

PAIRED-LEARNING IN THE ELEMENTARY SCHOOL

THESIS

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CHAPTER I

THE PROBLEM, PROCEDURE, AND TERMS

Introduction

One of the purposes of any new or different method of teaching and learning is to improve learning for each individual. Some desirable outcomes of learning are the abilities, the knowledges, the skills, the attitudes, and the ideas acquired by the learner. These learnings encompass the pupil's physical, mental, social, and moral being.¹

The thesis presents an introduction to the problem, procedure, and terms used; a review of the literature giving the significant implications of paired-learning in the everyday life of an individual and similar investigations in the field of paired-learning; experimentation design and activities of the planning and pairing procedures and the execution of the plan; the presentation of data; and the summary, conclusions, and recommendations.

Purpose of the Study

The purpose of the study was to assess the influence of paired-learning upon attitudes, study skills, and achievement

¹A.S. Barr, An Introduction to Scientific Study of Classroom Supervision, pp. 2-7.

levels. The importance of the present research is indicated by the constant attention to drop-outs and the unproductivity of some students in the classroom. This concern focused attention upon the study and the adoption of some classroom procedures that would make the students want to come to school and learn.

Even though a positive relationship between intelligence and academic success has been shown,² many students scoring high on intelligence tests have achieved a level below that indicated by their intelligence scores.³ Thus, educators and psychologists have generally concluded that a considerable portion of the variability in academic performance is influenced by factors other than those measured by tests of intellectual functioning.⁴ One purpose of the present study was to determine if paired-learning can be used in the classroom to increase academic performance.

Many educators state underachievers' problems in terms of poor motivation:

We provide excellent facilities, counseling, and encouragement, but these are not enough. How can we motivate these young people to want to learn? How can we strike the spark of ambition? What is the key to the

²Henry Weitz and H. Jean Wilkenson, "The Relationship Between Nonintellective Factors and Academic Success," Journal of Counseling Psychology, IV (1957), p. 55.

³Ibid.

⁴Ibid.

transformation of an unresponsive, apathetic student into one who is actively motivated to achieve? How do we generate drive?⁵

This study was conducted to determine if paired-learning is one "key to the transformation of an unresponsive, apathetic student into one who is actively motivated to achieve."⁶ The importance of the latter goal is underscored by the fact that, in 1968, up to forty percent of the students who entered the fifth grade in September of 1961, probably will not be graduated from high school,⁷ and many of those who will continue in school will probably show lack of interest.

A dramatic illustration of the underlying problem of a dislike of school by some students appeared in the following news item:

Gaffney, S.C. (AP) - Four youths appeared in General Sessions Court in connection with a series of breakins. Judge Frank Epps, learning that they had quit school, gave them the choice of returning to school or going on the chain gang. Without hesitation, all four chose the chain gang.⁸

The joy and skill of working and learning together must be well established in the elementary school. This early development of the ability to work together will enable the

⁵ Goodwin Watson (ed.), No Room at the Bottom, p. 1.

⁶ Ibid., p.2.

⁷ Ibid., p.1.

⁸ New York Times, "Four Choose Chain Gang Over Return to School," New York Times, August 2, 1962, p. 43M.

student to have a much better chance to succeed in his junior and senior high school years. The temptation of dropping out of school at this level for any available job is great. The student must have acquired learning skills and developed the ability to work as a cooperative member of a team if he is to become a successful member of the nation's workforce. Most types of work in our society require a team effort. Another purpose of this study is to determine if paired-learning improves children's attitudes towards working together.

Procedure of the Study

An examination of the literature and previous research in the field of paired-learning indicated a need for organizing and teaching an experimental group in a classroom situation. Paired-learning has not been used extensively before in all subject areas in a self-contained elementary classroom.

Permission to organize and teach by the paired-learning experimental method in a public school classroom was obtained from Mr. Ace Alsup, Superintendent of the Temple Public Schools. A letter of explanation was sent to parents of all those children who were given the special achievement tests, study skills test, and attitudes test. (See Appendix A.)

A sixth-grade class was chosen in which to conduct the classroom experiment. From the permanent record folders, all

I.Q. test scores, taken from the California Short-Form of Mental Maturity; and the fifth-grade achievement test scores, on the Stanford Achievement Test, were collected. An additional achievement test, the California Comprehensive Test of Basic Skills - Form Q, was given at the beginning of the sixth-grade school year, 1968-1969. The purpose of the latter test was to check the validity of the fifth-grade achievement test scores. In September of the 1968-1969 school year, additional standardized tests and teacher-made tests on study skills, attitudes, and art achievement were given to the sixth-grade students. (See Appendixes B and C.)

Twenty-eight sixth-grade students were paired into fourteen paired-learning teams according to similar intelligence test scores and achievement test scores. For each experimental learning-pair, there was one control student in another class who had similar intelligence test scores and achievement test scores. The experimental class was organized and taught in a paired-learning situation, which is described in detail in Chapter III.

In May, 1969, the last month of the school year, achievement tests and teacher-made tests were again given to the fourteen paired-learning teams and to the fourteen students who acted as the controls. The data were analyzed as to how much and in what areas the paired-learning students advanced as compared to the control students.

In addition to compiling, comparing, and summarizing the information from the various test subjects, a review of the literature and research in the field of paired-learning and related subjects was made. This review appears in Chapter II.

Definitions of Terms and Symbols

Terms and symbols used in this thesis include:

1. Paired-learning - a team of two individuals working cooperatively on a common task. The individuals may be different in age or abilities but are most often of the same age and of similar learning ability, working on a common problem. In this study the narrower definition is used and means that the learning-pair is of the same age, similar I.Q.'s, and similar achievement levels.
2. Team-learning - learning by two or more individuals working together to solve a common problem. In team-learning, the individuals usually have a wider range of abilities and each tends to learn more from the other than from an outside force. There is no set leader and each shares equally in the task, ie., shares his abilities, skills, and knowledges with the other.
3. Cooperative-learning - another term used for both paired-learning and team-learning.
4. Buddy-system learning - individuals grouping them-

selves together because of social or friendship ties, working cooperatively on a common problem or task.

All of the groups described in this thesis are small. This small size eliminates the need of a leader, and thus all of the individuals have equal responsibilities.

6. Learning-station - the table or desk in which the learning equipment is kept and on which the paired-learners work.

7. The symbol S - the subject under investigation⁹ or the child who is a member of a paired-learning team.

8. The symbol C - the control subject or the child who is not a member of a paired-learning team but who is investigated and tested for comparison with a paired-learning team.

9. The numbers 1-14 - indicate the team referred to in the data.

Example: S1 is a paired-learning team. C1 is the control who has the same I.Q. and achievement test scores as the S1 paired-learning team.

10. The lower case letters a and b - designate a certain child who is one member of a paired-learning team.

Example: S1a and S1b are both members of the paired-learning team S1, and both S1a and S1b have as their comparison the control subject C1.

⁹Nicholas A. Fattu, "The Role of Research in Education," The Methodology of Educational Research, VII, November, 1963, p. 413.

Limitations of the Study

The study dealt with a variety of variables related to the selected population: home background, socio-economic background, sex, motivation, field of interest, attention span, emotional maturity, social maturity, and attitudes toward school, peers, and teachers. Even with the number of variables involved, this research is of practical value because the results are derived from an inquiry carried out in a classroom situation. The population was carefully studied and controls established for as many of the variables as possible.

The scope of this study is also limited to a one-year investigation of a sixth-grade classroom in the Temple Public School System. It is further limited to forty-two children, fourteen paired-learning teams in the experimental group and fourteen control students in various sixth-grade classrooms in Temple Elementary Schools.

Another limitation is the fact that this is the first time, to the writer's knowledge, that paired-learning has been used in all subject areas anywhere in the public schools in the United States. The data presented could not be compared with any other studies conducted previously.

Sources of Data

The research conducted for this thesis included an investigation of pertinent materials found in books, periodicals, unpublished materials; data from school records; teacher-made tests; and studies within the writer's experimental classroom.

The sources from which these materials were obtained included the Southwest Texas State University Library in San Marcos, Texas; the University of Texas Library in Austin, Texas; school records in the elementary schools of Temple, Texas; and the researcher's personal library in Temple, Texas.

CHAPTER II

REVIEW OF THE LITERATURE

Significant Implications For Everyday Living

In a democratic nation we have confidence in the capacity of all people to function cooperatively and develop mutual respect. The essence of democracy is the group process. The democratic group process is a means through which people work together to locate, define, and study their own needs and continuously improve their methods of meeting these needs.¹ The democratic way of life is based upon effective group interaction. The quality of living in a democracy depends upon the quality of the process used in making decisions. Children develop behavior patterns through their relations with others. Democracy is maintained by behavior patterns which one generation passes on to the next.²

In addition, a safe and secure world relies upon cooperation among nations. Cooperation among nations develops from understanding and good will among individuals.

Students, some of these individuals, spend many hours in informal paired-learning or buddy-system learning and group

¹Lucile Lindberg, The Democratic Classroom, p. 2.

²Ibid., pp. 4-5.

activities. From these activities they derive many values of benefit to themselves and their communities.

When a pair of these individuals work as a team, attitudes, ways of behaving, and values are shared, learned, and transmitted from one member to the other. As persons change, society assumes new forms. Society is improved as individuals become more kindly, cooperative, and sensitive to others.³

To improve society and maintain democracy, educators have become convinced that our schools should provide a climate in which mutual respect and trust are possible. Mutual trust grows as people work together on problems to which each person may make a contribution. Initiative and self-confidence flourish as each child feels his importance in the team effort.

Through the establishment of common goals and a problem-centered organization, groups will work at their highest level.⁴ People work best when they do what is important to them. Teamwork and loyalty to one another develop as children begin to realize that they are helping themselves as they help others.⁵

Stimulation and motivation in teamwork stems from the fact that an individual is working for some cause which is beyond himself; he will find satisfaction and happiness in that work.⁶ "When learning becomes an active process, it is inevitable that people must somehow work together to accomplish

³Ruth Strang, Group Work in Education, pp. 1-2.

⁴A. S. Barr, et al., Supervision, p. 92.

⁵Louise E. Hock Using Committees in the Classroom, pp.5-6.

⁶Ibid., pp. 4-8.

some of the tasks."⁷

In a survey made among students at the University Junior High School in Bloomington, Indiana, which uses flexible scheduling, it was found that learning became a more active and more enjoyable process for the students when class instruction was done in small-group sessions. It was found that students of all ability levels liked large-group sessions the least. On the other hand, the students preferred the small-group instruction and paired-learning activities in which they could interact with each other and share their ideas.⁸ The students liked close association or the "personal touch" to learning.

The "personal touch" to learning is important as pointed out in the 1962 A.S.C.D. Yearbook, Perceiving, Behaving, Becoming, which contains the following statements:

A positive view of self is learned.

- A. People learn about themselves from other people.
- B. To produce a positive self, it is necessary to provide experiences that teach people they are positive people.
- C. People develop feeling that they are liked, wanted, acceptable, and able from having been liked, wanted, accepted, and from having been successful.⁹

In addition to a positive view of self, a child must have a feeling of belonging if he is to be comfortable and happy. "A child needs to share others' interests, to have children to

⁷Mildred Swearington, Supervision of Instruction, p. 258.

⁸Hock, loc. cit., p. 5.

⁹A.S.C.D., Perceiving, Behaving, Becoming, p. 53.

laugh with, to show off to, to gain ascendancy over, and to knuckle down to."¹⁰

Children, having shared their interests with each other, have a feeling of belonging and success.¹¹ Loyalty to the peer group and fear of losing a feeling of belonging makes the child fearful of anyone outside the peer group.¹²

A C.B.S. News report on the "Challenging Times," reported that "young people trust young like themselves more than they trust the establishment."¹³ The school to some young people is considered "the establishment" against which to rebel. "Young people work harder at goals set by themselves than for standards set by persons outside their peer group."¹⁴

The learner can set goals and establish his own area of difficulty and achievement sometimes better than a teacher.¹⁵ The teacher should create a classroom climate within which each pupil can enjoy the excitement of setting goals which provide satisfactory challenges to him.

A symposium on "The Reluctant Learner" held in St. Louis, Missouri, August 29, 1962, recommended the following:

1. Provide peer-group support. Quests and projects should usually be group enterprises, in which pupils

¹⁰U.S. Department of Health, Education, and Welfare, Your Child From 6 to 12, p. 26.

¹¹Ibid., pp. 26-27.

¹²Ibid.

¹³C.B.S. News Department, "Challenging Times," May, 1968.

¹⁴Ibid.

¹⁵Goodwin Watson, (ed.), No Room at the Bottom, p. 12.

join in decisions of what, who, how, when, and where. Participation by and support from the "gang" will sustain motivation through many tough spots that discourage a youngster working alone.

2. Use positive reinforcement almost exclusively. In typical classes in disadvantaged neighborhoods, the proportion of teacher time devoted to warning, threatening, rebuking, scolding, complaining, and castigating has been observed to be as high as 75 percent. This wastes time badly needed for instruction and fosters resentment and hostility toward the school. It destroys the learner's faith in himself and his ambition to achieve.¹⁶

New methods of instruction are needed which will provide positive reinforcement by permitting each learner to experience recurring satisfaction from mastery of tasks at gradually increasing levels of difficulty through more peer-oriented activities. Approval by peers and work-associates will produce satisfaction. "This cumulation of successes is the best technique for building zest for further achievement."¹⁷

Related Studies

The following investigations were made in industry and in schools in the fields of paired-learning, tutored-learning, and team-learning:

Citizens with little or no education have increasing difficulty in an economy in which only five percent of the jobs are unskilled.¹⁸ A survey of fired workers in three industries

¹⁶Ibid., pp. 90-92.

¹⁷Ibid.

¹⁸Ibid., p. vii.

in Chicago found that 67 percent of their former employees were fired not because of their lack of skill but because of the inability of the employees to work together as a team. A retraining program was then set up in three Chicago industries. They put one group in a classroom type setting and another group paired with skilled workers in the plants. Overall, the paired-learning group took 43 percent less training time and stayed employed at the same plant an average of 1.7 years longer than the non-paired group. Each had training on how to work with others, but only the paired-learning group had practical experiences while in the training program.¹⁹ This favorable outcome indicates a possibility of achieving greater learning success in other situations such as an elementary classroom by using the paired-learning method.

In another study made by Miller and Dollard (1941) on first grade children, two boxes were placed on chairs in a room about ten feet from a starting line. A leader was brought in. The leader then went to the indicated box, raised the lid, took out a small piece of candy, and walked to the starting line. The follower was then given his turn. Followers were arbitrarily designed as imitators or nonimitators, and each found candy in the appropriate box if his behavior conformed to his designation. Imitators learned to perform perfectly with an average of 1.7 errors, and nonimitators made an

¹⁹C.B.S. News Department, "Retraining Program," September, 1968.

average of only .4 errors. A generalized test was then carried out with four boxes. In this test 75 percent of the twenty imitators chose the box chosen by the leader and none of the nonimitators chose that box.²⁰ This laboratory experiment demonstrates that this paradigm for matched-dependent behavior could also be used successfully with children in an elementary classroom. Imitation closely parallels paired-learning. Imitation is a very general kind of response for which there are highly available cues.²¹ In imitation, children can find a model for learning generalized ways of behaving in a wide variety of everyday situations.

In a third study made by Bandura (1965), each of three groups of children observed a film in which a model exhibited novel physical and verbal aggressive responses. Vicarious reinforcement was manipulated by establishing three different conditions with three different films. In one condition, the model was generously rewarded for his aggressive behavior. In the second condition, the model was severely punished. In the third condition, no consequences were shown for the model's behavior. After the children observed the behavior of the model and consequences, they were given performance tests for aggressive behavior. In these tests, the instances in which they performed imitative behavior were recorded. No reinforcement was applied to the behavior of the children in this phase.

²⁰Edward L. Walker, Conditioning and Instrumental Learning, p. 114.

²¹Ibid.

The effects of vicarious reinforcement may be seen in Table I in the "no incentive" condition. There was little difference between the condition in which no consequences for the behavior were shown, but the effects of punishment of the model is apparent. Vicarious punishment reduced the frequency of imitative behavior.²²

TABLE I

	NO INCENTIVE			POSITIVE INCENTIVE		
4.0		—		—	—	—
3.0	—	—		—	—	—
2.0	—	—		—	—	—
1.0	—	—	—	—	—	—
0.0	—	—	—	—	—	—
	1	2	3	1	2	3

1 - model rewarded; 2 - no consequence; 3 - model punished

Bandura contends that the children had learned the aggressive behavior by observing the model and that the vicarious reinforcement had influenced their performance in later tests. A further demonstration was provided in a third session in which highly attractive incentives were offered to the children for their performances of imitative behavior. The frequency of the imitative response increased in all three groups of children, with the largest increase occurring in the group of children who observed the model receiving punishment for the

²²Ibid., pp. 115-118.

aggressive behavior. Vicarious punishment of the model had reduced the performance of the behavior while direct positive reinforcement served as an incentive in increasing the frequency of the behavior.²³ Vicarious experiences, evident in paired-learning, can increase or decrease desired behavior.

It was found, in observation of several Navy teams (1962), that any group action is usually reduced to only two participants functioning at a time.²⁴ Two children often play and work better than three. Jealousy sometimes crops up when three or more work or play together, each wanting to be the only one who counts with another.²⁵ Actually only two children are functioning at a time while the third or fourth child is trying "to get in." Thus, a cycle arises where each child is either in, trying to stay in, or trying to get into the functioning and interchange of ideas. Two children in a group or team would eliminate this conflict because each could give full attention to the responses or feedback of the other.

A 1958 experimental approach²⁶ to paired-learning was to analyze the effects of varying kinds of feedback provided to two-member teams. A number of two-man teams were required to

²³Ibid.

²⁴Karl Ulrich Smith, Cybernetics, pp. 130-131.

²⁵United States Department of Health, Education, and Welfare, Your Child From 6 to 12, p. 28.

²⁶S. Rosenberg and R. L. Hall, "Feedback In Teams," Journal of Abnormal Social Psychology, p. 57.

perform simple tasks, such as turning a knob four times. Each subject sat at a different desk with his own knob and received feedback regarding the number of turns. He might receive his own feedback; he might receive only the feedback from the other's responses; he might receive feedback from the other member of the team as well as himself; or he might receive confounded feedback, which is the average of his own and the other subject's responses. With confounded feedback, the two subjects were able to produce an accurate average score by learning a compensatory pattern in which one subject might turn his knob twice while the other turned his six times.²⁷ One subject's weakness could be the other's strength. No improvement occurred when they received only the other's feedback, but under this condition, the greatest role differentiation occurred. The greatest improvements in performance were found when the individual received feedback concerning the other member of the team as well as himself.²⁸

Feedback is often communicated through direct statements of approval or disapproval, agreement or disagreement, and through nonverbal cues such as facial expressions, head nods, attention.²⁹ Everyday observations indicate that an individual is being continually evaluated by his peers. Evaluation

²⁷Ibid.

²⁸Smith, op. cit., p. 83.

²⁹Ibid., p. 232; Deutsch, "Strategies of Inducing Cooperation," Journal of Conflict Resolutions, September, 1967, p. 397; I. Stephen, "Some Effects of Group Process and Social Perception," Educational Leadership, May, 1966, p. 483.

feedback of this type influences the attention, activities, perceptions, and performance of the learning teams.

Observing evaluation feedback among children and noting that children strive for peer approval, the Monroe, Michigan, Public Schools tried cross-age tutoring.³⁰ This was tried as an experimental program to seek to enhance self-concept through cross-age interaction of children from the same background.

The first year of the program, ten culturally deprived fifth-grade children performing eight months or more below grade level in reading were selected to serve as tutors for ten culturally deprived second-grade children who were performing four or more months below grade level. Tutoring was done in reading only. Tutoring sessions were scheduled for three half-hour periods a week, in the second-grade classroom, while the teacher worked with another group. During the first five minutes of the tutoring session, the teacher gave the tutors specific instructions for material to be covered. Actual tutoring covered fourteen weeks per session.

During the project, both tutors and tutored met each week in a half-hour feedback session to discuss their progress and concerns. In turn, the project coordinator gave advice and encouragement.

At the project's conclusion, the positive results were far greater than the experimenters had anticipated. A questionnaire

³⁰Raymond Bottom, "A Cross-Age Pupil Tutoring Program," Scholastic Teacher, Volume 10, April, 1968, pp. 11-12.

concerning the pupils' attitudes toward teachers, siblings, peers, and adults showed positive change the second time it was administered. Academic growth was statistically significant for both tutors and tutored. Both groups grew more than eight times their previous rate in reading and more than four times their previous rate on a composite score. During the project both tutors and tutored grew at a faster rate than did their academically superior peers who were not program participants. Teachers of the fifth-grade tutors indicated social and attitudinal changes on the part of all tutors except one. Also, every fifth-grade participant had improved academic grades, and all but two improved in conduct. Second-grade teachers noted similar academic growth in the tutors who came to their rooms, noting more self-control, self-respect, and willingness to assume responsibility than at the start of the cross-age tutoring program. The teachers also noted academic growth in their second-graders, progress in reading and more interest, and they had fewer discipline problems than before cross-age tutoring.

On the basis of the excellent results of the first project, the number of children was increased to 188 in 1966. One significant change in the program was made. Tutors and tutored children went to a separate room for tutoring sessions. A remedial-reading teacher served as supervisor. This proved to be a serious flaw. While year-end tests showed greater academic growth than the children had previously exhibited, they

were far short of the spectacular growth recorded in the initial program. There was also less social growth.

It was concluded that the key to the tutoring program was to send the tutor to the classroom of the child he is tutoring. The enhancement of the tutor's self-concept comes from his relationship with the classroom teacher and from the respect and admiration of the children in the tutored child's class.³¹

Dr. Russell Stauffer, director of the Reading Study Center at the University of Delaware, wrote that a pupil tutor cannot be expected to diagnose the special problems his tutored students are having in reading. A guide sheet for the tutor indicating the needs of the tutored and describing procedures for the tutor to follow may then be worked out by teachers and reading specialists. Most tutors respond well to these suggestions.³²

Most tutors and paired-learning students also respond well to suggestions made by peers. This fact was evident when twenty-four members of a secondary methods class in teacher education at the University of Texas at El Paso tried peer-teaching. Each of these students made a presentation which was taped. At later sessions the video-tapes were played back to the group with a critique given on each presentation.

Two favorable outcomes were evident in this paired-learning technique. First, the student was allowed to evaluate

³¹Ibid.

³²Russell Stauffer, "Should You Use Pupil Tutors?" The Instructor, August, 1967, p. 35.

his performance in teaching contact with his peers. Second, he was given constructive criticism from his peers and analyzed his effectiveness based on self and peer reactions. Seeing his own mistakes and having his peers tell him what he was doing wrong made a greater impression than the instructor's opinion and comments alone.³³

Pupil learning-teams, which utilized constructive criticism from peers, were tried in a science class in Odessa Grade School in Odessa, Washington.³⁴ Twenty-seven pupils were divided into small teams. In advance of a class meeting, each student was responsible for choosing a number of important ideas from the assigned material. The student also prepared five or six original questions based on what he had read. When the class met, each student was given a chance to read his important statements. From their own reading, the students supported or refuted the issues. The teacher guided and added to the discussion.

Immediately afterwards, the teams met; then each member submitted his questions for discussion. If the group was unable to answer some question, the teacher read it to all the teams for a combined attack and discussion. If there were any additional questions that the teacher felt should

³³Hilmar Wagner, "Peer Teaching," The Texas Outlook, August, 1968, pp. 20-21.

³⁴C.P. Holm, "Pupil Teams Participate-Evaluate," The Instructor, August, 1967, p. 88.

be considered, he assigned a proportionate share of them to each group. Each member had a contribution chart with which he evaluated the contribution of each team member. Each member also had a self-evaluation chart on which he recorded his own efforts. By these forms, made to cover five team meetings, the teacher had an estimate of each student. About twice each month, each child was expected to present a short report. Great improvement in science achievement levels was noted.³⁵

This chapter has taken from current literature some significant implications for paired-learning in everyday living. Facts revealed in the review of the literature and research in the field of paired-learning and related subjects were significant to this study because these facts formed a basis for the organization and evaluation of paired-learning in the experimental elementary classroom.

³⁵Ibid.

CHAPTER III

EXPERIMENTATION DESIGN AND ACTIVITIES

Any scheme of instruction and educational design must serve the child in achieving better individual learning experiences. Any educational scheme must also serve to bring about effective group interrelationships.

Children sometimes learn better from children than from teachers or other adults.¹ An effective means by which this fact can be put into action and still be in keeping with our goals and purposes of education is paired-learning.

A paired-learning experiment was planned and conducted in a sixth-grade classroom at Emerson Elementary School in Temple, Texas, during the school year of 1968 to 1969. All subject areas, with the exception of music, were taught in the paired-learning situation.

Planning and Pairing Procedures

Extensive teacher planning was accomplished before paired-learning was instigated in the classroom. The desired educational and social outcomes or the general objectives were defined. The general objectives of the paired-learning experiment in grade six were as follows:

¹Goodwin Watson, (ed.), No Room At The Bottom, p. 12.

1. Fulfill the Minimum Standards of Achievement for Grade VI² in all subject areas as outlined by the Temple School District.

2. Improve achievement levels in all areas.
3. Improve academic skills.
4. Improve study skills.
5. Improve attitudes of students toward school.
6. Improve cooperation among students.
7. Improve cooperation between students and teachers.

When the desired general objectives for the school year were established by the teacher, the specific objectives for each subject area were taken from the minimum standards of achievement of the school system and from the experimenter's objectives. These specific objectives were put in outline form by the teacher-experimenter, mimeographed, and put in booklet form. These booklets were later given to the sixth-grade students for use as a learning guide for the school year. (See Appendix D.)

Donald C. Manlove and David W. Beggs, III, in their book Bold New Venture, stated, "Several discussions can go on at one time if the groups are isolated by vision screens. Once a discussion begins, the participants will block out the sounds beyond their particular group."³

²Temple School District, Minimum Standards of Achievement For Grade Six, pp. 1-85.

³Donald C. Manlove and David W. Beggs, III, Bold New Venture, p. 84.

The twenty-five by thirty foot rectangular room used in the paired-learning experiment was so arranged as to provide visual screens between learning-stations as shown in Illustration 1 on page 28. Several types of devices were used for visual screening in the experimental paired-learning classroom.

One type of screen, shown in Illustration 2 on page 29, was constructed of inexpensive soft-pine plyboard. One double-L-shaped divider was placed between four double desks. The desks were placed on each side of the divider facing the divider. The two divider screens were designed and made in the double-L-shape to prevent the screens from falling or getting turned over. The shape of the divider screens also offset the desks to prevent students from being distracted by other students sitting to the side of them. The dividers were two feet above the tops of the desks, which is above eye level of seated students. The plyboard dividers were designed not only to act as screening devices but also to serve as individual learning-station bulletin boards for a total of eight paired-learning teams.

Illustration 3 on page 30 shows another type of visual screening device. It was made by using an existing movable cabinet in the classroom. Six double desks were moved to face all sides of the cabinet. The top of the cabinet was one and one-half feet above the tops of the desks and the cabinet

ILLUSTRATION 1

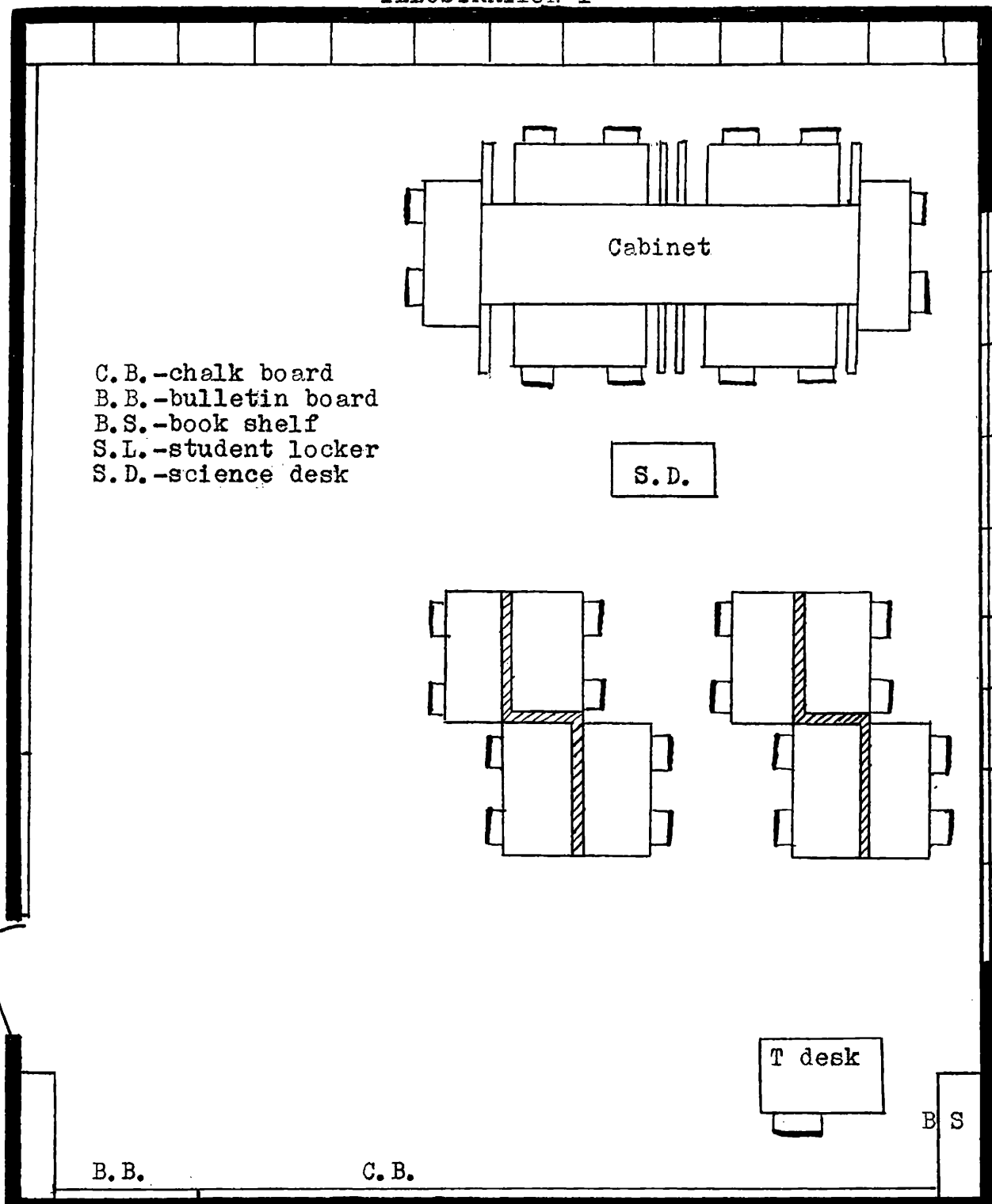
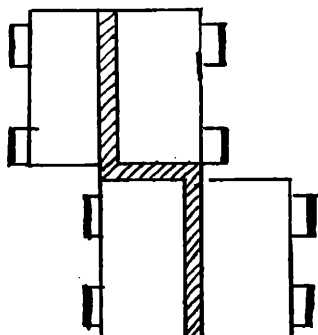
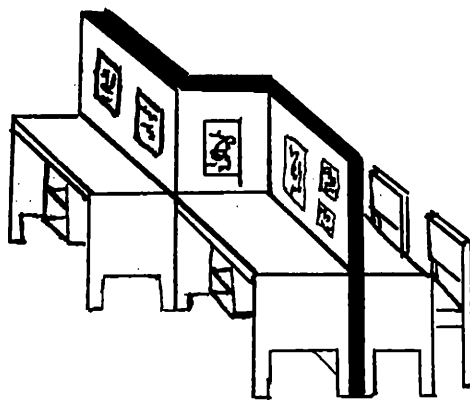


ILLUSTRATION 2

TOP VIEW
(scale: $\frac{1}{2}$ inch to one foot)



LEFT SIDE VIEW
(not drawn to scale)



FRONT VIEW
(not drawn to scale)

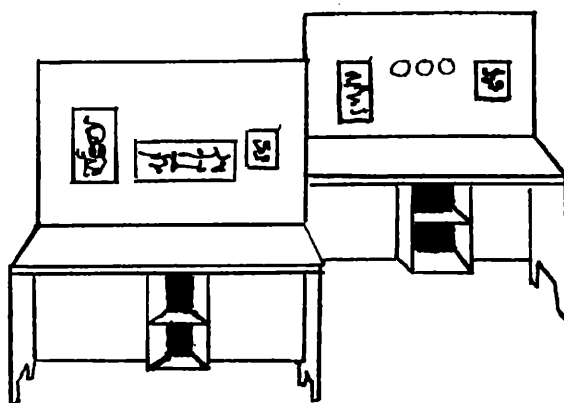
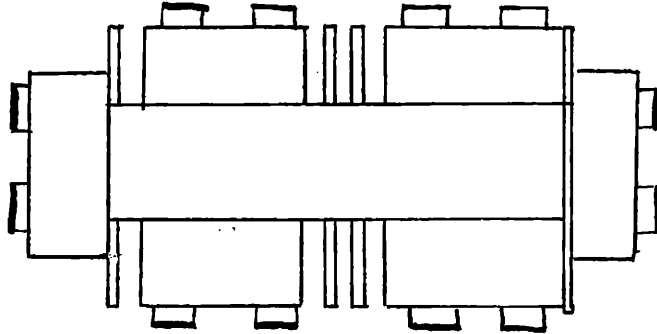
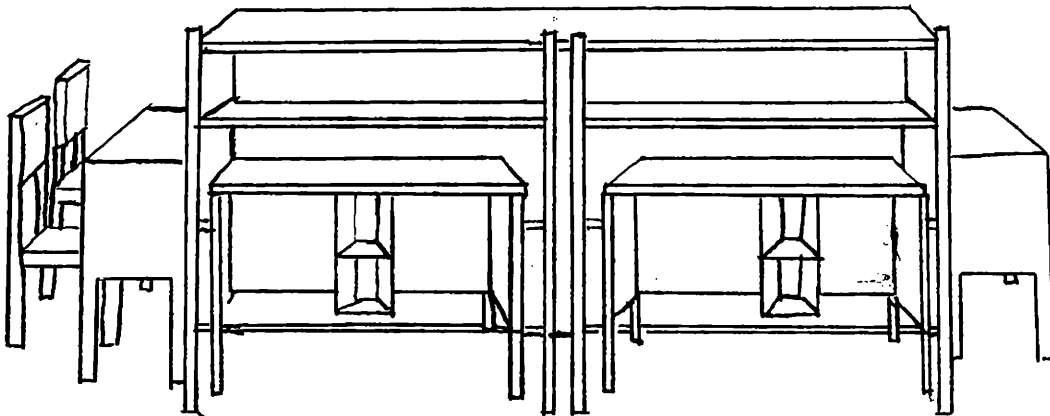


ILLUSTRATION 3

TOP VIEW
(scale: $\frac{1}{2}$ inch to one foot)



FRONT VIEW
(not drawn to scale)



doors were left open as side screens. The upper shelf and the top of the cabinet were used by the paired-learners for demonstrations and displays.

Large spaces were left in front of the chalk boards, as shown in Illustration 1 on page 28, where chairs could be shifted for different planned activities, demonstrations, lectures, group teachings, and board work. Class resource material and learning equipment was kept in the science desk, lockers, bookshelves, and cabinet.

The fifth-grade and early sixth-grade achievement test scores were averaged. Twenty-eight students were then paired into fourteen paired-learning teams according to similar average achievement test scores and similar intelligence test scores.

The students of the experimental paired-learning test group had similar backgrounds. All were from low to medium-low economic class⁴ Anglo, Negro, and Mexican-American families. All but two students were native to the Temple area, and all but four had attended Temple Public Schools throughout elementary school. No attempt was made to pair the learners according to economic or social background although the class as a whole was from similar backgrounds.

Those students whose test scores showed more than two years difference between the fifth-grade Stanford Achievement test scores and the sixth-grade Form Q of the California

⁴Low 0-\$3,000 per year; medium-low \$3,000-\$5,000 per year.

Achievement test scores were not chosen because a vast difference in achievement test scores indicate a possible invalid test score. Each of the fourteen control students was chosen from a different sixth-grade classroom. In addition, the control student was taught by a different teacher possessing a different personality, teaching by different methods, and in a different classroom and school setting. It was hoped that the careful selection of controls from a variety of learning situations would minimize the chance of error when comparisons and evaluations were made.

As was recommended by Mr. Ace Alsup, Superintendent of Temple Public Schools, letters of explanation were sent to parents of the paired-learners and control students. (See Appendix A.) The letters were sent for the purpose of gaining permission from the parents to give their children an extra battery of tests in September and again in May. The letter was also sent in order to find out if the child's family anticipated any move from the school system during the school year. Those who planned a move were not selected as paired-learners or as controls.

Execution of Plan

Paired-learning teams were assigned to learning-stations as soon as the teams were formed in September. The same learning-station was kept by the learning-pair until the

second semester when learning-stations were reassigned.

The class was shown where reference and learning equipment was kept. Each paired-learning team was assigned a locker where they could keep supplies. Textbooks, as listed in Appendix E, were issued. A sixth-grade learning guide booklet, as shown in Appendix D, was also given to each of the students.

The students were told that the learning guide would give them an idea of some of the concepts they would learn during the year. They did not, however, understand all of the words and phrases in the learning guide at the beginning of the school year but did comprehend all of them before the year was over. When the students felt they had learned an item thoroughly in class, the item was checked off their learning guide.

It is important in the early organization of a system of paired-learning or team-learning that the students be given an opportunity for understanding both the behavior of the people about them and their own behavior.⁵ With this knowledge of behavior, "they will be able to make more effective adjustments."⁶ This was done by teaching a unit on human behavior. Two texts were used, Health 6⁷ and a supplementary text, Choosing Your Goals.⁸ Chapter 1, "Growing in Mental Maturity," and Chapter 11, "Respect for the Rights of Others," in Health 6

⁵ Joseph Jones, "Personality Learning," p. 53.

⁶ Ibid.

⁷ Oliver E. Byrd, M.D., et al., Health 6.

⁸ Dana L. Farnsworth, Choosing Your Goals.

was taught during the first week of paired-learning. Chapter 1, "Improving Yourself," in Choosing Your Goals was taught during the second week of paired-learning.

The morale of the classroom is important. Morale is the emotional and mental reaction of a person to his environment. A desirable morale stems from a sense of fair treatment, of belonging, of security, of liking one's surroundings, of being important, of being needed, and of self-respect.

The desirable classroom morale was achieved through words and actions. Great care was taken in speaking to children. The effectiveness of teaching-learning situations in paired-learning depended on the wording of sentences and tone of voice used by the teacher. Children were treated as neither ignorant nor superior. They were given help which was meaningful but not dictatorial. The teacher provided guidance and help where needed. "The Teacher's Role," taken from N.E.A. Grouping in the Classroom, was helpful when modified to fit the paired-learning situation as shown in Appendix H.

Paired-learning requires the teams to do much research and independent study. The teacher was responsible for having material available to the children on as many levels as possible. The following was used to develop a favorable attitude toward research:

1. Wide reading and an enthusiastic approach by the teacher to the discovery of information.

2. Treating location of data as a treasure hunt.
3. Constant sharing of facts and ideas in research.
4. Surrounding children in the classroom with much material for reading and reference and permitting them enough time and freedom of movement for frequent use.⁹
5. Being watchful to see that paired-learners were selecting work within their capacities and needs.
6. Establishing activities which were of the type that extended past experiences into new experiences.
7. Establishing questions which served to guide the learners into critical thinking, into interpreting the facts, and into developing ideas, attitudes, and generalizations.

Paired-learning was the same in all subject areas. Pairs worked together, learning with and from each other.

After reading any assigned material, each of the pairs would choose new or different words from the material. Meanings of these words were found and discussed within each team. The two members of the paired-learning team then made a game of asking each other word definitions and making sentences with the words learned. In some subjects, such as science, drawings were made and labeled with the new words. Words and games were occasionally shared with other paired-learners.

Important ideas were chosen by each team member in almost

⁹Helen M. Carpenter, "Oral Reporting," The Instructor, Volume 74, Number 9, p. 110.

all assigned readings. The member also wrote down a few pertinent questions based on what he had just read. These ideas and questions were discussed by the paired-learning teams. Answers to their chosen questions were looked up in available texts or reference materials by the team and discussed in class during the daily lesson. Questions or problems that one team had were shared by another team for a combined effort.

Each team submitted one or two important ideas from the reading or a question or two for which they had found answers for use in the daily class lesson in each subject. The team told why they thought the idea or question was important. Other teams added to their comments and asked questions of the team. When the teacher had an important idea or question that had not been brought up by any team, she submitted it to the class for discussion.

Motivation was provided by each team competing with others by finding the most important ideas or by adding the most important facts to each idea or question presented.

Some examples of learning games and other work engaged in by the paired-learners are listed in the various subject areas as follows:

READING

Many of the reading games were taken from Reading Games

and Activities¹⁰ and modified to fit the paired-learning situation. Other games and activities were made up by the children and the teacher.

1. One partner said a word that contained a double letter. The other paired-learner said another word that has the same double letter. One variation to this game was to say one word with a short vowel and the other paired-learner had to say a word beginning with the same initial consonant and with the same vowel but with a long sound.

2. Teams wrote sentences with all words beginning with the same letter, such as: Both buttercup buds became beautiful blossoms because balmy breezes blew.

3. The "baseball game" was played by the pair drawing a baseball diamond and writing ai, ea, oa, ie, or iu at home and each of the bases. The partner who finished first was given a score. Modifications of this game were played in almost every subject where the students named, for example, the main cities in a country.

4. "Fish" was played by matching four words that had the same vowel sound. Each paired-learning team made its own set of cards and exchanged them with other teams. The designs on the cards were worked on during paired-learning in art class.

5. "The missing letter mystery" was played by writing words with two or three missing letters.

¹⁰Grace Booker, et al., Reading Games and Activities, pp. 3-21.

6. "Scrabble" was one commercially-made game played.

7. "Hangman" was enjoyed by the paired-learners. In this game blanks were drawn with spaces for as many letters as the word contained. The partner would guess a letter, and if it was in the word, it was written down. If the letter guessed was not in the word, one part of the stick-figure man would be drawn. The guesser would try to say the correct word before the stick-figure was drawn and hung by a drawn noose.

8. "Tick-tack-toe" patterns were drawn by both partners. The beginning player said a letter of the alphabet. Each player wrote the letter in one of the squares. The other player said another letter and both wrote this down. The winner was the one who made a word.

9. Printed compound words were cut into their component parts. Pupils arranged the cards to see how many compound words they could make.

10. Students matched words with their meanings.

11. Paired-learners built stories from descriptive phrases written down on strips of paper by the paired team. These phrases were arranged, adjectives, nouns, and verbs added to suit the paired-learner, and a story was created. The paired-learners could see that variations of thought can come from the same group of words.

12. Questions, such as: "Could you ride a casque?" were made by the learners. The answers were found in a dictionary.

13. A word of the day was posted for each team partner. Each would try to see how well he could use the word in his conversation that day.

14. Scrambled sentences were used to promote sentence comprehension.

15. Initial and final consonants were learned in a game. One child said the first word of a sentence. His partner added another word that began with the last letter of the previous word. For example: Ten nets slid down near rough houseboats.

16. The pupils made up directions for fellow students to follow.

17. Guessing story endings was one of the paired-learners' favorite activities. One of the learners read a story and his partner tried to guess the ending.

18. Library books which had been read were discussed by the paired-learners.

ENGLISH

Many of the previously described reading games and activities were played in English class. In addition, the following were engaged in:

1. Partners made a number code for alphabet letters and wrote messages.

2. Paired-learners split up run-on sentences made by their partners.

3. The students combined short sentences made by partners.

4. Team members found topic sentences.
5. Partners found synonyms for words in sentences.
6. Learners put end punctuation, quotation marks, and commas in stories written by their partners.
7. Two students worked on the same story or poem.
8. Teams hunted for nouns, adjectives, and other parts of speech.
9. Paired-learners made possessives and plurals from words chosen by the partner.
10. Team members wrote plays and learned from each other through creative dramatics.
11. One paired-learner wrote a story with blanks for nouns or verbs or adjectives. The partner said the nouns, verbs, or adjectives when asked and the team-partner wrote in the word his partner said. The story was read, often with surprising results.

SPELLING

Many of the games and activities described under the headings of Reading and English were also engaged in. Other activities included:

1. Words were matched with their meanings.
2. Sentences and stories were written with new words.
3. Crossword puzzles were constructed and filled in.
4. Missing letters in new words were filled in.
5. New words were constructed from the spelling words.

SOCIAL STUDIES

1. Paired-learners matched cities and rivers to countries.
2. One child would describe a country and his partner would guess the country.
3. Maps were drawn and labeled by the teams.
4. Paired-learning teams read assignments together.
5. Team notebooks were made.

MATH

1. Many problems were made up by each student.
2. Guessing missing numbers was a favorite game.
3. Written problems were made up by the teams.
4. Pairs worked on things to measure and found area, volume, and perimeter.

SCIENCE

1. Many experiments were performed by the paired-learners.
2. Definitions of words were supplied.
3. Definitions were given by one partner and the other paired-learner supplied the word.
4. Drawings were made by one partner and the other team member labeled the drawing.

ART

1. Both paired-learners made a scribble on a sheet of paper. They then exchanged papers and drew a picture out of the scribble. This fostered creative thinking.
2. Two students sometimes worked on the same piece of art.

3. The students told each other component parts. For example: "Put one line two inches long on the paper. Put down a small square. Put another square in one corner. Draw three two-inch lines. Draw a circle to finish the drawing." This helped to develop design ability and also helped the child follow directions.

4. The students drew portraits of each other.

5. The partners sometimes gave each other a list of colors to use in a piece of art work.

6. Team members worked together in doing their bulletin boards and displays.

PHYSICAL EDUCATION

1. Partners had contests between the two of them to see how much improvement each could make over the previous day.

The teacher observed the paired-learning teams very carefully since learning occurs through imitation. Imitation of good qualities is important. However, imitation plays an important role in the acquisition of bad, as well as conforming behavior. In some cases the amount of learning shown by the observer was as great as that shown by the performer. Children were not allowed to be copycats or mimickers, nor those who always sit back and let someone else do everything for them. They grew in doing for themselves, and in sensing the satisfaction which results from being thinkers, knowers, and doers.

Learning is more effective when constant evaluation indicates the progress that has been made in meeting the needs of

the paired-learners. "Checklists and self-appraisals will need to be utilized and an evaluative attitude developed before progress can be made."¹¹ Good records, then, need to be maintained in order that accomplishments can be analyzed.

Feedback of many kinds was almost constant. Each student took part in evaluation feedback.

In one such self-evaluation feedback, the teacher handed out mimeographed sheets such as the one shown in Appendix F. Questions asked on the Weekly Self-Evaluation Sheet were: "When did I waste time? When did I use time wisely? What things did I learn? What things did I not understand?" These self-evaluation sheets were filled out periodically throughout the day. The sheets were posted on the team's bulletin board in order for the teacher to see at a glance what each student was doing and what he did not understand. In addition to these sheets, the student could check off items in the Learning Guide. (Appendix D.)

Self-diagnosis and self-guidance is important because an individual knows himself as no one else could ever know him. His interest in self-diagnosis and self-guidance are basic and important in all of his personal affairs because they determine the successes and failures of his life, and how he shall meet them.

¹¹Albert H. Shuster and Wilson F. Wetzler, Leadership In Elementary School Administration and Supervision, pp. 28-32.

Team members also provided feedback by evaluating each other. This was done most often through verbal communication of approval or disapproval or of agreement or disagreement, and through non-verbal cues such as facial expressions, head nods, or written evaluations. Teams scored each other on tests or learning games. A Weekly Team Evaluation Chart, as shown in Appendix G, was kept. Headings listed on the chart included; "When did partner waste time? When did partner use time wisely? Tests and learning games played? Scores on tests and learning games?" The chart was collected by the teacher each week to help her evaluate team effort.

The teacher provided feedback and positive reinforcement by praising students' work improvements. Discipline was handled through feedback by what the children called the "No, No" system. When a child misbehaved, his team partner, another team, or the teacher would remind the student that they had just committed a "no, no." If a child had many reminders in one day, the class would decide that this student must not be allowed to play during the noon recreational period.

In May, tests were again given to determine the extent of improvement in the paired-learning situation. Controls were interviewed and tested. Data on these and other tests are given in Chapter IV.

CHAPTER IV

PRESENTATION OF DATA

Data were gathered and tests were given to the experimental group and control students in an effort to analyze and compare paired-learning with other procedures in the elementary classroom.

Data On Experimental Group

Intelligence test scores, taken in the fourth grade on the California Short-Form of Mental Maturity, were gathered from permanent record folders. The students' I.Q. test scores were recorded as shown on Table II for use in the pairing of the students. The paired-learners' I.Q. test scores were averaged for use in the selection of control students. As shown in Table II, the I.Q. test scores ranged from 126 to 65. S1a had an I.Q. test score of 126 and S1b had a score of 125 for a 125.5 pair average. The other paired-learners' test scores are S2a - 113 and S2b - 112 for 112.5 average; S3a - 110 and S3b - 109 for 109.5; S4a - 109 and S4b - 107 for 108.5; S5a - 101 and S5b - 101 for 101.0; S6a - 100 and S6b - 98 for 99.0; S7a - 97 and S7b - 95 for 96.0; S8a - 96 and S8b - 95 for 95.5; S9a - 93 and S9b - 93 for 93.0; S10a - 93 and S10b - 92 for 92.5; S11a - 86 and S11b - 85 for 85.5; S12a - 83 and S12b - 78 for 80.5; S13a - 70 and S13b - 68 for 69.0; and S14a - 68

TABLE II
I.Q. TEST SCORES ON PAIRED-LEARNERS

Student	I.Q.	Pair average
S1a	126	125.5
S1b	125	
S2a	113	112.5
S2b	112	
S3a	110	109.5
S3b	109	
S4a	109	108.5
S4b	107	
S5a	101	101.0
S5b	101	
S6a	100	99.0
S6b	98	
S7a	97	96.0
S7b	95	
S8a	96	95.5
S8b	95	
S9a	93	93.0
S9b	93	
S10a	93	92.5
S10b	92	
S11a	86	85.5
S11b	85	
S12a	83	80.5
S12b	78	
S13a	70	69.0
S13b	68	
S14a	68	66.5
S14b	65	

and S14b - 65 for 66.5 average.

Scores on the Stanford Achievement Test - Form W were taken from the permanent records of the fifth-grade and recorded on Table III. S1a has a fifth-grade median score of 6.4 and S1b has a median score of 6.2 for a 6.3 pair average; S2a - 7.0 and S2b - 7.4 for 7.2; S3a - 6.0 and S3b - 5.6 for 5.8; S4a - 4.7 and S4b - 4.8 for 4.8; S5a - 4.5 and S5b - 4.6 for 4.6; S6a - 5.3 and S6b - 5.3 for 5.3; S7a - 4.7 and S7b - 4.5 for 4.6; S8a - 5.9 and S8b - 5.4 for 5.6; S9a - 5.1 and S9b - 5.0 for 5.1; S10a - 3.9 and S10b - 4.1 for 4.0; S11a - 4.9 and S11b - 4.3 for 4.6; S12a - 3.5 and S12b - 3.9 for 3.7; S13a - 4.2 and S13b - 3.7 for 4.0; and S14a - 3.5 and S14b - 3.9 for 3.7 average. These scores are shown in years and months of achievement.

Form Q of the California Achievement Test was given in September of the sixth-grade. Scores as recorded on Table IV include S1a median score of 6.7 and S1b with a median score of 6.2 for a 6.5 pair average; S2a - 7.0 and S2b - 7.3 for 7.2; S3a - 5.6 and S3b - 5.6 for 5.6; S4a - 4.6 and S4b - 4.6 for 4.6; S5a - 4.6 and S5b - 4.6 for 4.6; S6a - 5.8 and S6b - 5.2 for 5.5; S7a - 4.6 and S7b - 4.5 for 4.5; S8a - 6.3 and S8b - 5.5 for 5.9; S9a - 5.1 and S9b - 5.3 for 5.2; S10a - 4.4 and S10b - 4.6 for 4.5; S11a - 4.8 and S11b - 4.3 for 4.6; S12a - 3.7 and S12b - 4.2 for 4.0; S13a - 5.2 and S13b - 4.3 for 4.7; and S14a - 3.6 and S14b - 3.9 for 3.7 average.

TABLE III
STANFORD ACHIEVEMENT TEST SCORES MADE IN FIFTH-GRADE

Student	1	2	3	4	5	6	7	Mean	Pair
S1a	6.0	6.6	6.4	6.8	6.2	7.0	5.8	6.4	6.3
S1b	5.4	7.7	4.1	8.0	5.6	6.5	5.4	6.2	
S2a	8.0	7.0	7.2	6.4	6.0	7.0	6.8	7.0	7.2
S2b	8.0	7.2	7.1	7.4	6.0	8.0	8.1	7.4	
S3a	5.5	6.3	6.2	6.8	5.2	7.8	4.5	6.0	5.8
S3b	4.9	4.9	5.8	6.1	5.9	6.1	5.6	5.6	
S4a	4.4	5.0	5.7	4.3	4.1	4.3	5.1	4.7	4.8
S4b	4.1	4.9	5.3	4.4	4.0	5.9	4.4	4.8	
S5a	4.6	5.0	3.4	3.7	4.8	5.2	4.9	4.5	4.6
S5b	4.4	4.4	5.7	4.8	4.8	4.4	3.5	4.6	
S6a	test scores not known; estimated average								5.3
S6b	5.0	4.0	5.6	5.1	5.4	5.3	7.0	5.3	
S7a	4.6	4.6	5.1	4.3	4.1	5.2	5.1	4.7	4.6
S7b	4.1	4.2	6.7	4.0	3.8	5.4	4.4	4.5	
S8a	6.4	6.2	7.8	5.2	4.8	4.9	5.1	5.9	5.6
S8b	6.3	6.3	5.7	5.1	5.0	5.2	4.4	5.4	
S9a	5.9	5.3	5.2	4.8	4.6	4.0	5.2	5.1	5.1
S9b	4.8	4.6	4.6	5.0	5.8	5.2	5.4	5.0	
S10a	4.1	3.8	5.3	2.8	3.7	4.0	3.5	3.9	4.0
S10b	4.4	4.7	4.1	4.1	4.1	3.1	3.7	4.1	
S11a	4.7	6.1	5.6	4.4	3.7	4.3	4.2	4.9	4.6
S11b	4.7	4.0	5.1	3.6	4.3	4.6	4.0	4.3	
S12a	3.0	2.0	3.5	3.5	4.0	4.0	3.9	3.5	3.7
S12b	3.9	4.2	4.5	4.3	4.6	4.9	4.2	3.9	
S13a	3.0	4.6	3.7	3.9	4.0	4.6	5.1	4.2	4.0
S13b	3.5	4.1	3.7	3.2	3.9	4.5	3.6	3.7	
S14a	2.3	3.6	3.0	4.4	3.8	4.9	2.7	3.5	3.7
S14b	3.8	3.8	3.6	3.4	4.2	4.0	4.3	3.9	

1 - Word meaning; 2 - Paragraph meaning; 3 - Spelling; 4 - Language; 5 - Math computation; 6 - Math concepts; 7 - Math application

TABLE IV
FORM Q - CALIFORNIA ACHIEVEMENT TEST SCORES

Student	1	2	3	4	5	6	7	8	Mean	Pair
S1a	7.1	8.3	6.5	8.3	5.0	6.6	6.3	6.0	6.7	6.5
S1b	5.5	7.3	6.5	6.1	4.9	6.3	6.3	8.5	6.2	
S2a	6.8	6.6	8.7	10.7	7.0	6.6	5.3	7.0	7.0	7.2
S2b	6.8	7.3	9.9	10.7	9.4	7.6	4.9	7.6	7.3	
S3a	5.1	6.2	7.0	6.1	7.5	5.3	4.5	5.6	5.6	5.6
S3b	4.5	6.9	5.4	7.0	4.6	6.3	5.6	6.5	5.6	
S4a	4.0	4.3	4.6	6.3	3.2	4.0	5.6	8.0	4.6	4.6
S4b	5.0	3.1	4.5	5.3	3.3	5.0	5.6	9.4	4.6	
S5a	2.5	6.6	6.1	5.7	4.6	5.0	4.5	3.8	4.6	4.6
S5b	5.6	3.6	6.0	5.9	6.7	4.9	4.5	2.8	4.6	
S6a	5.7	4.4	4.9	5.3	9.4	5.9	8.1	6.5	5.8	5.5
S6b	4.5	5.5	7.0	4.6	7.4	6.0	4.7	4.1	5.2	
S7a	4.6	4.6	5.4	3.7	4.1	4.8	4.5	5.0	4.6	4.5
S7b	3.5	2.9	5.1	5.3	2.8	7.1	6.3	6.0	4.5	
S8a	6.5	5.5	7.6	7.0	5.3	6.3	7.6	5.6	6.3	5.9
S8b	4.6	5.5	6.5	4.3	7.0	5.9	5.1	7.0	5.5	
S9a	3.5	4.6	6.1	4.3	5.6	6.1	5.9	5.6	5.1	5.2
S9b	5.0	4.6	5.7	4.0	8.4	5.4	5.6	5.3	5.3	
S10a	5.3	2.9	4.9	3.3	4.3	5.2	4.7	5.3	4.4	4.5
S10b	1.8	3.3	7.6	2.3	4.1	8.7	6.7	8.5	4.6	
S11a	4.3	4.3	6.1	5.0	4.3	5.0	4.5	4.3	4.8	4.6
S11b	3.5	3.3	5.1	3.4	4.3	4.8	5.6	4.6	4.3	
S12a	2.9	3.4	4.5	4.7	3.0	3.4	3.3	4.1	3.7	4.0
S12b	6.5	3.7	2.9	2.5	5.6	4.5	3.6	4.8	4.2	
S13a	5.3	6.9	5.7	6.1	5.0	4.6	4.5	5.3	5.2	4.7
S13b	3.9	2.5	5.7	3.7	3.2	6.1	4.2	5.3	4.3	
S14a	4.6	3.3	2.9	3.3	2.8	3.3	4.7	4.1	3.6	3.7
S14b	3.1	3.7	4.2	3.4	3.2	5.4	3.6	3.8	3.9	

1 - Vocabulary; 2 - Comprehension; 3 - Language mechanics;
4 - Language expression; 5 - Spelling; 6 - Math computation;
7 - Math concepts; 8 - Math application

The Stanford and California - Form Q achievement test scores were averaged together to get a pair average as shown on Table V. The pair averages were used to select the controls with the same achievement average as each paired-learning team. Paired-learning team averages were S1 - 6.4; S2 - 7.1; S3 - 5.7; S4 - 4.6; S5 - 4.5; S6 - 5.4; S7 - 4.5; S8 - 5.7; S9 - 5.1; S10 - 4.2; S11 - 4.5; S12 - 4.8; S13 - 4.3; and S14 - 3.7.

September art achievement tests were given at the beginning of the school year. These tests were divided into several areas, design, art background, technique, and creativity, as shown on Table VI. Tests were graded on a hundred point possible score total and not on a yearly and monthly score system. Table VI shows S1a having an art achievement test score total of 55 and S1b a total of 65 with 60 points for a pair average; S2a - 35 and S2b - 25 for 30; S3a - 25 and S3b - 45 for 35; S4a - 60 and S4b - 50 for 55; S5a - 20 and S5b - 60 for 40; S6a - 70 and S6b - 35 for 53; S7a - 35 and S7b - 35 for 35; S8a - 35 and S8b - 65 for 50; S9a - 40 and S9b - 30 for 35; S10a - 55 and S10b - 70 for 63; S11a - 50 and S11b - 50 for 50; S12a - 35 and S12b - 30 for 33; S13a - 20 and S13b - 20 for 20; and S14a - 50 and S14b - 10 for 30.

The Study Skills Test, taken in September was a part of the California Achievement Test of Basic Skills - Form Q. The study skills test covered two areas. One area was reference skills, and the other area was graph skills. Table VII shows achievement

TABLE V
ACHIEVEMENT TEST AVERAGES BEFORE EXPERIMENTATION

Student	Stanford	California	Average	Pair
S1a	6.4	6.7	6.6	6.4
S1b	6.2	6.2	6.2	
S2a	7.0	7.0	7.0	7.1
S2b	7.4	7.3	7.3	
S3a	6.0	5.6	5.8	5.7
S3b	5.6	5.6	5.6	
S4a	4.7	4.6	4.6	4.6
S4b	4.8	4.6	4.7	
S5a	4.5	4.6	4.5	4.5
S5b	4.6	4.6	4.6	
S6a	5.3	5.8	5.6	5.4
S6b	5.3	5.2	5.2	
S7a	4.7	4.6	4.6	4.5
S7b	4.5	4.5	4.5	
S8a	5.9	6.3	6.1	5.7
S8b	5.4	5.5	5.4	
S9a	5.1	5.1	5.1	5.1
S9b	5.0	5.3	5.1	
S10a	3.9	4.4	4.1	4.2
S10b	4.1	4.6	4.4	
S11a	4.9	4.8	4.8	4.5
S11b	4.3	4.3	4.3	
S12a	3.5	3.7	3.6	4.8
S12b	3.9	4.2	4.0	
S13a	4.2	5.2	4.7	4.3
S13b	3.7	4.3	4.0	
S14a	3.5	3.6	3.5	3.7
S14b	3.9	3.9	3.9	

TABLE VI
SEPTEMBER ART ACHIEVEMENT TEST SCORES

Student	Design	Background	Technique	Creativity	Total	Pair
S1a	20	00	30	05	55	60
S1b	25	10	25	05	65	
S2a	10	05	20	00	35	30
S2b	05	00	10	10	25	
S3a	05	00	15	05	25	35
S3b	10	05	20	10	45	
S4a	15	10	20	15	60	55
S4b	05	05	20	20	50	
S5a	00	05	10	05	20	40
S5b	10	10	15	25	60	
S6a	20	10	15	25	70	53
S6b	15	00	05	15	35	
S7a	10	05	10	10	35	35
S7b	05	05	05	20	35	
S8a	15	00	10	10	35	50
S8b	15	10	25	15	65	
S9a	05	05	05	25	40	35
S9b	10	00	10	10	30	
S10a	25	05	15	10	55	63
S10b	30	05	30	05	70	
S11a	15	10	20	15	50	50
S11b	00	05	25	20	50	
S12a	10	00	15	10	35	33
S12b	15	05	10	00	30	
S13a	05	05	00	10	20	20
S13b	10	00	05	05	20	
S14a	15	00	25	10	50	30
S14b	00	00	05	05	10	

TABLE VII
SEPTEMBER STUDY SKILLS TEST SCORES

Student	Reference	Study Skills	Mean	Pair
S1a	6.7	6.3	6.5	6.5
S1b	6.2	6.7	6.5	
S2a	5.7	7.8	6.7	6.4
S2b	6.2	6.2	6.2	
S3a	4.3	4.4	4.3	4.9
S3b	4.3	6.3	5.4	
S4a	4.5	4.2	4.3	3.9
S4b	3.0	4.0	3.5	
S5a	2.9	5.3	4.1	4.4
S5b	4.7	4.5	4.6	
S6a	5.0	5.2	5.1	4.9
S6b	3.4	6.1	4.7	
S7a	3.4	3.0	3.2	4.0
S7b	4.6	5.3	4.8	
S8a	5.7	5.4	5.6	5.5
S8b	3.9	6.3	5.3	
S9a	3.4	5.0	4.2	4.1
S9b	4.3	3.7	3.9	
S10a	3.4	4.0	3.7	3.4
S10b	3.9	2.0	3.0	
S11a	3.0	4.4	3.9	4.1
S11b	4.6	4.2	4.3	
S12a	3.0	4.2	3.8	2.9
S12b	2.3	1.7	2.0	
S13a	5.7	6.0	5.9	4.8
S13b	3.4	4.0	3.7	
S14a	3.0	2.8	2.9	2.8
S14b	2.5	3.2	2.7	

in reference skills, graphing skills, total average study skills, and average study skills for each paired-learning team. S1a had 6.5 study skills average and S1b had 6.5 average for a total pair average of 6.5; S2a - 6.7 and S2b - 6.2 for 6.4; S3a - 4.3 and S3b - 5.4 for 4.9; S4a - 4.3 and S4b - 3.5 for 3.9; S5a - 4.1 and S5b - 4.6 for 4.4; S6a - 5.1 and S6b - 4.7 for 4.9; S7a - 3.2 and S7b - 4.8 for 4.0; S8a - 5.6 and S8b - 5.3 for 5.5; S9a - 4.2 and S9b - 3.9 for 4.1; S10a - 3.7 and S10b - 3.0 for 3.4; S11a - 3.9 and S11b - 4.3 for 4.1; S12a - 3.8 and S12b - 2.0 for 2.9; S13a - 5.9 and S13b - 3.7 for 4.8; and S14a - 2.9 and S14b - 2.7 for 2.8.

The September Study Habits and Attitudes Test (See Appendix B.) was taken from the Brown - Holtzman Survey of Study Habits and Attitudes, and the language was simplified for use in the sixth-grade. The students were asked to mark their answers truthfully with N for none; O for often; and A for almost always. Answers were then scored as U for undesirable; N for neutral; and D for desirable answers as shown on Table VIII. Only desirable (D) answers were later used to compare the experimental group with controls. All test scores are shown on Table VIII with S1a with 16 desirable answers; S1b - 6; S2a - 18; S2b - 7; S3a - 26; S3b - 4; S4a - 17; S4b - 15; S5a - 17; S5b - 23; S6a - 15; S6b - 15; S7a - 23; S7b - 24; S8a - 15; S8b - 13; S9a - 31; S9b - 15; S10a - 11; S10b - 18; S11a - 17; S11b - 24; S12a - 17; S12b - 17; S13a - 17; S13b - 17; S14a - 7; and S14b - 14.

TABLE VIII
SEPTEMBER STUDY HABITS AND ATTITUDES TEST SCORES

Student	Study Habits			Attitudes			Totals		
	U	N	D	U	N	D	U	N	D
S1a	05	10	10	18	26	06	23	36	16
S1b	16	04	05	38	12	00	54	15	06
S2a	08	11	06	38	00	12	46	11	18
S2b	12	08	05	37	11	02	49	19	07
S3a	06	03	16	30	10	10	36	13	26
S3b	07	15	03	28	21	01	35	36	04
S4a	14	09	12	26	19	05	40	28	17
S4b	10	14	01	13	23	14	23	37	15
S5a	10	08	07	22	18	10	32	26	17
S5b	09	06	10	20	17	13	29	23	23
S6a	10	03	12	39	08	03	49	11	15
S6b	09	07	09	32	12	06	41	19	15
S7a	05	09	11	11	27	12	16	36	23
S7b	09	01	15	34	07	09	43	08	24
S8a	13	02	10	29	16	05	42	18	15
S8b	12	05	08	33	12	05	45	17	13
S9a	05	06	14	13	20	17	18	26	31
S9b	05	13	07	09	33	08	14	46	15
S10a	10	12	03	16	26	08	26	38	11
S10b	16	05	04	18	18	14	34	23	18
S11a	13	03	09	31	11	08	44	14	17
S11b	08	04	13	36	03	11	44	07	24
S12a	11	06	08	13	28	09	24	34	17
S12b	04	10	11	29	15	06	33	25	17
S13a	09	11	05	34	04	12	43	15	17
S13b	14	07	04	28	09	13	42	16	17
S14a	21	04	00	40	03	07	62	07	07
S14b	10	09	06	37	05	08	47	14	14

In May, 1969, Stanford Achievement Tests were given. Scores are recorded on Table IX and show S1a having a mean score of 8.4 and S1b - 6.0 for a 7.2 pair average; S2a - 7.9 and S2b - 8.4 for 8.2; S3a - 7.6 and S3b - 7.7 for 7.7; S4a - 5.7 and S4b - 6.6 for 6.2; S5a - 6.2 and S5b - 6.5 for 6.3; S6a - 7.3 and S6b - 6.9 for 7.1; S7a - 5.9 and S7b - 5.6 for 5.8; S8a - 7.6 and S8b - 6.8 for 7.2; S9a - 6.2 and S9b - 6.6 for 6.4; S10a - 5.3 and S10b - 5.3 for 5.3; S11a - 6.3 and S11b - 5.1 for 5.7; S12a - 5.2 and S12b - 4.8 for 5.0; S13a - 5.0 and S13b - 5.5 for 5.3; and S14a - 4.5 and S14b - 4.5 for 4.5 average.

Form R of the California Achievement Test of Basic Skills was also given in May, 1969. As shown on Table X, S1a made a mean score of 11.9 and S1b - 6.2 for a pair average of 9.0; S2a - 8.4 and S2b - 8.8 for 8.6; S3a - 7.7 and S3b - 7.9 for 7.8; S4a - 5.5 and S4b - 6.6 for 6.1; S5a - 7.3 and S5b - 6.8 for 7.1; S6a - 7.3 and S6b - 6.6 for 6.7; S7a - 5.9 and S7b - 6.2 for 6.1; S8a - 7.6 and S8b - 7.3 for 7.5; S9a - 5.8 and S9b - 6.8 for 6.3; S10a - 5.6 and S10b - 5.5 for 5.6; S11a - 5.6 and S11b - 5.2 for 5.4; S12a - 5.3 and S12b - 4.6 for 5.0; S13a - 5.3 and S13b - 5.6 for 5.5; and S14a - 4.6 and S14b - 4.3 for 4.5.

A teacher-made art achievement test, constructed with the help of the Temple Public Schools art director, was given at the end of the school year. (See Appendix C.) This twenty-question test was scored on a hundred point total, which included thirty points for design skills, ten points for art

TABLE IX
MAY STANFORD ACHIEVEMENT TEST SCORES

Student	1	2	3	4	5	6	7	Mean	Pair
S1a	9.5	9.4	8.2	8.8	8.2	7.0	7.4	8.4	7.2
S1b	7.3	8.2	4.3	6.7	4.4	5.4	5.1	6.0	
S2a	8.9	8.5	7.6	7.7	7.1	7.3	8.3	7.9	8.2
S2b	6.6	9.6	6.8	7.5	9.9	8.5	9.1	8.4	
S3a	6.8	6.8	6.4	7.2	8.3	7.9	9.1	7.6	7.7
S3b	7.0	7.6	7.3	7.2	9.9	7.8	6.9	7.7	
S4a	6.5	6.3	6.0	6.4	4.4	5.3	5.0	5.7	6.2
S4b	5.5	6.6	5.7	6.9	7.7	5.9	8.0	6.6	
S5a	6.4	6.8	5.9	5.3	5.8	6.1	6.5	6.2	6.3
S5b	6.7	5.9	8.0	7.2	6.5	5.4	5.4	6.5	
S6a	6.7	6.9	6.9	9.2	8.2	5.9	7.1	7.3	7.1
S6b	6.8	6.7	8.2	7.1	6.6	6.6	6.2	6.9	
S7a	6.4	5.6	5.4	6.1	6.8	4.9	5.7	5.9	5.8
S7b	5.7	6.2	6.7	5.7	5.6	5.9	5.4	5.6	
S8a	7.0	5.7	11.0	7.4	8.5	7.3	7.1	7.6	7.2
S8b	6.2	6.3	7.5	7.3	7.1	6.6	6.5	6.8	
S9a	5.6	6.0	6.3	7.0	6.4	6.5	5.4	6.2	6.4
S9b	6.9	6.6	7.0	6.6	6.6	6.3	5.8	6.6	
S10a	4.7	4.3	7.6	5.6	4.8	5.6	4.4	5.3	5.3
S10b	4.4	5.7	5.4	5.1	6.6	6.3	5.1	5.3	
S11a	6.1	6.6	6.2	5.9	6.3	6.3	6.4	6.3	5.7
S11b	5.6	5.3	5.9	4.6	5.2	4.6	4.2	5.1	
S12a	4.2	4.4	4.7	6.5	6.5	5.2	4.9	5.2	5.0
S12b	4.2	5.0	6.4	6.0	3.7	4.6	3.6	4.8	
S13a	5.1	5.4	5.4	4.3	5.1	4.6	5.2	5.0	5.3
S13b	5.1	5.3	4.6	4.8	6.0	5.9	5.4	5.5	
S14a	3.9	3.9	4.4	5.4	5.6	4.3	4.1	4.5	4.5
S14b	3.2	4.2	5.3	5.3	5.4	4.0	3.8	4.5	

1 - Word meaning; 2 - Paragraph meaning; 3 - Spelling; 4 - Language; 5 - Math computation; 6 - Math concepts; 7 - Math application

TABLE X
FORM R - CALIFORNIA ACHIEVEMENT TEST SCORES

Student	1	2	3	4	5	6	7	8	Mean	Pair
S1a	11.0	10.2	11.9	11.9	11.9	10.4	9.4	11.1	11.9	9.0
S1b	8.0	7.3	6.7	6.5	5.5	5.7	7.1	5.6	6.2	
S2a	8.5	11.1	9.9	10.7	7.5	6.6	7.1	8.5	8.4	8.6
S2b	7.4	11.9	11.9	11.9	8.4	7.6	8.1	6.5	8.8	
S3a	7.9	8.9	8.7	9.1	9.4	7.1	6.7	7.0	7.7	7.8
S3b	7.4	8.9	11.7	9.8	8.4	6.3	7.1	8.5	7.9	
S4a	5.5	5.5	8.7	4.3	5.0	5.2	5.6	6.5	5.5	6.1
S4b	6.0	7.7	7.0	7.5	7.5	5.9	7.6	5.0	6.6	
S5a	7.4	7.7	7.6	9.8	9.4	7.6	7.6	4.6	7.3	7.1
S5b	6.0	7.7	9.9	6.1	8.4	5.9	7.1	7.6	6.8	
S6a	8.5	9.5	8.7	7.0	5.3	6.3	7.1	8.5	7.3	6.7
S6b	7.4	8.9	6.1	6.1	8.4	5.6	6.3	5.6	6.6	
S7a	6.5	8.9	6.1	6.6	6.5	5.4	4.9	4.3	5.9	6.1
S7b	6.0	5.3	8.7	7.5	6.5	5.7	7.1	5.6	6.2	
S8a	7.1	8.9	8.7	8.3	6.0	8.1	9.4	7.0	7.6	7.5
S8b	7.9	8.9	9.9	7.5	9.4	6.1	6.7	6.0	7.3	
S9a	4.5	5.7	9.9	4.6	6.0	6.3	6.3	7.0	5.8	6.3
S9b	7.1	10.2	7.0	7.5	4.3	7.6	8.1	5.3	6.8	
S10a	5.3	5.3	8.7	5.7	7.0	5.2	5.9	5.3	5.6	5.6
S10b	4.0	6.0	11.7	3.7	6.5	6.3	5.1	6.5	5.5	
S11a	5.3	6.0	8.7	4.3	6.5	5.7	5.3	5.3	5.6	5.4
S11b	4.5	5.5	7.0	4.6	9.4	5.0	4.7	4.1	5.2	
S12a	5.3	5.7	7.0	6.6	3.6	5.9	4.5	4.3	5.3	5.0
S12b	9.4	5.7	5.0	5.3	3.3	4.6	4.2	3.1	4.6	
S13a	5.5	4.4	7.0	3.4	5.6	5.4	6.3	6.5	5.3	5.5
S13b	6.8	4.9	4.2	7.5	6.5	5.2	5.3	7.6	5.6	
S14a	2.5	6.6	6.1	5.7	4.6	5.0	4.5	3.8	4.6	4.5
S14b	5.5	4.6	4.8	3.3	4.3	5.1	3.5	3.4	4.3	

1 - Vocabulary; 2 - Comprehension; 3 - Language mechanics;
4 - Language expression; 5 - Spelling; 6 - Math computation;
7 - Math concepts; 8 - Math application

background, thirty points for art technique skills, and thirty points for creative skills. Individual totals and pair averages of total points are given on Table XI and are as follows: S1a - 85 total and S1b - 90 total for an 88 pair average; S2a - 75 and S2b - 60 for 68; S3a - 65 and S3b - 60 for 63; S4a - 75 and S4b - 75 for 75; S5a - 55 and S5b - 70 for 63; S6a - 95 and S6b - 80 for 88; S7a - 65 and S7b - 70 for 68; S8a - 65 and S8b - 90 for 78; S9a - 85 and S9b - 60 for 73; S10a - 90 and S10b - 65 for 78; S11a - 85 and S11b - 70 for 78; S12a - 60 and S12b - 70 for 65; S13a - 55 and S13b - 65 for 60; and S14a - 85 and S14b - 30 for 58.

May Study Skills test scores, Table XII, are S1a - 9.4 and S1b - 6.9 for 8.2 pair average; S2a - 8.6 and S2b - 10.9 for 9.8; S3a - 6.5 and S3b - 7.2 for 7.0; S4a - 5.2 and S4b - 6.1 for 5.7; S5a - 5.3 and S5b - 6.2 for 5.8; S6a - 7.8 and S6b - 5.2 for 6.5; S7a - 4.2 and S7b - 6.3 for 5.3; S8a - 6.9 and S8b - 5.7 for 6.4; S9a - 5.1 and S9b - 5.1 for 5.1; S10a - 6.0 and S10b - 4.3 for 5.2; S11a - 5.5 and S11b - 4.3 for 4.9; S12a - 5.7 and S12b - 3.2 for 4.5; S13a - 5.5 and S13b - 4.6 for 5.1; and S14a - 4.2 and S14b - 3.6 for 3.9.

Table XIII includes the number of undesirable, neutral, and desirable answers on the May Study Habits and Attitudes Test. The desirable answers, which are later used in the comparisons, include S1a - total desirable answers at 56; S1b - 13; S2a - 31; S2b - 29; S3a - 40; S3b - 28; S4a - 34;

TABLE XI
MAY ART ACHIEVEMENT TEST SCORES

Student	Design	Background	Technique	Creativity	Total	Pair
S1a	25	05	30	25	85	88
S1b	25	10	30	25	90	
S2a	20	05	30	20	75	68
S2b	15	05	25	15	60	
S3a	25	00	20	20	65	63
S3b	10	10	25	15	60	
S4a	25	10	15	25	75	75
S4b	15	10	20	30	75	
S5a	05	10	10	30	55	63
S5b	25	05	25	15	70	
S6a	30	10	30	25	95	88
S6b	20	10	25	25	80	
S7a	10	05	20	30	65	68
S7b	15	10	20	25	70	
S8a	20	05	10	30	65	78
S8b	25	05	30	30	90	
S9a	30	10	15	30	85	73
S9b	10	10	25	15	60	
S10a	30	10	30	20	90	78
S10b	25	05	20	15	65	
S11a	25	10	25	25	85	78
S11b	10	05	25	30	70	
S12a	20	00	25	15	60	65
S12b	20	10	30	10	70	
S13a	25	05	15	10	55	60
S13b	15	10	20	20	65	
S14a	30	00	30	25	85	58
S14b	05	05	10	10	30	

TABLE XII
MAY STUDY SKILLS TEST SCORES

Student	Reference	Graphing	Mean	Pair
S1a	10.3	8.4	9.4	8.2
S1b	6.8	6.9	6.9	
S2a	7.8	9.3	8.6	9.8
S2b	10.7	11.2	10.9	
S3a	6.7	6.3	6.5	7.0
S3b	6.1	8.2	7.2	
S4a	5.5	4.8	5.2	5.7
S4b	6.3	5.8	6.1	
S5a	5.2	5.4	5.3	5.8
S5b	6.7	5.4	6.2	
S6a	7.5	8.0	7.8	6.5
S6b	4.3	6.2	5.2	
S7a	4.4	3.9	4.2	5.3
S7b	6.5	6.1	6.3	
S8a	7.0	6.8	6.9	6.4
S8b	5.2	6.2	5.7	
S9a	4.5	5.6	5.1	5.1
S9b	5.8	4.3	5.1	
S10a	6.0	5.9	6.0	5.2
S10b	4.8	3.7	4.3	
S11a	6.1	4.9	5.5	4.9
S11b	4.9	3.7	4.3	
S12a	5.1	6.3	5.7	4.5
S12b	3.8	2.5	3.2	
S13a	5.6	5.3	5.5	5.1
S13b	4.9	4.3	4.6	
S14a	4.4	3.9	4.2	3.9
S14b	3.6	3.6	3.6	

TABLE XIII
MAY STUDY HABITS AND ATTITUDES TEST SCORES

Student	Study Habits			Attitudes			Totals		
	U	N	D	U	N	D	U	N	D
S1a	02	03	20	03	11	05	05	14	56
S1b	10	07	08	24	21	05	34	28	13
S2a	00	10	15	06	28	16	06	38	31
S2b	03	02	20	15	26	09	18	28	29
S3a	04	13	18	07	21	22	11	34	40
S3b	01	10	14	12	24	14	13	34	28
S4a	02	10	13	13	16	21	15	26	34
S4b	03	09	13	11	22	17	14	31	30
S5a	08	09	08	05	16	29	13	25	37
S5b	07	04	14	04	10	36	11	14	50
S6a	11	02	12	19	04	27	30	06	39
S6b	02	05	18	23	09	18	25	14	36
S7a	00	03	22	04	16	30	04	19	52
S7b	04	07	14	16	12	22	20	19	36
S8a	09	03	13	00	18	32	09	21	45
S8b	05	04	16	08	11	31	13	15	47
S9a	01	10	14	10	24	16	11	34	30
S9b	02	11	12	03	13	34	05	24	46
S10a	03	12	10	02	16	32	05	28	42
S10b	07	13	05	14	04	32	21	17	37
S11a	04	13	08	10	03	37	14	16	45
S11b	08	03	14	12	18	20	20	21	34
S12a	07	08	10	11	23	16	18	31	26
S12b	00	15	10	07	24	19	07	39	29
S13a	03	13	09	08	06	36	11	19	45
S13b	08	10	07	07	15	28	15	25	35
S14a	13	04	08	21	28	01	34	32	09
S14b	06	06	13	25	07	18	31	13	31

S4b - 30; S5a - 37; S5b - 50; S6a - 39; S6b - 36; S7a - 52; S7b - 36; S8a - 45; S8b - 47; S9a - 30; S9b - 46; S10a - 42; S10b - 37; S11a - 45; S11b - 34; S12a - 26; S12b - 29; S13a - 45; S13b - 35; S14a - 9; and S14b - 31.

The individual and paired-learning team advancement made in test scores during the sixth-grade was found by subtracting the test scores made in September from test scores made in May. In the case of no advancement during the sixth-grade, the advance is shown on the tables as either a zero or a minus number.

Advancement in the Stanford test scores after experimentation is shown on Table XIV. S1a shows an advancement of 2.0 and S1b has -0.2 for a pair-average advancement of 1.8; S2a - 0.9 and S2b - 1.0 for 1.0; S3a - 1.6 and S3b - 2.1 for 1.9; S4a - 1.0 and S4b - 1.8 for 1.4; S5a - 1.7 and S5b - 1.9 for 1.8; S6a - 2.0 and S6b - 1.6 for 1.8; S7a - 1.2 and S7b - 1.1 for 1.2; S8a - 1.7 and S8b - 1.4 for 1.6; S9a - 1.1 and S9b - 1.6 for 1.4; S10a - 1.4 and S10b - 1.2 for 1.3; S11a - 1.4 and S11b - 0.8 for 1.6; S12a - 1.7 and S12b - 0.9 for 1.8; S13a - 0.8 and S13b - 1.8 for 1.3; and S14a - 1.0 and S14b - 0.6 for 0.8 average.

Advancement on the California achievement test scores after experimentation, Table XV, shows that advancement by S1a is 5.2 and S1b - 0.0 for a pair-average advancement of 2.6; S2a - 1.4 and S2b - 1.5 for 1.5; S3a - 2.1 and S3b - 2.3 for

TABLE XIV

ADVANCEMENT IN STANFORD ACHIEVEMENT TEST SCORES

Student	Fifth-grade	Sixth-grade	Advancement	Pair
S1a	6.4	8.4	2.0	1.8
S1b	6.2	6.0	-0.2	
S2a	7.0	7.9	0.9	1.0
S2b	7.4	8.4	1.0	
S3a	6.0	7.6	1.6	1.9
S3b	5.6	7.7	2.1	
S4a	4.7	5.7	1.0	1.4
S4b	4.8	6.6	1.8	
S5a	4.5	6.2	1.7	1.8
S5b	4.6	6.5	1.9	
S6a	5.3	7.3	2.0	1.8
S6b	5.3	6.9	1.6	
S7a	4.7	5.9	1.2	1.2
S7b	4.5	5.6	1.1	
S8a	5.9	7.6	1.7	1.6
S8b	5.4	6.8	1.4	
S9a	5.1	6.2	1.1	1.4
S9b	5.0	6.6	1.6	
S10a	3.9	5.3	1.4	1.3
S10b	4.1	5.3	1.2	
S11a	4.9	6.3	1.4	1.6
S11b	4.3	5.1	0.8	
S12a	3.5	5.2	1.7	1.8
S12b	3.9	4.8	0.9	
S13a	4.2	5.0	0.8	1.3
S13b	3.7	5.5	1.8	
S14a	3.5	4.5	1.0	0.8
S14b	3.9	4.5	0.6	

TABLE XV
ADVANCEMENT IN CALIFORNIA ACHIEVEMENT TEST SCORES

Student	Fifth-grade	Sixth-grade	Advancement	Pair
S1a	6.7	11.9	5.2	2.6
S1b	6.2	6.2	0.0	
S2a	7.0	8.4	1.4	1.5
S2b	7.3	8.8	1.5	
S3a	5.6	7.7	2.1	2.2
S3b	5.6	7.9	2.3	
S4a	4.6	5.5	0.9	1.5
S4b	4.6	6.6	2.0	
S5a	4.6	7.3	2.7	2.5
S5b	4.6	6.8	2.2	
S6a	5.8	7.3	1.5	1.5
S6b	5.2	6.6	1.4	
S7a	4.6	5.9	1.3	1.5
S7b	4.5	6.2	1.7	
S8a	6.3	7.6	1.3	1.6
S8b	5.5	7.3	1.8	
S9a	5.1	5.8	0.7	1.1
S9b	5.3	6.8	1.5	
S10a	4.4	5.6	1.2	1.1
S10b	4.6	5.5	0.9	
S11a	4.8	5.6	0.8	0.9
S11b	4.3	5.5	0.9	
S12a	3.7	5.6	1.6	1.0
S12b	4.2	5.2	0.4	
S13a	5.2	5.3	0.1	0.7
S13b	4.3	4.1	1.3	
S14a	3.6	4.3	1.0	0.7
S14b	3.9	3.1	0.4	

2.2; S4a - 0.9 and S4b - 2.0 for 1.5; S5a - 2.7 and S5b - 2.2 for 2.5; S6a - 1.5 and S6b - 1.4 for 1.5; S7a - 1.3 and S7b - 1.7 for 1.5; S8a - 1.3 and S8b - 1.8 for 1.6; S9a - 0.7 and S9b - 1.5 for 1.1; S10a - 1.2 and S10b - 0.9 for 1.1; S11a - 0.8 and S11b - 0.9 for 0.9; S12a - 1.6 and S12b - 0.4 for 1.0; S13a - 0.1 and S13b - 1.3 for 0.7; and S14a - 1.0 and S14b - 0.4 for 0.7 average.

The Stanford and California achievement test score advancement was averaged and shown on Table XVI. A 3.6 average advancement was made by S1a and a -0.1 was made by S1b for a pair average advancement of 1.8; 1.2 - S2a and 1.3 - S2b for 1.3; 1.9 - S3a and 2.2 - S3b for 2.0; 1.0 - S4a and 1.9 - S4b for 1.5; 2.2 - S5a and 2.0 - S5b for 2.1; 1.8 - S6a and 1.5 - S6b for 1.7; 1.3 - S7a and 1.4 - S7b for 1.4; 1.5 - S8a and 1.6 - S8b for 1.6; 0.9 - S9a and 1.6 - S9b for 1.3; 1.3 - S10a and 1.1 - S10b for 1.2; 1.1 - S11a and 0.9 - S11b for 1.0; 1.7 - S12a and 0.6 - S12b for 1.2; 0.5 - S13a and 1.6 - S13b for 1.1; and 1.0 - S14a and 0.5 - S14b for 0.8.

Improvement in art, Table XVII, shows 30 points improvement by S1a and 25 - S1b for a pair average improvement of 28 points; 40 - S2a and 35 - S2b for 38; 40 - S3a and 15 - S3b for 28; 15 - S4a and 25 - S4b for 20; 35 - S5a and 10 - S5b for 23; 25 - S6a and 45 - S6b for 35; 30 - S7a and 35 - S7b for 33; 30 - S8a and 25 - S8b for 28; 45 - S9a and 30 - S9b for 38; 35 - S10a and -5 - S10b for 15; 35 - S11a and 20 -

TABLE XVI
AVERAGE ACHIEVEMENT ADVANCEMENT

Student	Stanford	California	Average	Pair
S1a	2.0	5.2	3.6	1.8
S1b	-0.2	0.0	-0.1	
S2a	0.9	1.4	1.2	1.3
S2b	1.0	1.5	1.3	
S3a	1.6	2.1	1.9	2.0
S3b	2.1	2.3	2.2	
S4a	1.0	0.9	1.0	1.5
S4b	1.8	2.0	1.9	
S5a	1.7	2.7	2.2	2.1
S5b	1.9	2.2	2.0	
S6a	2.0	1.5	1.8	1.7
S6b	1.6	1.4	1.5	
S7a	1.2	1.3	1.3	1.4
S7b	1.1	1.7	1.4	
S8a	1.7	1.3	1.5	1.6
S8b	1.1	1.8	1.6	
S9a	1.6	0.7	0.9	1.3
S9b	1.4	1.5	1.6	
S10a	1.2	1.2	1.3	1.2
S10b	1.4	0.9	1.1	
S11a	0.8	0.8	1.1	1.0
S11b	1.7	0.9	0.9	
S12a	0.9	1.6	1.7	1.2
S12b	0.8	0.4	0.6	
S13a	1.8	0.1	0.5	1.1
S13b	1.0	1.3	1.6	
S14a	1.0	1.0	1.0	0.8
S14b	0.6	0.4	0.5	

TABLE XVII
IMPROVEMENT IN ART ACHIEVEMENT

Student	Design	Background	Techniques	Creativity	Total	Pair
S1a	05	05	00	20	30	28
S1b	00	00	05	20	25	
S2a	10	00	10	20	40	38
S2b	10	05	15	05	35	
S3a	20	00	05	15	40	28
S3b	00	05	05	05	15	
S4a	10	00	-5	10	15	20
S4b	10	05	00	10	25	
S5a	05	05	00	25	35	23
S5b	15	-5	10	-10	10	
S6a	10	00	15	00	25	35
S6b	05	10	20	10	45	
S7a	00	00	10	20	30	33
S7b	05	05	15	05	35	
S8a	05	05	00	20	30	28
S8b	10	-5	05	15	25	
S9a	25	05	10	05	45	38
S9b	00	10	15	05	30	
S10a	05	05	15	10	35	15
S10b	-5	00	-10	10	-5	
S11a	05	00	05	10	35	28
S11b	10	00	00	10	20	
S12a	10	00	10	05	25	32
S12b	05	05	20	10	40	
S13a	20	00	15	00	35	40
S13b	05	10	15	15	45	
S14a	15	00	05	15	35	28
S14b	05	05	05	05	20	

S11b for 28; 25 - S12a and 40 - S12b for 32; 35 - S13a and 45 - S13b for 40; and 35 - S14a and 20 - S14b for 28.

Improvement in study skills, Table XVIII, shows a 2.9 total study skills improvement made by S1a and 0.4 - S1b for a pair total average improvement of 1.7; 1.8 - S2a and 4.8 - S2b for 3.3; 2.2 - S3a and 1.9 - S3b for 2.1; 0.8 - S4a and 2.6 - S4b for 1.7; 1.3 - S5a and 1.5 - S5b for 1.4; 2.7 - S6a and 0.5 - S6b for 1.6; 1.0 - S7a and 1.4 - S7b for 1.2; 1.4 - S8a and 0.6 - S8b for 1.0; 0.9 - S9a and 1.1 - S9b for 1.0; 2.3 - S10a and 1.3 - S10b for 1.8; 1.8 - S11a and -0.1 - S11a for 0.9; 2.1 - S12a and 1.2 - S12b for 1.7; -.4 - S13a and 0.7 - S13b for 0.2; and 1.3 - S14a and 0.8 - S14b for 1.1.

Improvements in attitudes and study habits after experimentation, Table XIX, show a gain of 40 points by S1a; 8 - S1b; 13 - S2a; 22 - S2b; 14 - S3a; 24 - S3b; 17 - S4a; 15 - S4b; 20 - S5a; 27 - S5b; 24 - S6a; 21 - S6b; 29 - S7a; 12 - S7b; 30 - S8a; 34 - S8b; -1 - S9a; 21 - S9b; 31 - S10a; 19 - S10b; 28 - S11a; 10 - S11b; 9 - S12a; 12 - S12b; 28 - S13a; 18 - S13b; 2 - S14a; and 17 - S14b.

Data on Control Students

Control students were selected with similar intelligence test scores and achievement test scores to those of the paired-learning teams. Each control was in a different classroom.

TABLE XVIII
IMPROVEMENT IN STUDY SKILLS

Student	Reference	Graph	Average	Pair
S1a	3.6	2.1	2.9	1.7
S1b	0.6	0.2	0.4	
S2a	2.1	1.5	1.8	3.3
S2b	4.5	5.0	4.8	
S3a	2.4	1.9	2.2	2.1
S3b	1.8	1.9	1.9	
S4a	0.9	0.6	0.8	1.7
S4b	3.3	1.8	2.6	
S5a	2.3	0.1	1.3	1.4
S5b	2.0	0.9	1.5	
S6a	2.5	2.8	2.7	1.6
S6b	0.9	0.1	0.5	
S7a	1.0	0.9	1.0	1.2
S7b	1.9	0.8	1.4	
S8a	1.3	1.4	1.4	1.0
S8b	1.3	-0.1	0.6	
S9a	1.1	0.6	0.9	1.0
S9b	1.5	0.6	1.1	
S10a	2.6	1.9	2.3	1.8
S10b	0.9	1.7	1.3	
S11a	3.1	0.5	1.8	0.9
S11b	0.3	-0.5	-0.1	
S12a	2.1	2.1	2.1	1.7
S12b	1.5	0.8	1.2	
S13a	-0.1	-0.7	-0.4	0.2
S13b	1.0	0.3	0.7	
S14a	1.4	1.1	1.3	1.1
S14b	1.1	0.4	0.8	

TABLE XVIX

IMPROVEMENT IN ATTITUDES AND STUDY HABITS AFTER EXPERIMENTATION

Student	Study Habits	Attitudes	Total	Pair
S1a	10	30	40	44
S1b	03	05	08	
S2a	09	04	13	18
S2b	15	07	22	
S3a	02	12	14	19
S3b	11	13	24	
S4a	01	16	17	16
S4b	12	03	15	
S5a	01	19	20	24
S5b	04	23	27	
S6a	00	24	24	23
S6b	09	12	21	
S7a	11	18	29	21
S7b	-01	13	12	
S8a	03	27	30	32
S8b	08	26	34	
S9a	00	-01	-01	10
S9b	05	16	21	
S10a	07	24	31	25
S10b	01	18	19	
S11a	-01	29	28	19
S11b	01	09	10	
S12a	02	07	09	11
S12b	-01	13	12	
S13a	04	24	28	23
S13b	03	15	18	
S14a	08	-06	02	10
S14b	07	10	17	

Control student 1 (C1) has an intelligence test score of 125; C2 - 112; C3 - 110; C4 - 108; C5 - 101; C6 - 99; C7 - 96; C8 - 96; C9 - 93; C10 - 92; C11 - 85; C12 - 80; C13 - 69; and C14 - 67, which are shown on Table XX.

Scores, Table XXI, made on the fifth-grade Stanford test are C1 with a mean score of 5.8; C2 - 7.0; C3 - 5.8; C4 - 4.2; C5 - 5.0; C6 - 4.9; C7 - 4.3; C8 - 5.6; C9 - 5.1; C10 - 3.8; C11 - 4.6; C12 - 5.0; C13 - 4.1; and C14 - 3.4.

Form Q of the California Achievement Test was given in September to all potential control students. Scores, as shown on Table XXII, show the mean scores of the control students selected. C1 had a mean score of 7.0; C2 - 7.2; C3 - 5.6; C4 - 5.0; C5 - 4.1; C6 - 5.8; C7 - 4.7; C8 - 5.5; C9 - 5.1; C10 - 4.6; C11 - 4.5; C12 - 4.5; C13 - 4.5; and C14 - 3.8.

Table XXIII shows the average achievement test scores on the selected controls before the year of experimentation began. C1, at the beginning of the sixth-grade, had an average of 6.4; C2 - 7.1; C3 - 5.7; C4 - 4.6; C5 - 4.5; C6 - 5.4; C7 - 4.5; C8 - 5.6; C9 - 5.1; C10 - 4.2; C11 - 4.6; C12 - 4.8; C13 - 4.3; and C14 - 3.6.

September art achievement test scores in Table XXIV show C1 having a total of 55 points; C2 - 50; C3 - 50; C4 - 60; C5 - 60; C6 - 60; C7 - 30; C8 - 45; C9 - 30; C10 - 55; C11 - 95; C12 - 45; C13 - 15; and C14 - 30.

TABLE XX
I.Q TEST SCORES ON CONTROL STUDENTS

Student	I.Q.
C1	125
C2	112
C3	110
C4	108
C5	101
C6	99
C7	96
C8	96
C9	93
C10	92
C11	85
C12	80
C13	69
C14	67

TABLE XXI
FIFTH-GRADE STANFORD ACHIEVEMENT TEST SCORES

Control	1	2	3	4	5	6	7	Mean
C1	6.8	6.0	5.0	5.6	6.6	5.7	4.8	5.8
C2	9.0	6.5	6.8	6.0	6.9	7.4	7.5	7.0
C3	7.0	5.7	5.2	6.4	4.6	5.5	5.1	5.8
C4	4.1	5.2	3.9	3.0	5.3	4.5	3.1	4.2
C5	6.3	5.4	4.7	4.7	5.2	4.4	4.2	5.0
C6	6.0	5.5	5.1	4.0	5.8	4.7	3.2	4.9
C7	4.0	2.8	3.5	4.6	5.1	5.0	4.9	4.3
C8	5.3	6.4	4.8	5.8	6.0	5.3	5.6	5.6
C9	3.0	3.5	3.9	4.7	7.2	6.9	5.4	5.1
C10	5.2	5.4	4.6	5.3	2.3	2.0	1.8	3.8
C11	5.8	4.5	4.5	4.3	3.8	4.9	4.2	4.6
C12	4.2	3.2	3.5	5.2	6.8	5.9	5.8	5.0
C13	3.6	3.7	3.8	3.9	4.2	4.3	5.0	4.1
C14	3.4	3.2	3.5	3.6	3.0	3.6	3.5	3.4

1 - Word meaning; 2 - Paragraph meaning; 3 - Spelling; 4 - Language; 5 - Math computation; 6 - Math concepts; 7 - Math application

TABLE XXII
FORM Q - CALIFORNIA ACHIEVEMENT TEST SCORES

Control	1	2	3	4	5	6	7	8	Mean
C1	6.4	10.1	11.6	5.2	8.3	6.5	7.0	5.9	7.0
C2	6.1	6.8	8.6	6.9	6.4	6.2	7.0	8.4	7.2
C3	6.1	7.3	5.5	7.3	6.0	4.6	5.7	4.0	5.6
C4	4.5	3.3	5.9	6.7	5.4	5.3	5.4	5.4	5.0
C5	4.9	7.2	4.6	6.8	2.0	4.1	3.3	2.6	4.1
C6	6.1	5.5	9.7	7.3	5.6	5.7	5.6	5.3	5.8
C7	3.3	5.7	6.7	6.3	5.0	4.6	4.3	4.5	4.7
C8	7.1	6.6	4.9	5.0	5.6	5.4	4.7	5.0	5.5
C9	4.5	3.6	6.6	7.3	6.0	5.1	5.3	5.5	5.1
C10	2.5	3.5	5.9	5.9	5.7	5.4	2.8	5.1	4.6
C11	5.5	8.1	4.6	6.8	2.0	3.6	3.7	5.5	4.5
C12	3.7	6.9	6.7	4.6	2.8	4.3	3.9	6.5	4.5
C13	2.8	6.3	2.4	5.0	4.0	4.3	4.3	6.5	4.5
C14	3.1	5.9	1.6	5.9	2.4	3.3	3.4	5.1	3.8

1 - Vocabulary; 2 - Composition; 3 - Language mechanics; 4 - Language expression; 5 - Spelling; 6 - Math computation; 7 - Math concepts; 8 - Math application

TABLE XXIII
AVERAGE ACHIEVEMENT TEST SCORES OF CONTROLS

Control	Stanford	California	Average
C1	5.8	7.0	6.4
C2	7.0	7.2	7.1
C3	5.8	5.6	5.7
C4	4.2	5.0	4.6
C5	5.0	4.1	4.5
C6	4.9	5.8	5.4
C7	4.3	4.7	4.5
C8	5.6	5.5	5.6
C9	5.1	5.1	5.1
C10	3.8	4.6	4.2
C11	4.6	4.5	4.6
C12	5.0	4.5	4.8
C13	4.1	4.5	4.3
C14	3.4	3.8	3.6

TABLE XXIV
SEPTEMBER ART ACHIEVEMENT TEST SCORES

Control	Design	Background	Technique	Creativity	Total
C1	20	05	25	05	55
C2	05	10	20	15	50
C3	25	10	15	00	50
C4	30	05	10	15	60
C5	15	10	15	20	60
C6	25	10	20	05	60
C7	10	05	10	05	30
C8	20	05	15	05	45
C9	15	10	00	05	30
C10	10	00	20	25	55
C11	25	10	30	30	95
C12	15	05	15	10	45
C13	00	00	10	05	15
C14	15	05	05	05	30

September Study Skills Test scores, Table XXV, show C1 with an average of 6.1; C2 - 7.5; C3 - 5.9; C4 - 6.9; C5 - 5.1; C6 - 3.9; C7 - 5.9; C8 - 5.1; C9 - 6.5; C10 - 6.2; C11 - 3.8; C12 - 3.0; C13 - 2.2; and C14 - 1.6.

September Study Habits and Attitudes Test scores, as shown on Table XXVI, show C1 with 27 desirable answers; C2 - 29; C3 - 14; C4 - 5; C5 - 28; C6 - 18; C7 - 34; C8 - 21; C9 - 30; C10 - 20; C11 - 38; C12 - 22; C13 - 32; and C14 - 12.

Table XXVII shows the sixth-grade Stanford Achievement Test scores taken by the control students in May, 1969, the last month of the school year. C1 has a mean score of 5.9; C2 - 7.2; C3 - 5.8; C4 - 4.8; C5 - 5.3; C6 - 5.7; C7 - 5.0; C8 - 5.9; C9 - 5.7; C10 - 4.9; C11 - 4.9; C12 - 5.5; C13 - 4.1; and C14 - 3.1.

Form R of California Achievement Test scores, Table XXVIII, show C1 with a mean score of 6.8; C2 - 7.5; C3 - 5.9; C4 - 5.4; C5 - 5.0; C6 - 6.6; C7 - 4.8; C8 - 6.3; C9 - 5.7; C10 - 5.0; C11 - 5.2; C12 - 4.7; C13 - 4.6; and C14 - 3.9.

May Art Achievement Test scores for controls are shown on Table XXIX. On this test, C1 made a total of 75 points out of a possible 100 points; C2 - 45; C3 - 55; C4 - 60; C5 - 35; C6 - 60; C7 - 30; C8 - 55; C9 - 30; C10 - 35; C11 - 65; C12 - 60; C13 - 30; and C14 - 15 points.

Table XXX shows the scores made by the control students

TABLE XXV
SEPTEMBER STUDY SKILLS TEST SCORES

Control	Reference	Graph	Average
C1	5.8	6.3	6.1
C2	7.4	7.5	7.5
C3	5.8	6.0	5.9
C4	7.5	6.3	6.9
C5	5.2	5.0	5.1
C6	4.4	3.0	3.9
C7	6.0	5.7	5.9
C8	5.2	4.7	5.1
C9	7.0	5.9	6.5
C10	6.2	6.2	6.2
C11	4.2	3.3	3.8
C12	2.9	3.0	3.0
C13	2.0	2.3	2.2
C14	1.3	1.9	1.6

TABLE XXVI
SEPTEMBER STUDY HABITS AND ATTITUDES TEST SCORES

Control	Study Habits			Attitudes			Totals		
	U	N	D	U	N	D	U	N	D
C1	06	09	10	07	26	17	13	35	27
C2	02	11	12	14	19	17	16	30	29
C3	15	10	00	10	26	14	25	36	14
C4	14	10	01	18	28	04	32	38	05
C5	07	00	18	03	37	10	10	37	28
C6	10	13	02	04	30	16	14	43	18
C7	00	05	20	03	33	14	03	38	34
C8	12	10	03	05	29	18	17	39	21
C9	11	08	06	09	17	24	20	25	30
C10	13	07	05	11	24	15	24	31	20
C11	08	08	09	12	09	29	20	17	38
C12	09	13	03	19	13	19	28	25	22
C13	06	15	04	11	11	28	17	26	32
C14	05	10	05	14	29	07	19	39	12

TABLE XXVII
SIXTH-GRADE STANFORD ACHIEVEMENT TEST SCORES

Control	1	2	3	4	5	6	7	Mean
C1	6.4	6.3	5.5	5.4	6.7	5.8	5.0	5.9
C2	8.2	6.8	6.8	6.5	7.0	7.2	8.0	7.2
C3	6.8	6.3	6.0	6.0	5.2	5.3	5.0	5.8
C4	5.3	5.8	4.8	3.7	4.8	4.9	4.4	4.8
C5	6.5	6.0	5.1	5.0	5.0	4.9	4.3	5.3
C6	6.8	6.2	6.3	5.5	5.4	5.1	4.9	5.7
C7	5.3	4.9	5.0	4.7	5.0	5.1	5.2	5.0
C8	6.0	6.5	5.3	5.7	6.6	5.0	6.1	5.9
C9	4.5	4.7	5.3	5.2	6.9	7.1	6.0	5.7
C10	5.3	5.7	5.1	5.3	4.8	4.2	3.9	4.9
C11	6.0	5.3	5.0	4.8	4.1	5.2	4.5	4.9
C12	5.0	4.5	4.3	5.2	6.9	6.3	6.1	5.5
C13	3.9	3.3	3.7	4.3	3.9	4.0	4.9	4.1
C14	2.8	3.1	3.3	3.0	2.4	3.7	3.2	3.1

1 - Word meaning; 2 - Paragraph meaning; 3 - Spelling; 4 - Language; 5 - Math computation; 6 - Math concepts; 7 - Math application

TABLE XXVIII
FORM R - ACHIEVEMENT TEST SCORES

Control	1	2	3	4	5	6	7	8	Mean
C1	5.6	10.1	9.1	5.3	8.6	6.6	7.6	5.9	6.8
C2	6.5	6.7	11.8	7.2	6.1	7.1	10.3	9.5	7.5
C3	6.1	8.0	5.1	8.9	5.5	4.6	5.7	3.5	5.9
C4	4.2	4.1	7.3	9.7	7.5	5.7	5.6	4.3	5.4
C5	5.3	7.9	4.8	6.7	3.6	5.9	5.5	3.1	5.0
C6	6.0	6.5	7.6	6.9	6.7	6.7	7.0	6.3	6.6
C7	3.3	6.8	7.2	6.9	6.4	4.4	3.5	4.1	4.8
C8	9.9	9.1	5.0	5.7	6.5	7.1	4.6	5.9	6.3
C9	4.0	3.1	7.5	9.2	6.5	4.1	5.0	5.5	5.7
C10	3.6	5.0	7.9	6.8	5.5	5.3	3.7	5.1	5.0
C11	6.3	8.7	5.5	7.7	3.6	4.1	4.5	5.8	5.2
C12	3.6	7.1	6.7	4.9	3.4	5.8	4.1	5.9	4.7
C13	4.0	6.5	4.0	4.5	4.6	4.6	4.6	5.5	4.6
C14	3.0	4.6	6.1	2.7	5.5	3.3	3.9	4.0	3.9

1.- Vocabulary; 2 - Composition; 3 - Language mechanics;
4 - Language expression; 5 - Spelling; 6 - Math computation;
7 - Math concepts; 8 - Math applications

TABLE XXIX
MAY ART ACHIEVEMENT TEST SCORES

Control	Design	Background	Technique	Creativity	Total
C1	20	10	25	20	75
C2	15	05	10	15	45
C3	25	00	20	10	55
C4	30	10	05	15	60
C5	10	05	10	10	35
C6	25	10	15	10	60
C7	15	00	10	05	30
C8	10	00	25	20	55
C9	05	05	05	15	30
C10	10	00	15	10	35
C11	15	05	20	25	65
C12	20	05	20	15	60
C13	15	00	10	05	30
C14	05	05	05	00	15

TABLE XXX
MAY STUDY SKILLS TEST SCORES

Control	Reference	Graph	Average
C1	7.0	5.9	6.5
C2	8.1	8.3	8.2
C3	6.3	6.1	6.2
C4	7.4	7.3	7.4
C5	5.1	4.8	5.0
C6	4.8	2.9	4.0
C7	6.5	6.2	6.4
C8	5.5	5.5	5.5
C9	6.5	6.8	6.7
C10	7.3	6.5	6.9
C11	5.0	4.8	4.9
C12	2.7	2.5	2.6
C13	3.1	2.5	2.8
C14	2.0	2.1	2.1

on the May study skills test Form R of the California Achievement Test Battery. C1 made an average score of 6.5; C2 - 8.2; C3 - 6.2; C4 - 7.4; C5 - 5.0; C6 - 4.0; C7 - 6.4; C8 - 5.5; C9 - 6.7; C10 - 6.9; C11 - 4.9; C12 - 2.6; C13 - 2.8; and C14 - 2.1.

Table XXXI shows desirable answers given by the controls on the May test of study skills and attitudes. C1 has 25 desirable answers; C2 - 22; C3 - 21; C4 - 16; C5 - 20; C6 - 21; C7 - 29; C8 - 16; C9 - 20; C10 - 18; C11 - 37; C12 - 20; C13 - 42; and C14 - 16.

Advancement on control students was found by subtracting scores made in September from scores made in May. If advancement had not occurred during the sixth-grade school year, advancement would be 0 or a minus number on the tables.

Table XXXII lists average advancement on achievement tests taken by the control students. A -0.1 average was made by C1; 0.3 - C2; 0.2 - C3; 0.5 - C4; 0.6 - C5; 0.8 - C6; 0.4 - C7; 0.5 - C8; 0.3 - C9; 0.3 - C10; 0.6 - C11; 0.3 - C12; 0.1 - C13; and -0.1 - C14.

Improvements in art achievement test scores, Table XXXIII, show 20 points improvement made by C1; -5 by C2; 5 - C3; 0 - C4; -25 - C5; 0 - C6; 0 - C7; 10 - C8; 0 - C9; -20 - C10; -30 - C11; 15 - C12; 15 - C13; and -15 - C14.

Improvements in study skills made by controls, Table XXXIV, show 0.4 by C1; 0.8 by C2; 0.3 - C3; 0.5 - C4; -.1 - C5;

TABLE XXXI
MAY STUDY HABITS AND ATTITUDES TEST SCORES

Control	Study Habits			Attitudes			Totals		
	U	N	D	U	N	D	U	N	D
C1	05	13	07	08	24	18	13	37	25
C2	04	17	04	12	20	18	16	37	22
C3	12	08	05	07	27	16	19	35	21
C4	03	18	14	20	28	02	23	46	16
C5	04	13	08	08	30	12	12	43	20
C6	06	13	06	00	35	15	06	48	21
C7	03	12	10	07	24	19	10	36	29
C8	07	11	06	12	28	10	19	39	16
C9	08	08	08	13	25	12	21	33	20
C10	13	12	00	15	17	18	28	29	18
C11	03	14	08	06	15	29	09	29	37
C12	09	10	06	25	11	14	34	21	20
C13	03	12	10	11	09	32	14	21	42
C14	05	15	05	13	26	11	18	41	16

TABLE XXXII
CONTROL ADVANCEMENT ON ACHIEVEMENT TESTS

Control	Stanford Advance	California Advance	Mean
C1	0.1	-.2	-0.1
C2	0.2	0.3	0.3
C3	0.0	0.3	0.2
C4	0.6	0.4	0.5
C5	0.3	0.9	0.6
C6	0.8	0.8	0.8
C7	0.7	0.1	0.4
C8	0.3	0.6	0.5
C9	0.6	0.0	0.3
C10	1.1	0.4	0.3
C11	0.3	0.7	0.6
C12	0.5	0.2	0.3
C13	0.0	0.1	0.1
C14	-.3	0.1	-0.1

TABLE XXXIII
IMPROVEMENT IN ART ACHIEVEMENT TEST SCORES

Control	Design	Background	Technique	Creativity	Total
C1	00	05	00	15	20
C2	10	-5	-10	00	-5
C3	00	-10	05	10	05
C4	00	05	-5	00	00
C5	-5	-5	-5	-10	-25
C6	00	00	-5	05	00
C7	05	-5	00	00	00
C8	-10	-5	10	15	10
C9	-10	-5	05	10	00
C10	00	00	-5	-15	-20
C11	-10	-5	-5	-10	-30
C12	05	00	05	05	15
C13	15	00	00	00	15
C14	-10	00	00	-5	-15

TABLE XXXIV
CONTROL IMPROVEMENT ON STUDY SKILLS

Control	Reference	Graph	Mean
C1	1.2	-.4	0.4
C2	0.7	0.8	0.8
C3	0.5	0.1	0.3
C4	-.1	1.0	0.5
C5	-.1	-.2	-.1
C6	0.4	-.1	-.1
C7	0.5	0.5	0.5
C8	0.3	0.8	0.6
C9	-.5	0.9	0.2
C10	1.1	0.3	0.7
C11	0.8	1.5	0.7
C12	-.2	-.5	-.3
C13	1.1	0.3	0.7
C14	0.7	0.2	0.5

-.1 - C6; 0.5 - C7; 0.6 - C8; 0.2 - C9; 0.7 - C10; 0.7 - C11; -.3 - C12; 0.7 - C13; and 0.5 - C14.

Increase shown by controls in desirable study habits and attitudes is listed in Table XXXV. A -2 was made by C1; -7 by C2; 7 by C3; 11 by C4; -8 by C5; 3 by C6; -5 by C7; -5 by C8; -10 by C9; -2 by C10; -1 by C11; -2 by C12; 10 by C13; and 4 by C14.

Comparison

Comparison between advancement made by paired-learners and advancement made by controls on the Stanford achievement tests, as shown on Table XXXVI, reveals a -.3 to 1.9 advancement by experimental teams over controls.

Comparison of the California test scores, Table XXXVII, shows paired-learners' advancement over all controls from 0.0 to 5.4. S1a shows the greatest advancement of 5.4 and S13a shows the least advancement of 0.0.

Comparisons of the averages of the Stanford and California achievement tests are shown on Table XXXVIII. S1a made an average advancement of 3.7 and S1b - 0.2 for a pair average advancement over controls of 1.8; S2a - 0.9 and S2b - 1.0 for 1.0; S3a - 1.7 and S3b - 2.0 for 1.8; S4a - 0.5 and S4b - 1.4 for 1.0; S5a - 1.6 and S5b - 1.4 for 1.5; S6a - 1.0 and S6b - 0.7 for 0.9; S7a - 0.9 and S7b - 1.0 for 1.0; S8a -

TABLE XXXV
INCREASE IN DESIRABLE STUDY HABITS AND ATTITUDES

Control	Study Skills	Attitudes	Mean
C1	-3	01	-2
C2	-8	01	-7
C3	05	02	07
C4	13	-2	11
C5	-10	02	-8
C6	04	-1	03
C7	-10	05	-5
C8	03	-8	-5
C9	02	-12	-10
C10	-5	03	-2
C11	-1	00	-1
C12	-3	-5	-2
C13	06	04	10
C14	00	04	04

TABLE XXXVI
COMPARISON OF ADVANCEMENT ON STANFORD TEST SCORES

Student	Advance	Control Advance	Comparison	Pair
S1a	2.0	0.1	1.9	1.7
S1b	-0.2		-0.3	
S2a	0.9	0.2	0.7	0.8
S2b	1.0		0.8	
S3a	1.6	0.0	1.6	1.9
S3b	2.1		2.1	
S4a	1.0	0.6	0.4	0.8
S4b	1.8		1.2	
S5a	1.7	0.3	1.4	1.5
S5b	1.9		1.6	
S6a	2.0	0.8	1.2	1.0
S6b	1.6		0.8	
S7a	1.2	0.7	0.5	0.5
S7b	1.1		0.4	
S8a	1.7	0.3	1.4	1.3
S8b	1.1		0.8	
S9a	1.6	0.6	1.0	0.9
S9b	1.4		0.8	
S10a	1.2	1.1	0.1	0.2
S10b	1.4		0.3	
S11a	0.8	0.3	0.5	1.0
S11b	1.7		1.4	
S12a	0.9	0.5	0.4	0.4
S12b	0.8		0.3	
S13a	1.8	0.0	1.8	1.4
S13b	1.0		1.0	
S14a	1.0	-0.3	1.3	1.1
S14b	0.6		0.9	

TABLE XXXVII

COMPARISON OF ADVANCEMENT ON CALIFORNIA TEST SCORES

Student	Advance	Control Advance	Comparison	Pair
S1a	5.2	-0.2	5.4	2.8
S1b	0.0		0.2	
S2a	1.4	0.3	1.1	1.2
S2b	1.5		1.2	
S3a	2.1	0.3	1.8	1.9
S3b	2.3		2.0	
S4a	0.9	0.4	0.5	1.1
S4b	2.0		1.6	
S5a	2.7	0.9	1.8	1.6
S5b	2.2		1.3	
S6a	1.5	0.8	0.7	0.6
S6b	1.4		0.5	
S7a	1.3	0.1	1.2	1.4
S7b	1.7		1.6	
S8a	1.3	0.6	0.7	1.5
S8b	1.8		1.2	
S9a	0.7	0.0	0.7	1.1
S9b	1.5		1.5	
S10a	1.2	0.4	0.8	0.7
S10b	0.9		0.5	
S11a	0.8	0.7	0.1	0.2
S11b	0.9		0.2	
S12a	1.6	0.2	1.4	0.8
S12b	0.4		0.2	
S13a	0.1	0.1	0.0	0.6
S13b	1.3		1.2	
S14a	1.0	0.1	0.9	0.6
S14b	0.4		0.3	

TABLE XXXVIII

COMPARISON OF ADVANCEMENT ON ACHIEVEMENT TEST SCORES

Student	Advance	Control Advance	Comparison	Pair
S1a	3.6	0.1	3.7	1.8
S1b	-0.1		-0.2	
S2a	1.2	0.3	0.9	1.0
S2b	1.3		1.0	
S3a	1.9	0.2	1.7	1.8
S3b	2.2		2.0	
S4a	1.0	0.5	0.5	1.0
S4b	1.9		1.4	
S5a	2.2	0.6	1.6	1.5
S5b	2.0		1.4	
S6a	1.8	0.8	1.0	0.9
S6b	1.5		0.7	
S7a	1.3	0.4	0.9	1.0
S7b	1.4		1.0	
S8a	1.5	0.5	1.0	1.1
S8b	1.6		1.1	
S9a	0.9	0.3	0.6	1.0
S9b	1.6		1.3	
S10a	1.3	0.3	1.0	0.9
S10b	1.1		0.8	
S11a	1.1	0.6	0.5	0.4
S11b	0.9		0.3	
S12a	1.7	0.3	1.4	0.9
S12b	0.6		0.3	
S13a	0.5	0.1	0.4	1.0
S13b	1.6		1.5	
S14a	1.0	-0.1	1.1	0.9
S14b	0.5		0.6	

1.0 and S8b - 1.1 for 1.1; S9a - 0.6 and S9b - 1.3 for 1.0; S10a - 1.0 and S10b - 0.8 for 0.9; S11a - 0.5 and S11b - 0.3 for 0.4; S12a - 1.4 and S12b - 0.3 for 0.9; S13a - 0.4 and S13b - 1.5 for 1.0; and S14a - 1.1 and S14b - 0.6 for 0.9. All paired-learning students advanced except S1b. S1a made the highest advancement by making a three-year, seven-month advance over the control.

Art achievement test scores, Table XXXIX, show advancement in paired-learners of 5 points to 60 points over the controls. In seven cases, the September scores of the control students were higher than those of the paired-learners. Paired-learners improved by the end of the year while the control students showed little or no improvement.

Table XL shows the comparison of study skills test scores. Twenty-three paired-learners showed advancement over controls of 0.2 to 3.9. Three paired-learners showed -1.1 to 0.0 non-advancement.

A comparison of study habits and attitudes, Table XLI, shows an advancement of from 4 to 42 desirable answers by paired-learners over controls. The greatest advancement shown by the paired-learners was in attitudes toward school, study, and teachers. S1a made the greatest advancement on this test as well as on the achievement tests.

Table XLII shows that each paired-learner except S1b

TABLE XXXIX
COMPARISON OF ART ACHIEVEMENT TEST SCORES

Student	Advance over control					Total	Pair
	Design	Background	Technique	Creativity			
S1a	05	00	00	05	10	08	
S1b	00	-5	05	05	05		
S2a	00	05	20	20	45	43	
S2b	00	10	25	05	40		
S3a	20	10	00	05	35	23	
S3b	00	15	00	-5	10		
S4a	10	-5	00	10	15	20	
S4b	10	00	05	10	25		
S5a	10	10	05	30	60	38	
S5b	20	00	15	00	35		
S6a	10	00	20	-5	25	35	
S6b	05	10	25	05	45		
S7a	-5	05	10	20	30	30	
S7b	00	10	15	05	30		
S8a	15	10	-10	05	20	18	
S8b	20	00	-5	00	15		
S9a	35	10	05	-5	35	33	
S9b	10	15	10	-5	30		
S10a	05	05	20	25	55	23	
S10b	-5	00	-5	-5	-15		
S11a	20	05	05	20	50	50	
S11b	20	05	05	20	50		
S12a	05	00	05	00	10	17	
S12b	00	05	15	05	25		
S13a	05	00	15	00	20	25	
S13b	-10	10	15	15	30		
S14a	25	00	05	20	50	43	
S14b	15	05	05	10	35		

TABLE XL
COMPARISON OF STUDY SKILLS TEST SCORES

Student	Advance over control			
	Reference	Graph	Average Skills	Pair
S1a	2.4	2.5	2.5	1.3
S1b	-0.6	0.6	0.0	
S2a	1.3	0.7	1.0	2.5
S2b	3.9	4.2	4.0	
S3a	1.9	1.8	1.9	1.7
S3b	1.3	1.8	1.5	
S4a	1.0	-0.4	0.3	1.3
S4b	3.4	1.0	2.2	
S5a	2.4	0.3	1.4	1.6
S5b	2.3	1.1	1.7	
S6a	2.1	2.9	2.5	1.5
S6b	0.5	0.2	0.4	
S7a	0.5	0.4	0.5	0.7
S7b	1.4	0.3	0.9	
S8a	1.0	0.6	0.8	0.4
S8b	1.0	-0.9	0.1	
S9a	1.6	-0.3	0.7	0.8
S9b	2.0	-0.4	0.8	
S10a	1.5	1.6	1.6	1.1
S10b	-0.2	1.4	0.6	
S11a	2.3	-1.0	0.6	0.0
S11b	-0.5	-1.0	-0.7	
S12a	2.3	2.6	2.5	2.0
S12b	1.7	1.0	1.5	
S13a	-1.2	-1.0	-1.1	-0.4
S13b	0.4	0.0	0.2	
S14a	0.7	0.9	0.8	0.5
S14b	0.4	0.2	0.3	

TABLE XLI

COMPARISON OF STUDY HABITS AND ATTITUDES AFTER EXPERIMENTATION

Student	Advance over control			
	Study Skills	Attitudes	Total	Pair
S1a	13	29	42	26
S1b	06	04	10	
S2a	17	03	20	25
S2b	23	06	29	
S3a	-03	10	07	12
S3b	06	11	17	
S4a	-12	18	06	05
S4b	-01	05	04	
S5a	11	17	28	32
S5b	14	21	35	
S6a	-04	25	21	20
S6b	05	13	18	
S7a	21	13	34	27
S7b	11	08	19	
S8a	00	35	35	37
S8b	05	34	39	
S9a	-02	11	09	20
S9b	03	28	31	
S10a	12	21	33	27
S10b	06	15	21	
S11a	00	29	29	20
S11b	02	09	11	
S12a	05	12	17	17
S12b	-02	18	16	
S13a	-02	20	18	13
S13b	-03	11	08	
S14a	08	02	10	12
S14b	07	06	13	

TABLE XLII

COMPARISON OF INDIVIDUAL ADVANCEMENT MADE ON STANFORD TESTS

Student	1	2	3	4	Advance over previous rate
S1a	6.3	6.4	0.1	2.0	1.9
S1b	5.0	6.2	1.2	-0.2	-1.4
S2a	-	7.0	-	0.9	-
S2b	7.0	7.4	0.4	1.0	0.6
S3a	5.4	6.0	0.6	1.6	1.0
S3b	5.7	5.6	-0.1	2.1	2.2
S4a	3.8	4.7	0.9	1.0	0.1
S4b	3.7	4.8	1.1	1.8	0.7
S5a	3.7	4.5	0.8	1.7	0.9
S5b	4.0	4.6	0.6	1.9	1.3
S6a	4.8	5.4	0.6	2.0	1.4
S6b	5.0	5.3	0.3	1.6	1.3
S7a	3.8	4.7	0.9	1.2	0.3
S7b	4.0	4.5	0.5	1.1	0.6
S8a	5.2	5.9	0.7	1.7	1.0
S8b	4.8	5.4	0.6	1.1	0.5
S9a	4.7	5.1	0.4	1.6	1.2
S9b	4.8	5.0	0.2	1.4	1.2
S10a	3.8	3.9	0.1	1.2	1.1
S10b	3.6	4.1	0.5	1.4	0.9
S11a	4.2	4.9	0.7	0.8	0.1
S11b	3.4	4.3	0.9	1.7	0.8
S12a	4.1	3.5	-0.6	0.9	0.3
S12b	3.1	3.9	0.8	0.8	0.0
S13a	3.5	4.3	0.8	1.8	1.0
S13b	3.0	3.7	0.7	1.0	0.3
S14a	3.2	3.5	0.3	1.0	0.7
S14b	3.5	3.9	0.4	0.6	0.2

1 - Fourth-grade score; 2 - Fifth-grade score; 3 - Advance made in fifth-grade; 4 - Advance made in sixth-grade

advanced over his previous rate of advancement on the Stanford achievement tests. Individual paired-learner advancement ranged from 0.1 to 2.2 or ~~one~~-month to two years and two months advancement over their previous rate.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to investigate paired-learning and its improvement of achievement, study-skills, and attitudes.

To accomplish this aim, it was necessary: (1) to survey literature on paired-learning and related fields; (2) to plan for a paired-learning experiment in an elementary school classroom; (3) to select criteria for pairing procedures; (4) to select paired-learners; (6) to select controls; (7) to select and construct tests to measure achievement in the sixth-grade school year; (8) to give tests at the beginning of the school year on academic achievement, study-skills, and attitudes; (9) to carry out the paired-learning experiment in an elementary school classroom; (10) to test the results of the experiment; and (11) to compare experimental results with controls.

In September of the 1968-1969 school year, tests were given in scholastic achievement, art achievement, study skills, study habits, and attitudes. Data obtained from these tests were transcribed and used in the pairing of students and in the selection of control students.

The paired-learning situation was organized and conducted

in a self-contained sixth-grade classroom. Paired-learning was used in all subjects except music. Music was taught by band and chorus teachers.

In May 1969, the last month of the school year, tests were again given in scholastic achievement, art achievement, study skills, study habits, and attitudes. Data obtained from these tests were compared with data from the September tests. This comparison revealed the amount of advancement or the amount of non-advancement obtained by each paired-learner and by each control during the sixth-grade school year. The amount of advancement or non-advancement of the paired-learner was then compared with that of the control.

Conclusions

From comparisons, the following conclusions were made in relation to the experimental group:

1. Ninety-six percent of the paired-learners improved more than the controls on the Stanford Achievement Test scores.
2. One-hundred percent of the paired-learners improved more than the controls on the California Achievement Test scores.
3. Ninety-six percent of the paired-learners improved more than the controls in average of achievement scores.
4. One-hundred percent of the paired-learners improved more than the controls in art achievement test scores.

5. Eighty-nine percent of the paired-learners improved more than controls in study skills.

6. One-hundred percent of the paired-learners improved more than the controls in the average test score of study habits and attitudes.

7. Paired-learners showed improvement in attitudes over their previous test scores.

8. Ninety-six percent of the paired-learners improved in their individual achievement rate when compared with their grade-four to grade-five rate.

Recommendations

Few people have done research on paired-learning in the elementary schools. Therefore, the following recommendations are made:

1. Organize the paired-learning situation carefully, following procedures given in this study.

2. Further experimentation should be conducted in a variety of elementary classrooms in a variety of grade levels.

3. Experimentation could be conducted in the junior high school or high school level.

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APPENDIX

APPENDIX A
LETTER SENT TO FORTY-TWO PARENTS

Dear _____:

A study will be conducted in several sixth-grade classrooms during the 1968-1969 school year in the Temple Public School District to gain knowledge of an effective way for children to learn.

Your child, _____, has been selected to take part in this study. The students will be given several written tests in school during September and again in May. Your child will also be interviewed briefly in May by the teacher doing the study.

Your permission for your child to take part in the study will be greatly appreciated.

Sincerely,

Loretta Sears
Emerson School

Please sign appropriate blank:

I grant permission for my child to take part in the study.

_____.

I deny permission for my child to take part in the study.

_____.

We plan to move during the school year so therefore, my child cannot take part in the study. _____.

APPENDIX B

SURVEY OF STUDY HABITS AND ATTITUDES

DIRECTIONS:

MARK N FOR ALMOST NONE; O FOR OFTEN; AND A FOR ALMOST ALWAYS. REMEMBER, MARK WHAT YOU DO AND NOT AS YOU THINK YOU SHOULD DO OR FEEL OR WHAT YOU THINK OTHERS MIGHT DO.

THERE ARE 75 QUESTIONS. THERE IS NO TIME LIMIT. READ AND MARK CAREFULLY.

1. I feel that teachers do not understand student's problems.
2. My dislike for one teacher causes me not to do my work.
3. I feel that I would study harder if I could choose the subjects that I like.
4. Whether I like a subject or not, I still work hard to make a good grade.
5. When my homework is long or hard, I either quit or hurry through the work, studying only the easy parts of the lesson.
6. When making reports or writing a story, I make sure that I understand what is wanted before I begin work.
7. I have trouble choosing the right words and this slows me down when writing.
8. I feel teachers give better grades to people they like.
9. My teachers criticize my written reports as being written too fast and poorly organized.
10. I lose interest in my studies after the first few days.
11. I memorize rules without really understanding them.
12. I give special attention to neatness on work I turn in.
13. I take it easy and let my homework pile up until the last minute.
14. I hesitate to ask the teacher to explain an assignment that is not clear to me.
15. Lack of interest in school work makes it difficult for me to keep my attention on assignments.

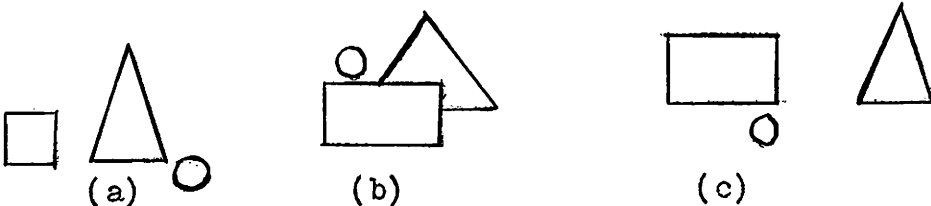
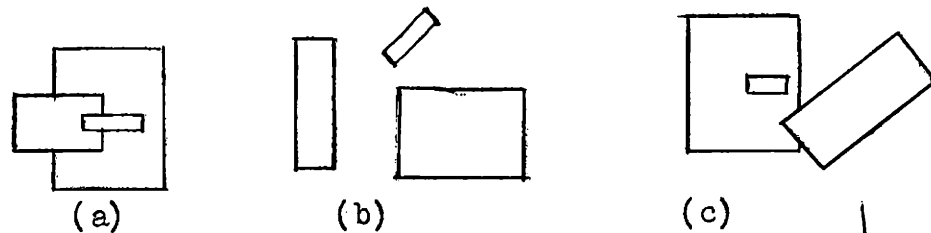
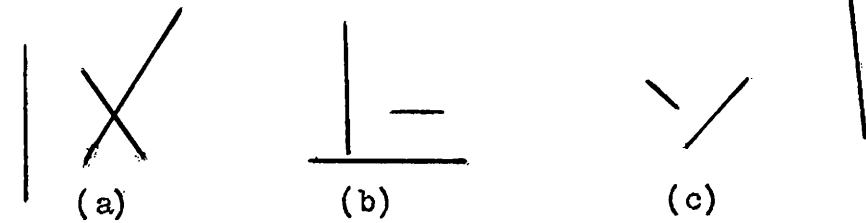
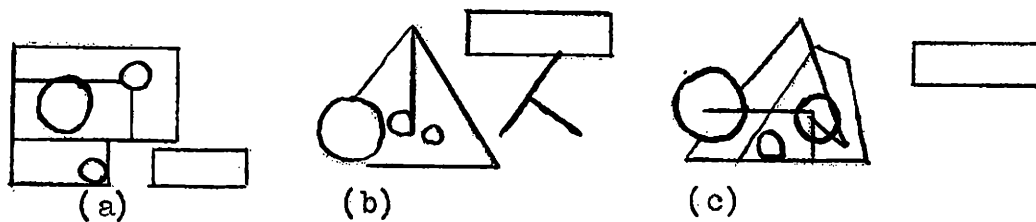
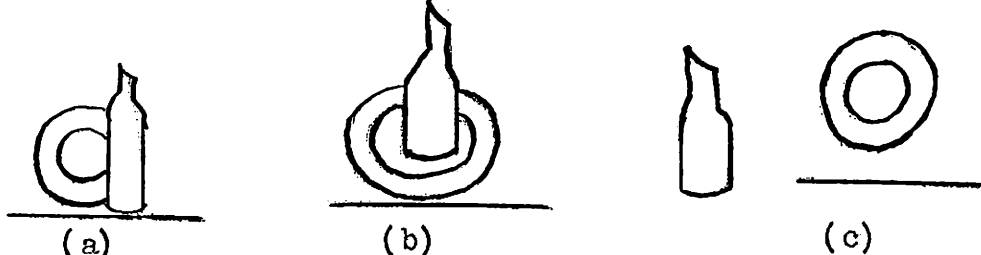
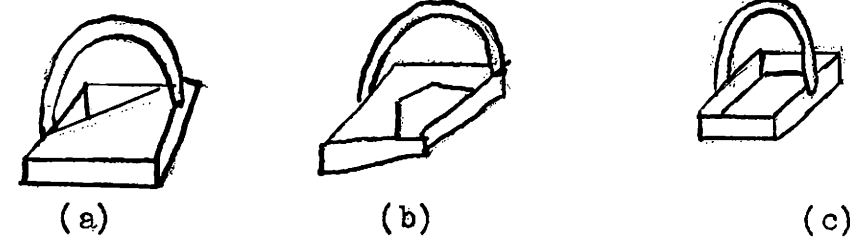
16. Unless I really like a subject, I believe in doing only enough to get a passing grade.
17. I get nervous and confused when taking a test and fail to answer questions as well as I could.
18. I have trouble with writing correct English.
19. When I get behind in my school work when ill, I make up my assignments without the teacher or my parents telling me to.
20. I feel confused and undecided as to what my goal in life should be.
21. Some of my subjects are so boring that I have to "force" myself to do the assignments.
22. When I am under pressure, my work is not as good.
23. Daydreaming distracts my attention when studying.
24. I believe that having a good time is just as important as studying.
25. Even though an assignment is dull and boring, I stick to it until it is completed.
26. In taking notes, I tend to take down what later turns out to be unimportant.
27. In taking class notes, I try to copy down the teacher's exact words as closely as possible.
28. I keep all notes and papers for each subject together and arrange them in order.
29. When I am having trouble with my school work, I try to talk it over with the teacher.
30. I feel my grades show what I can do.
31. I feel it is a waste of money to get an education.
32. I have trouble getting thoughts together in a short time; so I do poorly on tests.
33. Some of my subjects are so boring that I spend the class period drawing pictures or daydreaming instead of listening.

34. I don't correct my papers.
35. I keep my desk cleared of all unnecessary things when I study.
36. People coming in and out of the room bother me when I study.
37. It takes me a long time to begin to study.
38. I sometimes sulk and will not talk in class.
39. I put writing reports off until the last minute.
40. I feel I am taking subjects that are of no use to me.
41. When I sit down to study I find myself too tired, bored, or sleepy to study hard.
42. I try to be interested in all subjects.
43. I go to school only because my friends are there.
44. I think it would be nice to drop out of school and get a job.
45. I carefully study the pictures and tables in reading an assignment.
46. Reading or studying a long time gives me a headache.
47. After reading several pages, I can not remember what I have just read.
48. I stay away from school whenever there is something I would rather do and tell my parents I am ill.
49. I waste too much time to study.
50. I don't plan my study.
51. Playing makes me get behind on my school work.
52. I study before class and during noon.
53. Worries outside of school cause me not to do my school work.
54. I am on time with written work.
55. I have trouble picking out important parts of books.

56. I like to follow an example when writing a paper.
57. I like to have the radio or T.V. on when I do homework.
58. When reading, I stop often to review the main facts.
59. It takes a long time to get any work done.
60. I like to sit in the rear of the class.
61. I have to be in the right mood to study.
62. I study at least two hours at home each night.
63. I set up a plan as to how much I will get done.
64. I can concentrate on reading for only a short time before the words become a meaningless jumble.
65. Noises bother me when I study.
66. I copy drawings the teacher puts on the board.
67. I do my homework every day even if I will not have to turn it in.
68. I like to study my lessons alone rather than with others.
69. I lose points on true-false or multiple-choice tests because I change my answers which were right the first time.
70. When studying for a test I put facts in order.
71. I am careless with spelling and English when taking a test.
72. Although I work until the last minute, I am unable to finish a test in time.
73. When there is time I check over my work.
74. When I get tests or homework back, I find my grade was lower because of careless mistakes.
75. I think that questions such as these are silly and of no use to anyone.

APPENDIX C
ART ACHIEVEMENT TEST

I. Which of the following looks better? Circle it.

1. 
 - (a)
 - (b)
 - (c)
2. 
 - (a)
 - (b)
 - (c)
3. 
 - (a)
 - (b)
 - (c)
4. 
 - (a)
 - (b)
 - (c)
5. 
 - (a)
 - (b)
 - (c)
6. 
 - (a)
 - (b)
 - (c)

7. Which are the three primary colors?

(a) yellow, purple, green

(b) red, yellow, blue

(c) white, orange, black

8. _____ is my favorite artist.

9.



reminds me of (what?) _____

10.



reminds me of _____

11.



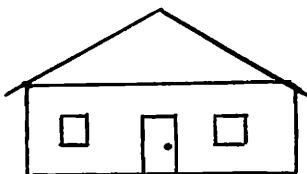
reminds me of _____

12.



reminds me of _____

13. Draw the right side of the house.



14. Draw a book.

15. Draw a tree.

16. Draw a face.

17. Draw a hand.

18. Draw an animal.

19. Draw happiness.

20. Draw sadness.

APPENDIX D
LEARNING GUIDE - GRADE SIX

This booklet gives a list of things we will study in the sixth grade this year. You will probably not understand all the words in this booklet at first, but don't worry about this. We will learn all of it by the end of the year.

When we have studied something that is listed in this booklet and you think you have learned it very well, you may check it off your list. In this way you can keep track of what you have learned. You will also be able to see how much you still need to learn.

The list is as follows:

Language

I. Written Language Abilities and Skills

A. Sentence Sense and Structure Skills

1. Complete sentences
2. Kinds of sentences
3. Order in sentences
4. Parts of sentences
5. Combining sentences
6. Proofreading
7. Punctuation

B. Paragraph Skills

1. Paragraph sense
2. Order in paragraphs

3. Relation of ideas in and among paragraphs
4. Topic sentences
5. Relation to outline

C. Capitalization Skills

1. Capitals in names and words
2. Capitals in sentences
3. Capitals in outlines
4. Capitals in letter writing
5. Capitals in poetry
6. Capitals in quotations
7. Capitals in titles of stories
8. Capitals in labels

D. Punctuation Skills

1. Period
2. Comma
3. Question mark
4. Exclamation mark
5. Hyphen
6. Apostrophe
7. Quotation marks
8. Colon
9. Underline
10. Dash

E. Skill in Usage of Words

F. Communication Skills

1. Writing a friendly letter
2. Writing a business letter
3. Writing a report
4. Writing title labels, sentence, and sign cards
5. Writing an invitation
6. Writing an outline
7. Writing the minutes of a club meeting
8. Writing a thank-you letter
9. Writing a letter of acceptance
10. Writing a letter of regret
11. Taking notes
12. Writing a bibliography

G. Creative Expression

1. Writing a book report
2. Writing an original poem
3. Writing a report of the weather
4. Writing a paragraph
5. Writing a story
6. Writing a script for a play
7. Writing an editorial
8. Writing a news story
9. Writing a headline for a news story
10. Writing a personal-experience story

H. Vocabulary and Diction Skills

1. Interest in power of words

2. Development of meaning vocabulary
3. Refinement of meaning
4. Spelling

II. Oral Language Abilities and Skills

A. Communication Skills

1. Participating courteously in conversation
2. Participating in group planning
3. Giving book reports
4. Reading poems aloud
5. Conducting group meetings
6. Following parliamentary procedure
7. Conducting an interview
8. Telephoning
9. Telling a fable or story
10. Giving a short talk
11. Offering and accepting suggestions
12. Setting group standards

B. Articulation Skills

1. Speaking distinctly
2. Using accent marks

III. Oral and Written Language Abilities

A. Nouns

1. Common and proper
2. Number in nouns
3. How to form plurals of nouns
4. Possessive nouns

- B. Pronouns
- C. Verbs
 - 1. Action, being, or state of being
 - 2. Verb phrases
 - 3. Making verbs agree with subjects
- D. Adjectives
 - 1. Predicate adjectives
 - 2. Prepositional phrases
 - 3. Comparison of adjectives used
- E. Adverbs
- F. Prepositions
- G. Conjunctions
- H. Interjections

Social Studies

- I. Skills
 - A. Skill in Use and Application of Maps and Globes
 - B. Skill in Use of Text and References
 - 1. Content
 - 2. Index
 - 3. Appendix
 - 4. Illustrations
 - 5. Vocabulary
 - 6. Guide words
 - 7. Essential facts
 - 8. Comprehension and summarization of facts
 - 9. Outlining and reporting

II. Knowledge and Understanding of Social Relations

- A. Leadership
- B. Patriotism
- C. Citizenship
- D. Intergroup and Intragroup Relations
- E. International Relations

Spelling

- I. Spell Words on Basic List in Text
- II. Understanding of Root Words, Prefixes, Suffixes, Plurals, and Abbreviations

Handwriting

- I. Development of Handwriting Vocabulary
- III. Use of Correct Chalkboard Position
- III. Use of Desk Position
- IV. Learn Correct Movement, Rhythm, and Alignment
- V. Learn Correct Letter Forms
- VI. Write Legibly

Reading

- I. Basal Reading Skills
 - A. Understanding Stories and other Selections
 - B. Figure out Pronunciation of New Words
 - C. Figure out Meanings of New Words in the Context
- II. Study-Reading Skills
 - A. Skill in Locating Information
 - B. Understand What is Read
 - C. Skill in Using Information

- D. Ability to Remember What is Read
- III. Recreational Reading
- IV. Oral Reading
- V. Word Analysis
 - A. Recognize Vowel Sounds
 - B. Recognize the Consonant Sound
 - C. Understand Consonant Digraphs and Blends
 - D. Understand Vowels

Math

- I. Place Value and Number Bases
 - A. Understand What is Place Value
 - B. Reading and Writing Large Numbers
 - C. Inequalities
 - D. Exponent
 - E. Rounding off Large Numbers
 - F. Expanded Notation
- II. Whole Numbers
- III. Computing
 - A. Review of Addition, Subtraction, and Multiplication
 - B. Estimation
 - C. Short Division
 - D. Averages
- IV. Number Theory
 - A. Factors
 - B. Multiples
 - C. Prime Numbers

- D. Greatest Common Factor
- E. Least Common Multiple
- V. Fractions and Rational Numbers
 - A. Factors and Number Pairs
 - B. Improper Fractions
 - C. Equal Fractions
 - D. Lowest Terms
 - E. Changing from Fractions to Numbers
- VI. Addition and Subtraction of Rational Numbers
 - A. Number Line
 - B. Mixed Numbers
 - C. Addition and Subtraction with Decimals
- VII. Multiplication and Division of Rational Numbers
 - A. Number line Games
 - B. Multiplication and Division with Decimals
- VIII. Geometry
 - A. Congruent Segments, Angles, and Triangles
 - B. Parallel Lines
 - C. Construction
- IX. Ratio
 - A. Using Ratio to Compare Sets
 - B. Using Ratio in Measurement
- X. Decimals
 - A. Decimals and Place Value
 - B. Inequalities with Decimals
 - C. Addition and Subtraction of Decimals

D. Multiplication and Division with Decimals

XI. Percent

A. Percent and Ratio

B. Percent in Equalities

XII. Integers

XIII. Graphing

A. Graphs of Numbers on the Number Line

B. Establishing the Coordinate System

C. Graphing Points on a Plane

D. Graphing Functions

E. Line Graphs

XIV. Measurement

A. Length and Perimeter

B. Area and Surface Area

C. Volume

D. Angle Measurement

E. Sums of Angle Measurement

F. Scale Drawing

G. Area of Triangles

H. Pythagorean Theory

I. The Metric System

J. Circumference of a Circle

K. Area of a Circle

Art

I. Appreciation of Art

A. Art Vocabulary

- B. Ancient Art
- C. Myths and Legends in Art
- D. Modern Art

II. Knowledge of Color

- A. Primary Colors
- B. Mixing Primary Colors to form New Colors

III. Knowledge of Technique

- A. Line and Form
- B. Perspective
- C. Showing Movement

IV. Working in Different Media

- A. Pencil
- B. Pen and Ink
- C. Wire Sculpture
- D. Papier-mache
- E. Wood-mache
- F. Water Color
- G. Tempera
- H. Paper and String Sculpture
- I. Printing
- J. Weaving
- K. Knitting

Physical Education

I. President's Fitness Test

- A. Test at Beginning of the Year
- B. Test at End of the Year

II. Exercise

III. Knowledge of Games and Rules

A. Football

B. Soft Ball

C. Dodge Ball

D. Volley Ball

E. Basketball

APPENDIX E

TEXT BOOKS AND SUPPLEMENTARY BOOKS USED IN THE SIXTH-GRADE EXPERIMENTAL CLASSROOM

Basic Spelling Keys, J. B. Lippincott Company.

Better Handwriting for You, Noble and Noble.

Beyond the Horizon, Bobbs-Merrill, Inc.

Bright Peaks, Houghton Mifflin.

Choosing Your Goals, Lyons and Carnahan.

Cavalcades, Scott-Foresmann.

Health 6, Laidlaw Brothers.

Heart of the Wild, The Steck Company.

You and Others, Scott-Foresmann.

Young Artists, Charles E. Merrill, Inc.

Language for Daily Use, World Book Company.

Math Workshop for Children, Encyclopaedia Britannica, Inc.

Modern Mathematics, American Book Company.

Old World Lands, Silver Burdett Company.

Old World Past, The Steck Company.

Our Language Today, American Book Company.

Practice for Arithmetic, Laidlaw Brothers.

Seven Seas, Harper and Row.

Thorndike Burnhart Dictionary, Scott-Foresmann.

Today's Basic Science, Harper and Row.

APPENDIX F

WEEKLY SELF-EVALUATION SHEET

WHEN DID I WASTE TIME	WHEN DID I USE TIME WISELY	WHAT THINGS DID I LEARN	WHAT THINGS DID I NOT UNDERSTAND	SCORES
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MON.

TUES

WED

THURS

FRI

APPENDIX G

WEEKLY TEAM EVALUATION SHEET

WHEN DID PARTNER WASTE TIME	WHEN DID PARTNER USE TIME WISELY	TESTS AND GAMES USED	PARTNER'S SCORES
MON			
TUES			
WED			
THURS			
FRI			

APPENDIX H
THE TEACHERS ROLE

- I. ACT AS A GUIDE
 - A. Guide planning so that there is a division of responsibility.
 - B. Guide individual children in developing good work habits.
 - C. Guide selection of activities so that every child will get a variety of experiences.
 - D. Guide in setting up standards in each team.
 - E. Guide in setting up goals or objectives.
 - F. Guide in maintaining direction and program.
 - G. Guide children in developing self-evaluation.
- II. ACT AS A CONSULTANT OR ADVISOR
 - A. Meet with pairs to plan future projects.
 - B. Help in the details of planning.
 - C. Act as clearing house for conflicting opinions.
 - D. Recommend units to be considered.
 - E. Suggest new activities.
 - F. Advise as to sources of research materials and varieties of materials.
- III. ACT AS A MODERATOR
 - A. Help establish rapport within the team.
 - B. Keep one member from dominating the situation.
 - C. Circulate among the teams.
 - D. Anticipate and prevent sources of friction.
 - E. Arbitrate intragroup and intergroup difficulties.
 - F. Be an observer of the team and individual reactions.

IV. ACT AS A COORDINATOR AMONG THE TEAM

- A. Coordinate the efforts and activities among the various teams.
- B. Help summarize for mutual understanding the findings of the teams.
- C. Coordinate the work of each child so that he will attain optimum growth.

V. ACT AS SUPERVISOR

- A. Move from team to team making suggestions, but do not boss.
- B. Be aware of what each child is doing and minimize any waste of time that may be evident.
- C. Observe children for correction of poor work habits.
- D. Observe children for problems or individual difficulties.
- E. Ascertain pupil's interests, needs, and abilities.
- F. Motivate, inspire, and stimulate.
- G. Encourage all children to take part in activities.

VI. ACT AS HELPER FOR THE TEAM

- A. Supply materials fitted to the respective levels and problems of the team.
- B. Suggest references.
- C. Have material available when needed.
- D. Adapt material from many sources to the needs, interest, abilities, and capacities of the team.
- E. Aid in locating information.
- F. Encourage slow or shy children.
- G. Give individual help as needed.
- H. Offer further suggestions for further study.
- I. Help students in research and recording.

- J. Assist in setting up problems, procedures, and routines.
- K. Suggest a number of procedures from which a choice may be made.
- L. Help children to evaluate the team's work and their own achievements.
- M. Suggest next steps and broad implications and applications.

VII. ACT AS AN INSTRUCTOR

- A. Teach skills and techniques.
- B. Define words and concepts.

VIII. ACT AS AN EVALUATOR

IX. ACT AS A DIRECTOR OR LEADER

- A. Initiate an activity.
- B. Provide first-hand and vicarious experiences.
- C. Direct team thinking by use of leading questions.
- D. Present material to be studied.
- E. Plan group work.
- F. Supplement group reports for general class consumption.
- G. Prepare guide sheets with thought questions or major topics for each group.