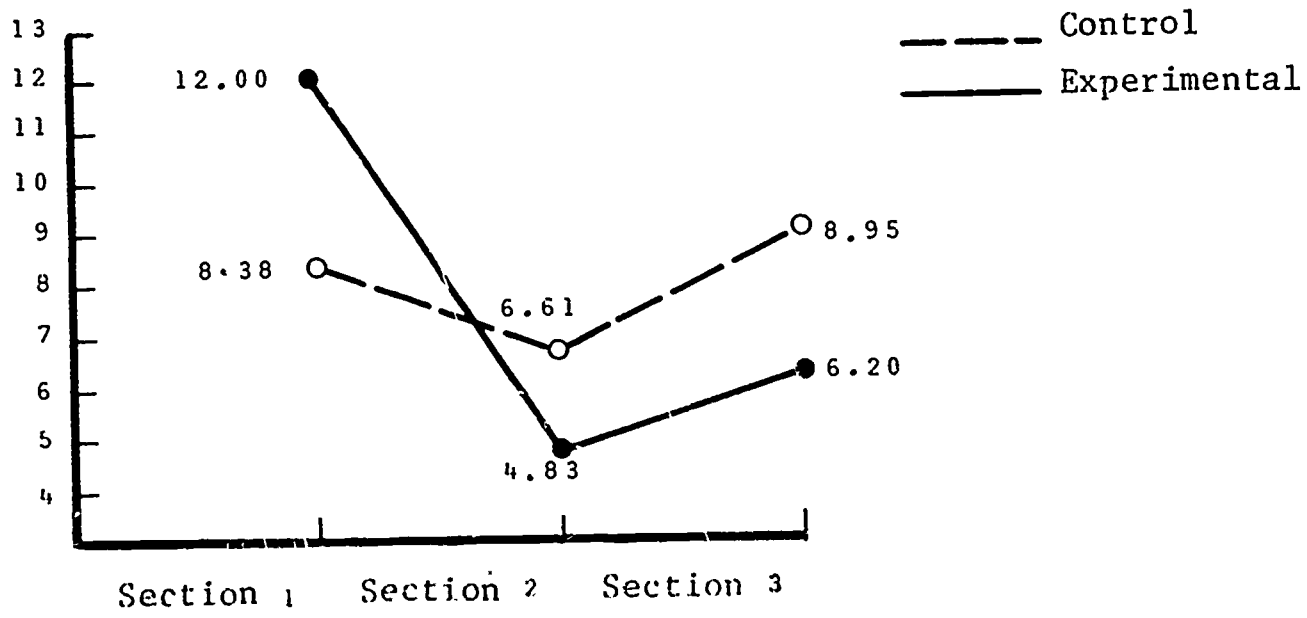

Fig. 1. Means of Spring Attitude Scores

McFarland, Grade 2

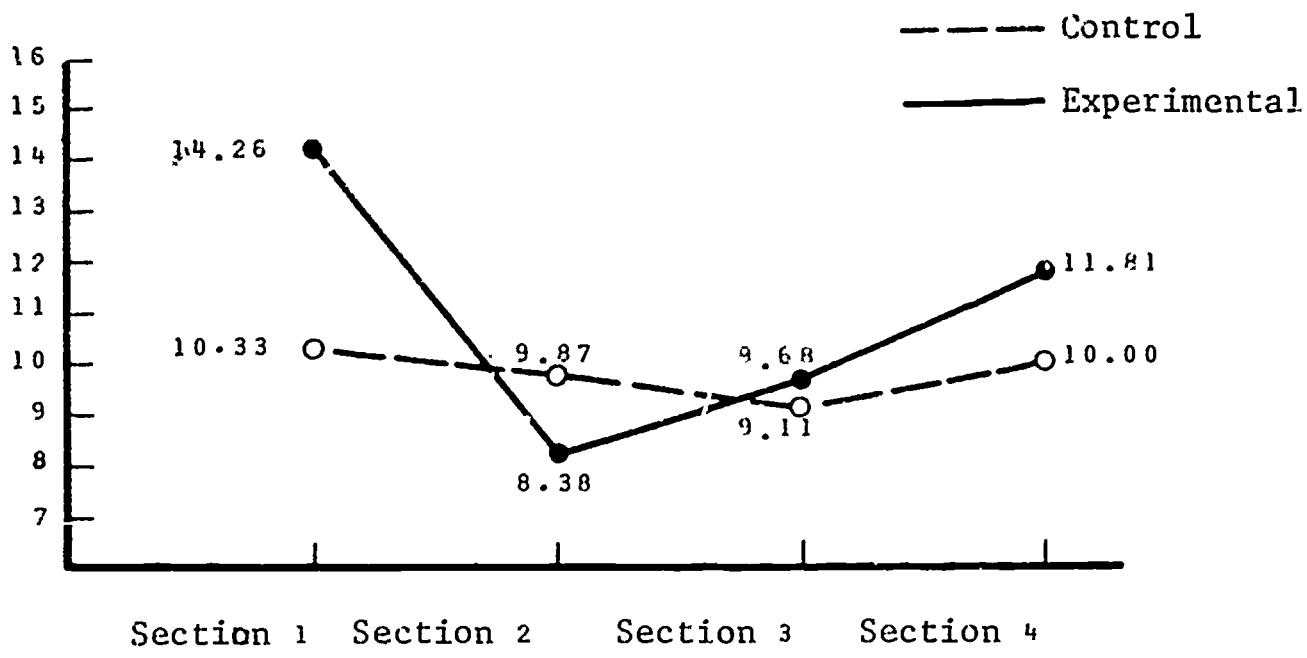

Fig. 2. Means of Spring Attitude Scores

McFarland, Grade 3

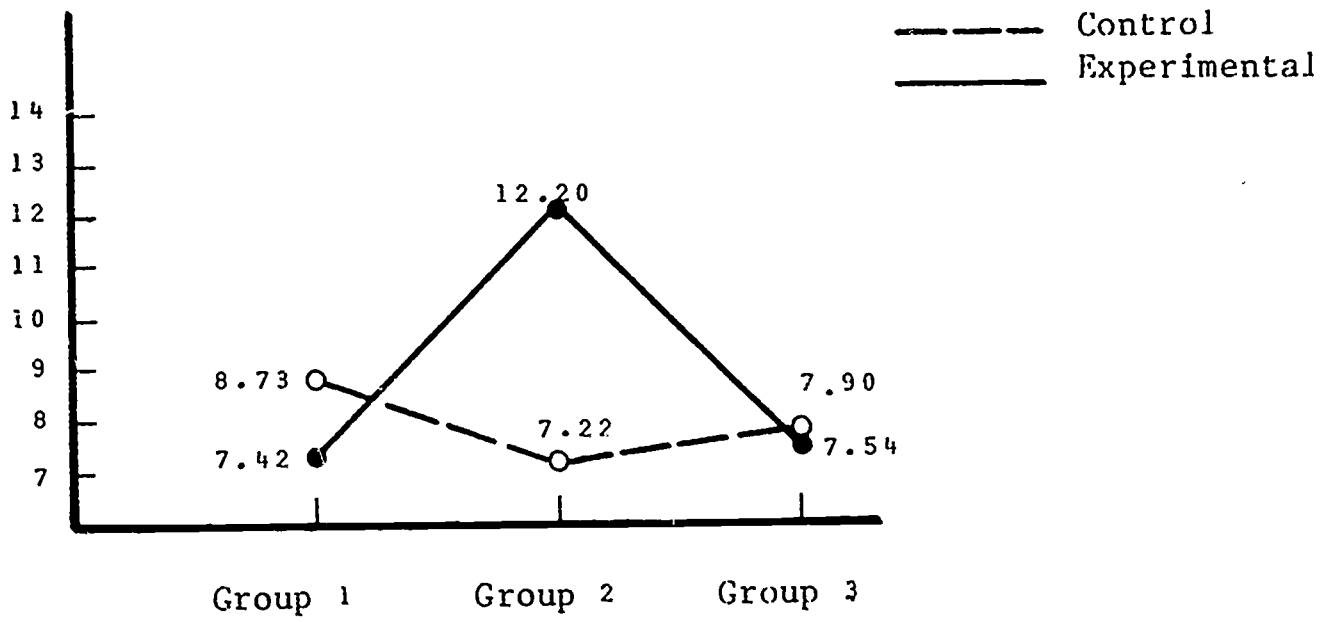

Fig. 3. Means of Spring Attitude Scores

St. Bernard's, Grade 2

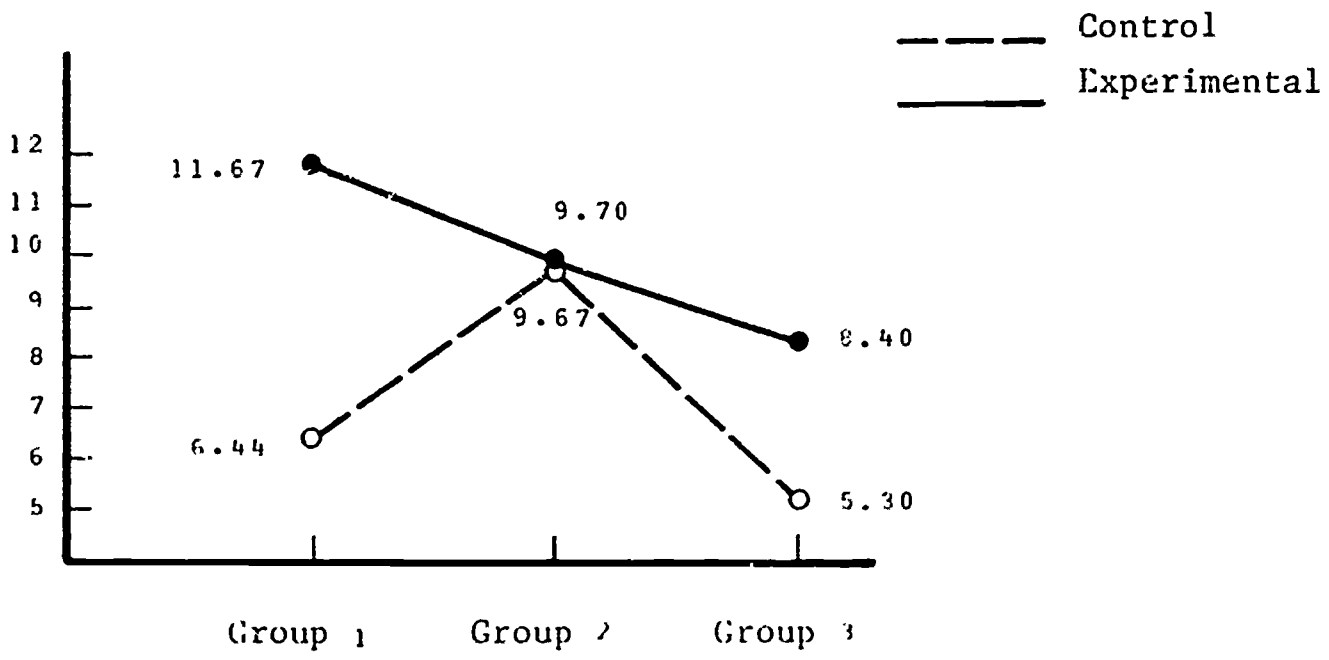

Fig. 4. Means of Spring Attitude Scores

St. Bernard's, Grade 3

The attitude inventory was also administered in the fall of 1968 to the experimental subjects only. The purpose was to determine if a significant change would occur during the 1968-69 school year. If a significant difference were to exist between control and experimental subjects in spring attitude scores in the predicted direction, and if a significant change were to occur during the year for the experimental subjects, it could be argued that the experimental subjects were more positive toward recreational reading in the spring as a result of using the prototypic system. A significant change score would thus indicate that the experimental group was not higher initially in the fall than the control group would have been if control subjects had also taken the inventory in the fall of 1967. Since significant differences between the control and experimental groups in spring attitude scores existed only at St. Bernard's School, the change scores for the experi-

mental subjects are presented for St. Bernard's School only, although similar analyses were performed on the data from the McFarland Elementary School.

The mean attitude scores for the fall and spring administrations and the mean changes for each section at St. Bernard's School are presented in Table 22.

Table 22

Mean Fall and Spring
Attitude Scores and Mean Changes
Experimental Subjects
St. Bernard's School

		Fall Mean	Spring Mean	Change
Grade 2	Group 1	8.3333	7.4167	- .9166
	Group 2	9.3000	12.2000	2.9000
	Group 3	3.7273	7.5454	3.8181
Grade 3	Group 1	9.7500	11.6667	1.9167
	Group 2	7.2000	9.7000	2.5000
	Group 3	8.8000	8.4000	- .4000

An analysis of variance was performed on the change scores to test the hypothesis that the Grand Mean was different from zero. If the Grand Mean were significantly different from zero, then it could be concluded that a significant change had occurred from fall to spring of the 1968-69 school year. The results for St. Bernard's School are presented in Table 23.

Table 23

Analysis of Variance
Attitude Change Scores
St. Bernard's School

Source	df	MS	F	p
Grand Mean	1	41.60	4.44	.05
Grade (G)	1	.80	.08	NS
Section (S)	2	6.76	.72	NS
G x S	2	17.38	1.86	NS
Error	59	9.36		

It can be seen from Table 23 that a significant change in attitude scores did occur from fall to spring in the experimental subjects at St. Bernard's School. The interaction was not significant at the .10 level. Thus, since the experimental subjects at St. Bernard's School in the spring scored significantly higher in attitudes toward recreational reading than did control subjects, and since the change in the scores of experimental subjects from fall to spring was also significant, the second hypothesis was sustained at St. Bernard's School. The hypothesis was not upheld at the McFarland Elementary School.

Hypothesis 3

After one year's implementation of the Wisconsin Prototypic System of Reading Skill Development, participating teachers of grades 1-3 will make more use of small instructional groupings and employ more activities that individualize reading instruction than they did previously.

Method of Analysis

Observations--recordings of teacher behavior--were made in the fall and spring of the 1968-69 school year in the classrooms of 12 primary teachers at McFarland Elementary School. Two McFarland teachers were not included in the observations because they had teacher-aides in their classrooms. The number of primary teachers at St. Bernard's School was so small that classroom observations would not yield meaningful results, and thus they were not included in the observations.

After observing in the fall, a total of 192 observations was obtained. The two observers had each recorded eight observations of each of the 12 teachers. The number of observations in each category was tallied by the two dimensions that were being observed--Type of Activities and Size of Groups. The percentage that each category was marked (out of the total number of observations--192) was then calculated. The same procedure was followed for the data obtained in the spring of the school year.

Results

The raw data and percentages (of the total number of observations that each category was marked) are presented in Table 24, according to the two dimensions of classroom behavior being observed in the fall and spring of the 1968-69 school year. The categories in the dimension Type of Activities are described in greater detail in Table 1 in Chapter II (p. 18).

Table 24

Classroom Observations of Type of Activities and Size of Groups Used in Fall and Spring

TYPE OF ACTIVITIES:

Category	Fall		Spring	
	Raw Score	Percent	Raw Score	Percent
1 (basic program)	45	23.44	36	18.75
2 (workbooks)	15	7.81	14	7.29
3 (experience charts)	6	3.12	0	0
4 (supplementary reading)	21	10.94	43	22.40
5 (story read)	7	3.64	2	1.04
6 (visual materials)	6	3.12	8	4.17
7 (chalk board)	10	5.21	16	8.33
8 (audio-visual hardware)	8	4.17	2	1.04
9 (resource person)	36	18.75	49	25.52
10 (general procedures)	7	3.64	7	3.64
11 (non-reading activities)	19	9.90	10	5.21
12 (language arts)	8	4.17	4	2.08
13 (formal test)	0	0	1	.52
14 (teacher-made quiz)	2	1.04	0	0
15 (auditory training)	2	1.04	0	0

SIZE OF GROUPS:

Category	Fall		Spring	
	Raw Score	Percent	Raw Score	Percent
Whole class	109	56.77	60	31.25
Large Group (16 or more)	2	1.04	0	0
Medium Group (6-15)	2	1.04	27	14.06
Small Group (2-5)	2	1.04	22	11.46
Individual	69	35.94	78	40.63
No children involved	8	4.17	5	2.60

A shift in emphasis in classroom procedures can be seen by comparing the percentages for the fall and spring in the two dimensions--Type of Activities and Size of Groups. Particularly noticeable changes occurred in the following categories under Type of Activities: 1 (teacher working with children in basals or programmed reading), 4 (teacher working with children on supplementary reading), 9 (teacher serving as resource person during independent work), and 11 (teacher involved in non-reading instruction activities). The following categories under Size of Groups showed notable changes: whole class, medium, small, and individual groupings.

The percentages that each category was marked were converted into proportions, and an attempt was made to estimate the range of each proportion in the categories which showed the greatest change from fall to spring. If the ranges in the same category for the fall and spring did not overlap, it could be concluded with at least 95 percent certainty that the true values of the fall and spring proportions for each category were different. The probability statement is given below:

$$\text{Probability } (\hat{p} - 1.96\sqrt{\frac{\hat{p}\hat{q}}{n}} \leq p \leq \hat{p} + 1.96\sqrt{\frac{\hat{p}\hat{q}}{n}}) \approx .95$$

This probability statement assumes a normal distribution and uses the quantity $\sqrt{\frac{\bar{p}\bar{q}}{n}}$ as an estimation of the standard error of measurement. The range of each proportion for fall and spring in the categories which showed the greatest amount of change is presented in Table 25.

Table 25

Range of Proportions for
Fall and Spring in Categories
Showing Greatest Change

Category	Range	
	Fall	Spring
Type of Activities:		
1 (basic program)	.1745 - .2943	.1323 - .2427
4 (supplementary reading)	.0652 - .1536	.1650 - .2830
9 (resource person)	.1323 - .2427	.1935 - .3169
11 (non-reading activities)	.0568 - .1412	.0207 - .0835
Size of Groups:		
Whole class	.4976 - .6378	.2469 - .3781
Medium Group	-.0034 - .0247	.0914 - .1898
Small Group	-.0034 - .0247	.0695 - .1597
Individual	.2915 - .4273	.3368 - .4758

From Table 25 it can be seen that the ranges of the proportions in the fall and spring did not overlap in category 4 (use of supplementary materials) under Type of Activities and in the categories of whole class, medium, and small groupings under Size of Groups. Therefore, it may be said with at least 95 percent certainty that the true values for the fall and spring for those categories are different and that change did occur in the predicted direction.

Although only the use of supplementary materials (category 4) showed a significant change in the dimension of Type of Activities, definite trends were observable in the decreased use of the basic

instructional program (category 1) and in the increased role of the teacher as a resource teacher during independent work (category 9). These changes seem to indicate a greater emphasis on individualizing instruction. The change in category 11 (teacher involved in non-reading instruction activities) is possibly a function of better classroom control at the end of the school year.

The categories in the other dimension, Size of Groups, changed in the predicted direction. The use of whole class groupings decreased significantly in the spring, with a significantly increased use of medium and small groups. Work with individuals also increased noticeably, although not significantly. Thus, the third hypothesis was sustained with the limitations mentioned above.

Hypothesis 4

After one year's implementation of the Wisconsin Prototypic System of Reading Skill Development, participating teachers of grades 1-3 will exhibit more positive attitudes toward the individualization of reading instruction than they did before using the prototypic system.

Method of Analysis

Each of the 17 teachers at McFarland and St. Bernard's schools took the Reading Teacher Survey both in the fall and in the spring. Since the inventories were unsigned, however, to protect the anonymity of the teachers and thus encourage candor, it was impossible to pair up the fall and spring inventories of each individual. Instead, group means for each administration were computed and compared statistically

through the use of a modified one-tailed t test for paired comparisons. The following formula was used:

$$t = \frac{M_2 - M_1}{\frac{s_1 + s_2 - 2rs_1s_2}{N - 1}}$$

Results

The group means and standard deviations are presented in Table 26.

Table 26

Mean Inventory Scores and Standard Deviations for Fall and Spring Administrations

Administration Time	Mean	Standard Deviation	N
Fall	517.53	51.64	17
Spring	561.82	45.73	17

The t value (t = 2.583) necessary for significance at the .01 level for a one-tailed test was inserted in the above formula. Then the value of r, the intercorrelation between the fall and spring scores, was calculated, resulting in r = .0112. Since it can be logically argued that a high positive correlation can be expected between fall and spring scores (since the same subjects were taking the inventory at both times) and since the t value would increase if the intercorrelation (r) were higher, there must be a significant difference in the predicted direction between the fall and spring scores at least at the .01 level of significance for a one-tailed test. For example, if

the intercorrelation (r) were the same value as the reliability (Hoyt) of the instrument--i.e., .90--then t would equal 7.87 which would be significant beyond the .001 level. Therefore, the hypothesis can be considered upheld; the teachers expressed significantly ($p < .01$) more positive attitudes toward individualizing reading instruction in the spring (after using the prototypic system) than they did in the fall of the same school year.

As further evidence of differences between the fall and spring scores, the frequency distributions are presented in graphic form in Figure 5. Although both distributions tend to be bimodal, the major mode shifted from the interval of 471-500 to the interval of 531-560, indicating a move toward more positive attitudes toward individualizing reading instruction.

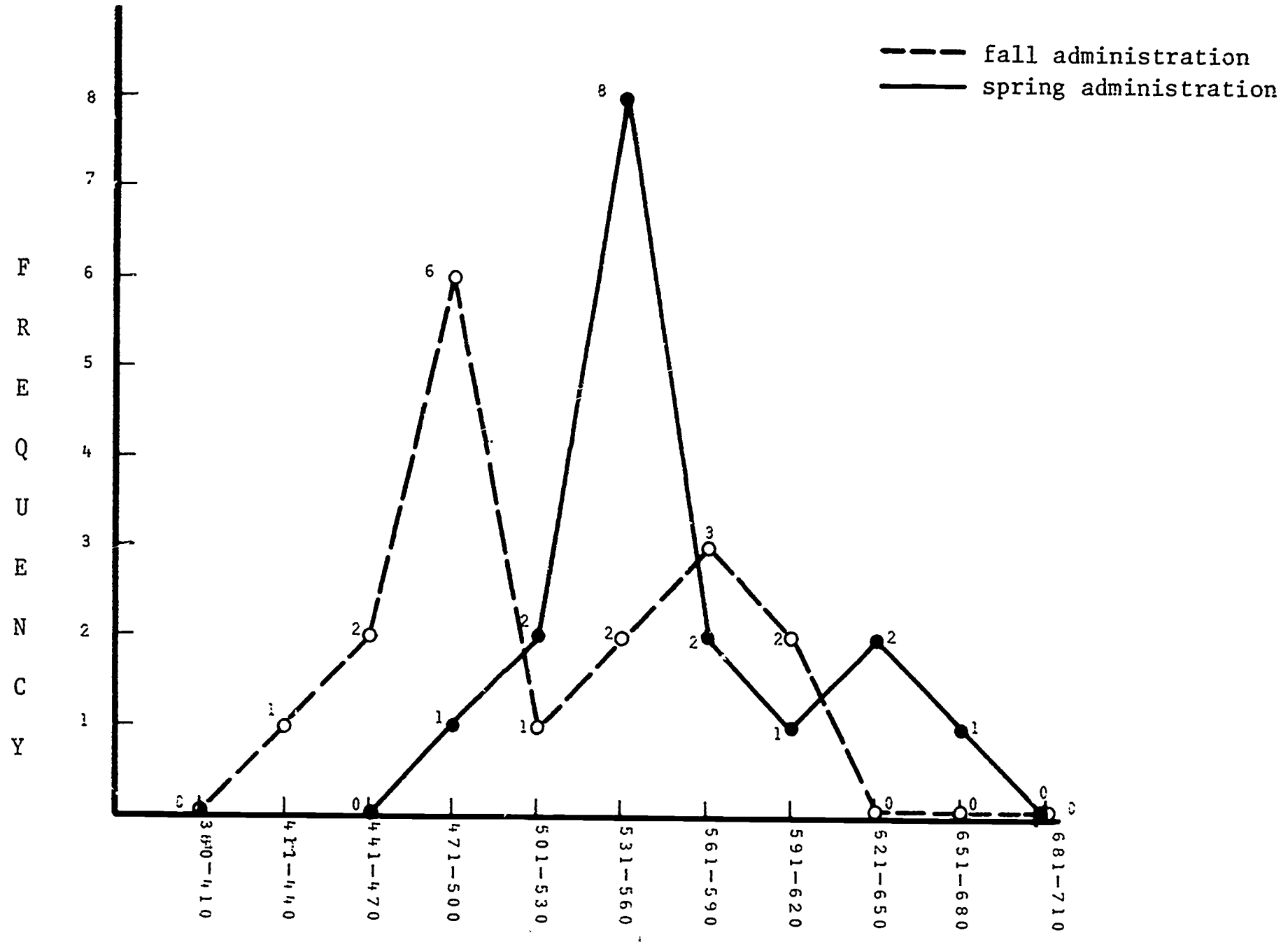

Fig. 5. Frequency Polygon of Fall and Spring Distributions of Teacher Attitude Inventory Scores

CHAPTER V

DISCUSSION, CONCLUSIONS, AND SUMMARY

Each hypothesis is discussed in light of the results presented in Chapter IV. Then the conclusions and implications that may be drawn are presented, followed by a summary of the study.

Discussion

Hypothesis 1

Inspection of the results presented in Tables 10-17 reveals no significant differences were obtained between the control and experimental groups in the vocabulary and comprehension subtests of standardized reading tests.

For three reasons it is not surprising that pupil achievement was not significantly affected by one year's exposure to the experimental treatment. First, the experimental intervention consisted wholly of work with teachers rather than with pupils, as outlined in Chapter III. Therefore, the influence on pupils was indirect.

Second, the activities at the beginning of the school year somewhat

delayed the use of the experimental program. Although the teachers were prompt in implementing the group diagnostic testing (Wisconsin Expanding Inventory of Reading Development), the results were not recorded in a form usable in the classroom until early November. Then, with the many classroom activities pertaining to Christmas, it is possible that many teachers did not seriously begin grouping for skills and marking individual skill attainments until after Christmas. Furthermore, although the prototypic system is not difficult to implement, it may have taken time for some teachers to accept the idea of individualizing reading instruction and to see that this method did not necessarily mean disruption of their normal routine. Consequently, the use of the results of the diagnostic testing and of the prototypic system in general may have been delayed, giving the pupils less than a full school year to be influenced by the experimental treatment.

The third possible explanation for the lack of significant differences between the control and experimental groups is that the use of standardized achievement tests does not directly assess specific skill development. Instead, they yield one score for word recognition and one for paragraph comprehension, each of which is a global term for more specific skills. The best assessment instrument would have been one that provided scores for specific skills, such as the Wisconsin Expanding Inventory of Reading Development does, so that specific progress could have been measured. But since the Wisconsin Expanding Inventory of Reading Development was part of the experimental treatment, it could not be used as an assessment instrument, and no other test that yielded

the desired information was available. Therefore, the tests used as part of the school testing programs were selected even though they did not directly measure the aspects of reading instruction being emphasized by the experimental treatment. Rothrock (1961) has commented on this problem of assessment instruments in research in reading: "A real weakness in most of these experiments is that few standardized tests are designed to measure some very important parts of the reading program....Most standardized tests fail to measure such important areas as reading attitudes, carry-over values, oral interpretation, critical reading skills, word attack skills, etc." (p. 235).

Hypothesis 2

The second hypothesis was upheld at St. Bernard's School--but not at McFarland Elementary School--in that the experimental subjects scored significantly ($p. < .10$) higher than did the control subjects on an instrument measuring attitudes toward recreational reading. A significant change score was also obtained at St. Bernard's School for the experimental subjects in measuring the growth in attitudes from fall to spring of the 1968-69 school year. The conclusions that can be drawn from the data at St. Bernard's School, however, are limited by the significant interaction of Treatment x Grade x Achievement Group. (See Figures 3 and 4 in Chapter IV.)

The results at the two schools present different pictures. At McFarland there was no significant treatment effect, but there was a highly significant interaction of Treatment x Grade x Section. (See Figures 1 and 2.) At St. Bernard's, on the other hand, the treatment

effect was significant, but the interaction was not as highly significant as it was at McFarland. It cannot be concluded, therefore, that the experimental treatment was especially beneficial, in terms of positive attitudes toward recreational reading, for either a particular grade or a particular achievement group.

A possible explanation for the lack of significant differences between control and experimental groups at McFarland is that attitudes toward recreational reading, rather than toward reading in the classroom, were being assessed. The measure was, therefore, more rigorous than if attitudes toward reading instruction in the classroom had been sought.

Hypothesis 3

It was expected that teachers might change their classroom procedures to an emphasis on individualizing reading instruction as a result of using the Wisconsin Prototypic System of Reading Skill Development. This hypothesis was tested only at McFarland Elementary School and was sustained with certain limitations.

It had been anticipated that a change would occur in the dimension of Type of Activities. A decrease in the use of the basic program (Sullivan's Programmed Reading) was expected, with an increase in the use of supplementary materials and in the role of the teacher as a resource person during independent work. Although all of these changes occurred in the predicted directions, only the use of supplementary materials can be said with 95 percent certainty to have changed. Since no control group of teachers was used, it is not possible to claim that this change

resulted solely from the experimental treatment. It may, in fact, be partially a function of the time of year--i.e., some students may have completed the Programmed Reading series by the spring of the school year.

The other dimension--that of Size of Groups--was considered to reflect most directly a shift in emphasis toward individualization. A decreased use of whole class instruction was expected, with an increase in the use of medium, small, and individual groupings. In other school settings, it might be anticipated that the percentage of use of medium-sized groups would be high--especially with the use of the typical basal reader system--and not reflect individualization of instruction. At McFarland at the beginning of the year, however, the basic instructional program, Programmed Reading, was used almost exclusively with individuals. The increased use of medium and small groups in the spring, therefore, probably indicates that teachers began grouping for specific skill instruction rather than working only with individuals or with the whole class. Inspection of the results indicates that a change occurred (with at least 95 percent certainty) in the decreased use of whole class groupings and in the increased use of medium and small groups.

Although the use of individual groupings did not increase significantly, a strong trend was evident. It is interesting to note that work with individuals increased in the spring even though the use of the basic program--which involves work with individuals in its operation--decreased. Therefore, it seems logical to conclude that individualization outside the operation of the basic program was increased

in the spring, especially in light of the significantly increased use of medium and small groups.

Among the dependent variables being measured, the area of classroom procedures is the most directly affected by the experimental treatment; it is important to note, therefore, that changes did occur in this variable in the predicted directions after using the Wisconsin Prototypic System of Reading Skill Development. It may be concluded, therefore, that the experimental program was accepted by the teachers and implemented effectively in the classrooms at the McFarland Elementary School.

Hypothesis 4

Inspection of the results reveals that teachers were more positive in their attitudes toward individualizing reading instruction after using the Wisconsin Prototypic System of Reading Skill Development. Scores on the Reading Teacher Survey were shown to be significantly ($p < .01$) higher in the spring than in the fall through an adaptation of a t test for paired comparisons.

Although the intent of the experimental treatment was not to influence teacher attitudes directly, it was likely that this area would be affected if teachers accepted the philosophy of the prototypic system and implemented the program accordingly in their classrooms. Since, after using the experimental program, a change in expressed attitudes did occur, it may be concluded that the teachers were influenced by the Wisconsin Prototypic System of Reading Skill Development and did incorporate its philosophy into their own thinking.

Conclusions and Implications

The conclusions and implications that may be drawn from the study are presented in this section. Conclusions based on comments from teachers and principals are also offered to indicate changes in specific areas not assessed in the study.

Conclusions and Implications Based on the Study

Two conclusions seem warranted from the results obtained. First, it appears that significant results were obtained in the areas that were most directly influenced by the experimental treatment. The influence of the prototypic system was less evident in those areas that were only indirectly affected by the experimental treatment.

The aspect (dependent variable) most directly affected by the experimental treatment was teachers' classroom procedures. This area logically should be the most likely to change under the influence of the experimental treatment. In fact, the third hypothesis was sustained with the limitations mentioned in the previous section. The next most directly influenced area of study was teacher attitudes. Since teachers expressed more positive attitudes toward individualizing reading instruction after the experimental treatment, the fourth hypothesis was upheld.

The dependent variable least directly affected by the experimental treatment was pupil attitudes toward recreational reading. As indicated in the previous section, the results differed in the two schools. The second hypothesis, therefore, may be considered to be upheld only at St. Bernard's School with the limitation imposed by a significant interaction. Pupil achievement was also not directly affected by the

experimental treatment, and the first hypothesis was not sustained.

Second, since changes did in fact occur in areas directly affected by the experimental treatment--teachers' classroom procedures and attitudes--use of the Wisconsin Prototypic System of Reading Skill Development may serve as a teacher training tool to promote greater individualization of reading instruction.

Two implications also may be drawn. First, changes pertaining to teachers may be all that can be expected after one year's implementation of the prototypic system. Pupil achievement and attitudes, being only indirectly influenced by the experimental treatment, may not show change immediately. It may take several years for teachers to become skillful and comfortable in using the prototypic system, and evaluation of pupil variables may be more valid if delayed. It may be that such changes cannot occur in one school year but over a period of several years using the experimental program.

Second, a longitudinal study should be made. The results after one year's implementation are equivocal, as has already been pointed out. Many teachers in their comments mentioned that this first year was hard but that now they understand how to use the program more effectively in the following years. Therefore, it seems that assessing the effects of the prototypic system in schools that have used it for several years might be a more fruitful approach than measuring after one year's experience with the program.

Conclusions Based on Teacher Comments

At the final inservice session the teachers and principals were given a questionnaire concerning their reactions to the Wisconsin Prototypic System of Reading Skill Development. The questionnaire is presented in Table 27.

Table 27

Final Inservice Questionnaire

1. What advantages and/or disadvantages do you see in the use of the group tests (Wisconsin Expanding Inventory of Reading Development)?

2. What advantages and/or disadvantages do you see in using the prototypic system in planning instruction?

3. For experienced teachers: In what ways is your teaching this year different from last year? If no change, indicate.

4. As participants in an early stage of the program, what improvements or additions do you suggest?

5. Further comments, if desired.

Since the questions were open-ended, no attempt was made to summarize the answers statistically. Teachers' comments indicate some areas that were not measured in the study where changes occurred. Most of the following comments were made repeatedly by teachers about the prototypic system:

1. "It has made us more aware of individual differences."

2. "I am doing a much better job of teaching and the children

are more interested." Another teacher commented that the prototypic system "made me aware of the various skills." Furthermore, the sequential outline of skills provided "a sense of direction--knowing what to teach."

3. Other teachers commented that the use of the prototypic system helped in planning reading instruction, for only the unmastered skills needed to be taught except for occasional review of mastered areas. One teacher stated that this was "one of the greatest advantages of the whole program."

4. Other teachers especially liked the specific evaluation of skill development, for the prototypic system "helped me to better evaluate the skills my kids really have, rather than what I think they have mastered." "Other years I seemed to flounder and guess at needed skills." The prototypic system aided teachers in "following an organized pattern with each child," as each child's individual skill needs were determined.

5. When the individual needs of the children were determined, they could be easily grouped for instruction on specific skills that they had not mastered.

The two principals made some of the same comments that had come from the teachers. Additionally, however, they mentioned the following:

1. The use of the prototypic system promoted a sense of teamwork among the teachers. They began to think of themselves as a primary unit rather than solely as self-contained classrooms.

2. The year-to-year record of each child's skill development

provides continuity to the reading instructional program of the school.

Although most of the teachers' comments were favorable, a few pointed out negative features of using the prototypic system. A common complaint was the amount of time needed to score diagnostic tests, record scores in the individual pupil folders, and use results in grouping the children for specific skill instruction. Admittedly, extra time is required, especially during the first year when none of the children had been given diagnostic tests. In the second year, however, the program should be less time-consuming since at the beginning of the school year teachers receive the individual pupil folders with the profile of each child's skill development outlined up to that point.

Another complaint, justly made, was the lack of materials to develop specific skills. The most effective approach, it appears to the investigator, is for teachers at each school to use inservice days to gather materials together that can be filed and keyed to the specific skills. Teachers at the McFarland Elementary School began this process during the 1968-69 school year. Furthermore, reading project personnel at the Research and Development Center are currently working on handbooks of suggested activities keyed to each skill in the six areas. Also the Compendium of Reading Materials and Teaching Techniques for the Wisconsin Prototypic System of Reading Instruction (Ellison, 1969) is now available (as of March, 1969) and will be of greater use during the next year.

A third criticism was directed at specific subtests of the group

tests, the Wisconsin Expanding Inventory of Reading Development. Since these diagnostic tests are all in the process of being revised on the basis of field testing this year, the teachers' comments reflect only the understandable inadequacies of the first version of a test battery.

In conclusion, most of the comments were favorable toward the use of the prototypic system. It is hoped that in the future some of the complaints may be alleviated through experience with the program and future developments in the prototypic system.

Summary

The study was designed to assess the effects of using the Wisconsin Prototypic System of Reading Skill Development, an experimental program which emphasizes diagnosis of reading skill development and instruction geared to individual skill needs. The prototypic system was implemented by the investigator who worked with the primary teachers of two elementary schools during the 1968-69 school year.

Procedures

Children in the experimental group were second and third grade pupils during the 1968-69 school year who had teachers who had taught the same grade and achievement level during the previous year. Control subjects were those second and third grade pupils who had had the same teachers as the experimental subjects during the 1967-68 school year.

Achievement on standardized reading tests and attitudes toward recreational reading of experimental subjects were compared to the scores of control subjects who took the same measures at the same time (spring)

during the previous year.

Since implementation of the Wisconsin Prototypic System of Reading Skill Development involved work solely with primary teachers, the teachers were also considered as experimental subjects, the control being themselves in the fall of the 1968-69 school year before using the prototypic system. Their classroom procedures during reading instruction and their attitudes toward individualizing reading instruction were compared at the beginning and end of the school year.

Three instruments were designed by the investigator for use in the study: a pupil attitude inventory, a classroom observation system, and a teacher attitude inventory.

Analyses and Results

After adjusting for each individual's fall score, experimental and control pupils' (vocabulary and comprehension subtests) achievement scores were compared by analysis of covariance. No significant differences were obtained ($p < .10$).

Pupil attitudes toward recreational reading were compared by analysis of variance, considering grade and achievement level. Significant differences were found at the .10 level only at one school although a significant interaction limits the conclusions that can be drawn from the data. In the same school, however, significant change scores in attitude from fall to spring (calculated for experimental subjects only) may indicate growth in attitudes toward recreational reading as a result of using the prototypic system.

The primary teachers using the experimental program showed changes in classroom procedures toward greater emphasis on individualizing instruction. Classroom observations were made in the fall and spring of 1968-69 school year to record the type of activities and the size of instructional groupings. The proportion that each category was marked out of the total number of observations was calculated: the ranges of the true values of the proportions were estimated for the fall and spring observations of each category. If the ranges for the fall and spring observations of a category did not overlap, the true values of the proportions were considered, with 95 percent confidence, different. Significant differences between fall and spring observations were obtained in the following categories: use of supplementary materials (increased) in the dimension of Type of Activities; use of whole class groupings (decreased) and the use of medium and small groups (increased) in the dimension of Size of Groups. Other categories showed noticeable, although not significant changes, all of which were in the predicted directions toward greater emphasis on individualizing reading instruction.

Scores on the teacher attitude inventory, administered in the fall and spring of the 1968-69 school year, were shown by an adaptation of the t test for paired comparisons to be significantly different beyond the .01 level. Therefore, teacher attitudes toward individualizing reading instruction were considered to have changed positively as a result of using the prototypic system.

Conclusions and Implications

Two conclusions seemed warranted from the study. First, those areas most directly affected by the experimental treatment showed change. Since the experimental treatment consisted of working with teachers to implement the Wisconsin Prototypic System of Reading Skill Development in their classrooms, changes were found in the dependent variables pertaining to teachers' classroom procedures and attitudes toward individualizing reading instruction. Limited or no change, however, was found in pupil achievement and in pupil attitudes toward recreational reading.

Second, since changes did occur in the dependent variables pertaining to the teachers, using the prototypic system may be a valuable inservice educatior tool to promote greater individualization of reading instruction.

Two implications were also drawn. First, the changes pertaining to teachers may be all that can be expected after one year's implementation of the prototypic system. It may take several years for teachers to become skillful and comfortable in using the program, and evaluation of pupil variables may be more valid if delayed. Second, a longitudinal study should be made to determine if pupil variables would be significantly affected after use of the experimental program for more than one year.

Finally, comments from teachers and principals were presented, showing specific areas of change that were not formally measured in the study.

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