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An Experimental Study of the Effect of Library Facilities and Instruction on Work-Study Skills of Fourth Grade Students

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AN EXPERIMENTAL STUDY
OF THE EFFECT OF LIBRARY FACILITIES AND INSTRUCTION
ON WORK-STUDY SKILLS OF FOURTH GRADE STUDENTS

A Thesis
Presented to
the Graduate Faculty
Central Washington College of Education

In Partial Fulfillment
of the Requirements for the Degree
Master of Education

by
Jessie Marilyn Wilkinson

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APPROVED FOR THE GRADUATE FACULTY

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Lillian Bloomer

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CHAPTER I

INTRODUCTION

I. THE PROBLEM

Statement of the problem. The primary purpose of the study is to determine the effectiveness of a method of teaching the work-study skills to fourth grade students by the school librarian in the library.

A second purpose of the investigation is to determine whether resulting growth will be more significant in some work-study skills than in others.

A third purpose of the study is to indicate any significant growth in general achievement of the fourth grade students through the influence of library facilities and instruction.

The researcher believed that significant growth in the work-study skills would be produced through library instruction. It was expected that more growth would be found in some skills than in others. No significant growth was expected in the general achievement of the fourth grade students.

Importance of the study. In answer to a child's query concerning the meaning of some word or the explanation of some

natural phenomenon, the teacher or parent frequently directs the child to seek the information in a dictionary or in the library. The answer is simple enough, and the task, too, if the student possesses adequate skill and understanding to utilize those reference tools to satisfy his immediate need. Young minds are always full of questions and problems to solve, and upon reaching the intermediate grade level students actually need little encouragement to "look it up" themselves. The encouragement is needed most throughout the developmental process of becoming proficient in location skills. But will students be given the opportunity to understand the use of these learning tools?

Will the student be given comprehensive instruction in the use of the location skills or will the knowledge of how to use these skills be left to incidental training? Will the bright student be motivated to his utmost capacity in the use of work-study skills or will he be left unchallenged? Will the retarded reader find the reference material within a small selection of books too difficult to master and be left perplexed?

This investigation was an attempt to determine if the work-study skills could be taught successfully by the librarian during library periods, and, if so, if library instruction would be more advantageous in dealing with some skills than with others. If this method of teaching work-study skills were proven successful, then perhaps it would be

advisable to include the work-study skills or part of them in a regular course of library instruction.

Definition of work-study skills. Within the scope of this study, work-study skills are identified as those reading skills involved in locating information. In more specific terms, the work-study skills in major consideration and emphases in this experiment are those involved in the use of references, dictionaries, indexes, and alphabetization.

II. SURVEY OF RELATED LITERATURE

Much literature and research is evident in the broad area of reading skills. Some of the material is specifically concerned with reading location skills. As a result of their research, writers have expressed the need of students for a proficient use of those skills, and have emphasized that the foundation in the use of the skills must be laid in the elementary grades. However, no evidence of statistical studies of the location skills was revealed within available literature.

Using available literature, an attempt was made to establish the need for a mastery of location skills, to indicate the role of the librarian and the teacher in cooperative presentation of the skills, and to present the school library as the laboratory in which the richest

results could be produced.

Need of the student.

A survey of the vast literature relating to the field of reading reveals that there are fundamentally two points of view with regard to the nature of the reading process. There is, first, the view that reading is a simple process involving few skills which are relatively simple in type. The second view, supported by such psychologists as Gates, is represented by the theory that reading is a complex process which may be analyzed in terms of a large number of reading skills or abilities.¹

Burkart's study represented a systematic attempt to classify those abilities and to weigh the relative importance of each in the reading process. She made a thorough survey of educational and psychological literatures for the purpose of obtaining a list of all skills and abilities which reading specialists believed to be involved in the reading process. This survey brought to light a total list of 214 abilities, eighty-nine of which were organized in form of a questionnaire, and rated by forty reading specialists. In one table the resulting data was classified under six headings--one of which was Research Abilities. The six headings were divided into a number of major abilities and those major abilities put into rank order. Of the eighteen major abilities considered and ranked, the ability to locate data was included, and given the rank order of twelve.²

¹Kathryn Harriett Burkart, "An Analysis of Reading Abilities," The Journal of Educational Research 38:430, February, 1945.

²Ibid., pp. 433-435.

Within the scope of this experimental study the rank order or relative importance of the ability to locate data in comparison with other reading abilities is not the important issue. The point is, reading is a complex process involving many specific skills and before the student can become a proficient and competent reader, each skill must be presented, comprehended, and fused into the total reading program. Mastering the location skills is only one step, but a step recognized by experts as important in the developmental growth of a successful reader and scholar.

Researchers indicate that skills acquired in the elementary school are not always sufficient to enable the pupil to master subject matter in high school or to achieve academic success on the college level. At the present time, the social studies subject area tends to be built around units of work which involve a wide and extensive use of reference and supplementary materials.

In agreement with Hurst, ". . . wide source material should be an everyday experience and not a special kind of exercise."³

She reported:

Furthermore, many studies having to do with high school enrolments show that the greatest losses occur in the first year. This writer is inclined to believe too much of the reading instruction at the early high school level is confined

³Fannie C. Hurst, "Bridging the Gap Between Elementary and High School Reading and Study Skills," School Review, 59:534, December, 1951.

to the mastery of complex organization of literature. The skills acquired in elementary school are not sufficient to meet this demand.

.
 Among the deficiencies the writer has found most often in the reading of college Freshmen are failure to verify facts in supplementary sources, and inability to locate materials independently. . . .⁴

Dr. Hunnicutt, Director of the Syracuse University

Reading Laboratory, reported:

A large number of students having trouble in maintaining adequate level of academic success reveal normal ability in those aspects of reading measured by most standard tests but they are apparently deficient in other necessary skills. Moreover, even students who are sufficiently successful academically to graduate from high school often operate with very low portion of their potential efficiency.⁵

The Syracuse University Reading Laboratory yearly serves more than one thousand university students who come for help in raising their general levels of academic ability. Most of them have distinct difficulty in some course. Hunnicutt stated:

. . . Every⁶ study skill taught there at college level has roots reaching down through secondary and into elementary school. Each can and should be a part of the developing learning of all children. Each area of skill includes aspects and experiences appropriate to various

⁴Ibid., p. 535.

⁵C. W. Hunnicutt, "Study Skills Start Early," Education 68:620, June, 1948.

⁶Italics of the original author.

sequential stages of schooling. At each successive age level, the preceding experiences and skills can become the foundation for further building.

The fact that study skills must be taught at college level is not an indictment of preceding teaching. Many aspects are appropriate only in college. But it is also true that many of the specific skills now necessarily taught there could be learned earlier. Many efficient learning practices could become habitual at a younger age and increase student success all along the line.

One important area of skill is the effective use of references. This work is begun not later than primary grades. Table of contents, picture dictionary, and in some cases the index of a book are typical reference tools to be mastered. . . . But even more important than the mechanical skills are the attitudes and points of view to be developed. The habit of searching for facts to support or disprove a belief, the realization that more than one source of information may be relevant, the knowledge that people are expected to gain information by themselves through appropriate search, and above all that such activities can be fun--all these are fundamental. . . .

During intermediate and on through secondary level this skill grows in scope and strength. Children add new tools and gain greater skill in the use of familiar ones. . . . Scope of library usage grows even more spectacularly.

.
By mastering the tasks appropriate to each stage of his development, he the student has achieved mature competence.⁷

Often instruction in the location skills is left to incidental training with no definite aim other than immediate use and no specific practice other than a few lessons in a textbook. Perhaps definite instruction and practice in the location skills are included in the

⁷Ibid., pp. 620-21.

yearly program but confined to a knowledge of the skills without practical application. Or, perhaps these skills or part of them are taught in the library but in isolated lessons with no relation to classroom activities or student interest. Then again, perhaps instruction and practice are presented in sequential steps in relation to current activities and all the necessary reference tools utilized with understanding to accomplish meaningful experiences.

This experimental study was conducted with the latter procedure in mind using the library and librarian as means to accomplish the end results.

Role of the librarian.

A new concept of the role of the librarian is prevalent in most schools today, largely because the librarian has proven her competence in planning with teachers. She participates with teacher planning groups in curriculum development, not because she is a 'materials person' but because she knows children and how they learn, and understands curriculum problems. She participates in the developmental reading program. She helps in teaching the skills required for effective reading and thinking. If one accepts the idea that next to the teacher the materials of instruction are the most influential factor in the learning of youth, then it seems fair to assume that the modern librarian, with her knowledge of teaching methods and her knowledge and skill in the materials, becomes a 'helping teacher' in the best sense of the word.⁸

⁸Florence Damon Cleary, "Changing Libraries for Changing Schools," Wilson Library Bulletin, 29:608, April, 1955.

Hartz, an elementary librarian, commented:

The school librarian, whether in secondary or elementary education, must be more than a mere keeper of books. He or she must keep in mind . . . three major objectives which could readily serve as guiding statements to anyone in the teaching profession:

1. To encourage social attitudes and provide experiences in social and democratic living.
2. To develop in children skill and resourcefulness in their use of books and libraries and to encourage the habit of personal investigation.
3. To work cooperatively and constructively with instructional and administrative staffs of the school.⁹

Cleary stated:

For many years teaching the use of books and libraries has been a major responsibility of the school librarian. Instruction has tended to center on finding information through the use of library tools. The lack of achievement of pupils in tests of work-study skills and the 'copy-word-for-word' type of reference work done by high school pupils in the library have led teachers and librarians to re-evaluate their teaching of work-study skills and the use of books and libraries. Increasingly it has become a joint endeavor with the librarian and the teachers of the content subjects planning together, with the teacher assuming the initiative in teaching the skills and the librarian giving follow-up instruction to pupils in the library.¹⁰

⁹Frederic R. Hartz, "Establishing the Elementary School Library," Wilson Library Bulletin, 30:631, April, 1956.

¹⁰Cleary, op. cit.

Dr. Rogers emphasized that, "The size of the school system is not a factor in providing personnel for the library. Every child regardless of his location should have access to a well stocked school library, directed by a trained teacher-librarian."¹¹ He continued to say that the teacher-librarian could be a key person in the improvement of teaching if she were in on educational planning from the "ground up." Such a librarian would not only help enrich the classroom teaching but would serve to advance the whole program of curriculum improvement.¹²

Role of the teacher.

To a great degree, it is the teacher who provides the purpose for which the printed material will be used. The library can fulfill many purposes, or it can fulfill few. The effectiveness of any school library can partly be gauged by the nature of purposes it serves.¹³

Bowman, a high school librarian, commented:

. . . administrators and teachers do not really consider the school library as an important adjunct to education. They do not know the techniques for implementing their fine philosophy regarding the library's purpose or function, nor do they find time to familiarize themselves with the books, pamphlets, and periodicals which could be used to advantage

¹¹Virgil M. Rogers, "Personnel and Services of the School Library," Wilson Library Bulletin, 29:228, November, 1954.

¹²Ibid., pp. 228-29.

¹³Helen O. Bowman, "Reading Skills and the School Library," Wilson Library Bulletin, 27:732, May, 1953.

in their own subject areas. Too frequently emphasis is in the wrong place--let's have all the seats in the library filled, never mind what fills the head.¹⁴

Some children are reading a great deal, Bowman continued, but too many who need books are not being reached. Some books are getting hard usage but the students are not becoming aware of the possibilities of books. Bright students are getting by with a minimum of effort. They are not being guided into widest use of library tools and materials and are not learning upper level comprehension skills such as locating information.¹⁵

Brown, another high school librarian, stated that:

Both teachers and educators have said that practical instruction in using the school library as a resource tool in teaching should be a part of every teacher training course. There are indications that this will be fact before too many years. But meanwhile what?¹⁶

Teachers are busy individuals and if they have not acquired the library habit the thought of seeking aid through library facilities seems more of a task than a means to share and lighten the instructional load. In that case, the extent to which the library will be used will depend largely upon the attitude and resourcefulness or the salesmanship of the librarian.

¹⁴Ibid., p. 732.

¹⁵Ibid., p. 732.

¹⁶Elizabeth Brown, "Library Use Is An Attitude," Wilson Library Bulletin, 27:734, May, 1953.

Most language texts have a chapter or at least a few lessons devoted to a discussion and practice in the work-study skills. However, the lessons often give practice only in isolated location skills and do not outline a definite procedure or offer follow-up practice in the location tools themselves. If the teacher is not familiar with the location tools and their use, or does not recognize their value in the learning process, then perhaps within the crowded classroom program instruction in the work-study skills will not be emphasized and limited only to textbook lessons and incidental learning.

McKee suggested:

A careful analysis of the correct use of each of the seven printed parts of an ordinary book, of each special aid, and of each specialized source will clarify the teacher's instructional task by identifying the specific understandings, skills, and attitudes which the pupil must have in order to use those tools effectively for locating information on a given topic or question.¹⁷

In view of all the facts discussed so far in this study, the logical answer to insure effective teaching of the work-study skills is cooperative planning and sharing in the instruction by the classroom teacher and the school librarian.

Value of the elementary school library. The library has been long accepted as a feature of significance in secondary and

¹⁷Paul McKee, The Teaching of Reading in the Elementary School (New York: Houghton Mifflin Company, 1948), p. 427.

collegiate education. But in the "little red schoolhouse" of years ago, there was little need for an outside resource center--the school library. The traditional school was primarily concerned with teaching the "three R's" and maintained a strict adherence to the textbook. Today the scene has changed. The modern curriculum is broad in scope and ever changing with an integrated program involving many dynamic and social activities. Current literature--reports, talks, articles--indicate that educators recognize the school library as a prominent feature in elementary education. The textbook still plays an important role in the classroom, but in addition, there is an immediate and increasing demand for a wide variety of resource and supplementary materials.

Dr. Rogers, Dean of the School of Education of Syracuse University, commented:

The school library as a service center becomes the vital hub of the instructional program. A school library cannot change the philosophy and outlook of a school system; however, when it is efficiently set up, adequately financed, and skillfully manned by a trained school library staff, it becomes integrated with the school's philosophy of education and carries with it a powerful impact and influence on the betterment of classroom teaching. It can make the difference between a mediocre and outstanding school system.¹⁸

¹⁸Rogers, op. cit.

"The modern reading program and the school library-- you can't have one without the other,"¹⁹ was the theme of a recent conference of the Association for Supervision and Curriculum Development.

Though the cost of a library program presents serious problems to a superintendent, the expense is entirely justified by the high education returns.²⁰

A report of the New York Library Association stated:

To attain educational aims and objectives of the school efficiently and effectively the library must perform these functions:

1. Provide all types of instruction materials on all subjects in the curricula and on current interests.
2. Provide adequate instruction in the use of books and libraries.
3. Serve all pupils, teachers, and supervisory and administrative staffs.
4. Be responsive to curriculum change.
5. Cooperate in the adaption of instruction to meet individual differences and interests.
6. Provide for the professional growth of teachers.
7. Respond to such changes in teaching methods and classroom practices as: the growing emphasis on the

¹⁹"A. S. C. D. Members Hear Importance of School Libraries Stressed," Library Journal, 81:1301, May 15, 1956.

²⁰Ibid., p. 1301.

socialized recitation; individual pupil and group projects; directed study techniques; cooperative activities; laboratory methods.²¹

In light of all its ideal characteristics and functions, however, the school library sometimes falls far below its potentialities, and even fails to meet its requirements. A school library, at one extreme, can be a stagnated storage bin for books, or, at the other extreme, an activated instructional center. The researcher prefers to regard the school library in terms of a working laboratory --a laboratory containing tools with which to work, instruction in the use of tools, a definite problem to solve, a guiding hand; a laboratory composed of all the necessary elements vital to the process of achieving a satisfying learning experience.

Within this introductory chapter, the problem of the study has been defined and a need for the study has been established. The following chapters of the investigation will be confined to (1) a description of the materials, groups, and procedures, (2) an explanation of the test results, and (3) a summary of the study and the conclusions derived from the experiment.

²¹New York Library Association. School Libraries Committee, "The Role of the School Library," Wilson Library Bulletin, 26:730, May, 1952.

CHAPTER II

RESEARCH MATERIALS AND PROCEDURES

I. MATERIALS

Iowa Every-Pupil Tests of Basic Skills. An investigation of available standardized tests revealed that only the Iowa Every-Pupil Tests of Basic Skills: Work-Study Skills, Test B--Elementary Grades 3-5 adequately tested at fourth grade level those specific skills under consideration in this study. This standardized test, which will be referred to as the Iowa Work-Study Skills Tests hereafter in this study, is divided into four sections: Part I, Map Reading; Part II, Use of References; Part III, Use of Index; Part IV, Use of Dictionary; Part V, Alphabetization. Although the complete test was administered, Part I, Map Reading was omitted in the analysis of the test results.

Spitzer reported, ". . . these tests are directly concerned only with certain basic skills and abilities, and are not intended to measure total achievement in any given subject or grade."¹

¹Herbert F. Spitzer, et al., Manual of General Information, Iowa Every-Pupil Tests of Basic Skills (New York: Houghton-Mifflin Company, 1945), p. 53.

To employ any test as a measuring instrument the validity and reliability of the test must be ascertained. The validity of the Iowa Work-Study Skills Tests is explained by Spitzer as follows:

It may be noted that the Iowa Every-Pupil Tests of Basic Skills are characterized by unusually liberal time allowances. The time allowed per question* in these tests is, on the whole, considerably greater than that allowed in any similar widely distributed standardized test material. While these liberal time limits tend to raise the validity of the test, they also tend to lower their reliability coefficients.²

The manual provided reliability coefficients for the Elementary Battery, Test B. A fourth grade sample drawn from 15 representative schools showed the following internal consistency coefficients: Part II (Use of References), .41 for Form L and .64 for Form M; Part III (Use of Index), .72 for Form L and .89 for Form M; Part IV (Use of Dictionary), .59 for Form L and .66 for Form M; Part V (Alphabetization), .74 for Form L and .82 for Form M; the Total, .84 for Form L and .90 for Form M.³

Kvaraceus and Lanigan reported that elementary and junior high students maintained relatively the same rank from one half-year to the next over a two-year period. Iowa Work-Study Skills Tests

*Italics of the original author.

²Ibid., p. 61.

³Ibid., p. 64.

showed students making regular gains at half-year steps over the two years tested.⁴

In critical analysis of the Iowa Work-Study Skills Tests,

Bryan commented:

The Iowa Every-Pupil Tests of Basic Skills are designed to measure educational growth in certain specific skills involved in learning. They are not concerned with the measurement of subject matter achievement as such. In terms of their objectives, the tests appear to be quite valid. In the opinion of the reviewer, the scores are, with some exceptions, sufficiently reliable for judicious use in diagnosis. The test content is of generally high quality and the individual items are on the whole skillfully written and judiciously selected. . . . Probably the most outstanding feature insofar as content is concerned is the inclusion of the work-study test, the scope of the content of which is unique with these batteries.⁵

For more conclusive evidence of reliability in definite terms of this experimental study, stability equivalent coefficients were established by using rank order correlations between the pre- and the post-tests of the control group. The control group was so designated since it was in no way influenced through library instruction during the school year.

⁴W. C. Kvaraceus and Mary A. Lanigan, "Pupil Performance on the Iowa Every-Pupil Tests of Basic Skills Administered at Half-Year Intervals in the Junior High School," Educational Psychological Measurements, 8:93-100, 1948.

⁵Mirain M. Bryan, "The Iowa Every-Pupil Tests of Basic Skills." In O. K. Buros (ed.), The Fourth Mental Measurement Year-book (Highland Park, New Jersey: The Gryphon Press, 1953), p. 41.

Although Pearson's product-moment coefficient is the standard index of the amount of correlation between two things, . . . when samples are small, a common procedure applied to regular data in place of the product-moment method is the rank-difference method of Spearman.⁶

An inspection of Table I, reveals that the rank-difference coefficient, or Rho, for the Iowa Work-Study Skills Tests was found to be .80. The degree of significance of relationship was beyond the one per cent level of confidence. This means that if the experiment were repeated one hundred times, ninety-nine chances out of the hundred the positive relationship would be greater than zero.

The stability coefficients of the sub-tests were not so high as that of the complete Iowa Work-Study Skills Tests. This usually occurs when comparing subtests with total scores. As shown in Table I, the Rho of Part II (Use of References) was .56; Part III (Use of Index) was .49; Part IV (Use of Dictionary) was .51; and Part V (Alphabetization) was .56. Only the Rho of the alphabetization sub-test reached an adequate level of significance--being beyond the five per cent level of confidence.

The stability coefficients obtained in this study were generally in line with the magnitude of the internal consistency coefficients of the Iowa Work-Study Skills Tests found by other researchers.

⁶J. P. Guilford, Fundamental Statistics in Psychology and Education (New York: McGraw-Hill Book Company, Inc., 1956), p. 287.

TABLE I
 STABILITY-EQUIVALENCE COEFFICIENTS
 USING RANK-ORDER CORRELATIONS
 FOR PRE-TESTS AND POST-TESTS OF THE CONTROL GROUP

Test	Stability-Equivalence Coefficients
Iowa Work-Study Skills Tests	.80*
Use of References	.53
Use of Index	.49
Use of Dictionary	.51
Alphabetization	.56**
Metropolitan Achievement Tests	.96*

* Significant beyond the one per cent level of confidence.

** Significant beyond the five per cent level of confidence.

Metropolitan Achievement Tests. The Metropolitan Achievement Tests were being used as the yearly measuring instrument of the school, so the selection of a general achievement test was made on that basis.

Concerning the reliability of the Metropolitan Achievement Tests, Wood reported coefficients of equivalence ranging from .758 for a single subtest to .974 for a complete battery with a median of about .86. He further reported that no test has a probable error of measurement of higher than 4.1 months, and the average was given as about 2.5.⁷

A stability coefficient of .96, indicated in Table I, was obtained by the researcher using the rank-order method of correlation between the pre-tests and the post-tests of the control group. The degree of significance of relationship was beyond the one per cent level of confidence.

The Metropolitan Achievement Tests were used to accomplish two purposes in this study:

1. To furnish evidence that the two groups prior to the study were relatively equal in general achievement.
2. To indicate any significant growth in general achievement as a result of library instruction in the work-study skills.

⁷H. B. Wood, "Metropolitan Achievement Tests." In O. K. Buros (ed.), The Nineteen Forty Mental Measurements Yearbook (Highland Park, New Jersey: The Gryphon Press, 1941), p. 1189.

II. PARALLEL-GROUP TECHNIQUE

Most education . . . experiments in the classroom . . . must be conducted with groups rather than with individuals.

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 The parallel-group procedure is an attempt to overcome the difficulties of the one-group technique, in that two or more groups, as nearly equivalent as possible, are employed at the same time. Under conditions controlled as carefully as possible, only a single factor or variable is manipulated or changed; the experimental factor is varied for one group (the experimental group)* while the parallel group serves as the control for comparative purposes, undergoing customary (usual)* or non-experimental conditions.⁸

The two sections of the fourth grade in a small rural elementary school served as the parallel group. Those two sections had been formed by choosing in alternate order students ranging from the highest achievement to the lowest achievement on the Metropolitan Achievement Tests given prior to entrance in the fourth grade.

The groups were not equated, but relatively equal in their mean scores and in range of grade equivalent achievement. As shown in Table VII, the group designated as the experimental group had attained a group mean of 4.34 at the conclusion of the third grade. The control group had attained a group mean of 4.18. There was no significant difference between the groups.

*Parentheses of the original author.

⁸Carter V. Good, and Douglas E. Scates, Methods of Research (New York: Appleton-Century-Crofts, Inc., 1954), pp. 704-705.

III. TESTING PROCEDURE

Prior to the beginning of the experimental study, the pre-test results of the Metropolitan Achievement Tests were already available. Those tests had been administered by the third grade teachers in April of the preceding school year.

The post-tests were administered in April by the fourth grade teachers. Growth between the pre- and the post-tests was measured on a twelve months' interval. Only the scores of those students present for both tests and also present for the pre- and the post-tests of the Iowa Work-Study Skills Test were used in the statistical analysis of the study.

The pre-tests of the Iowa Work-Study Skills Tests, using Form L, were given during the second week of September.

Using Form M, the Iowa Work-Study Skills post-tests were administered in the third week of May, allowing an eight months' interval of growth between pre-and post-tests.

Both the pre-tests and the post-tests of the Iowa Work-Study Skills Tests were administered by the researcher in strict compliance to the directions in the Examiner's Manual.⁹

⁹Herbert F. Spitzer, et al., Examiner's Manual for Test B --Elementary Work-Study Skills, Grades 3-5, Iowa Every-Pupil Tests of Basic Skills (New York: Houghton Mifflin Company, 1945), pp. 3-5.

The single period plan was followed. Only the results of those students present for both tests were included in the statistical treatment of the findings in this experiment.

The Examiner's Manual suggested immediate correction and analysis of the test for the purpose of pin-pointing weaknesses and preparing instruction accordingly.¹⁰ However, that recommendation was not followed for the reason that in this experimental study the test's value lay primarily in its ability to indicate the success of a plan of instruction and not to serve as an instrument of measuring correction. It was therefore intended that the delay in the test scoring would eliminate the possibility of teaching the test.

To determine the effect of library facilities and instruction on the work-study skills of the fourth grade, statistical tests of significance were computed between the pre- and the post-test scores within each group, and also, between the two groups. The results of the statistical analysis of the study are discussed in the following chapter.

IV. LIBRARY INSTRUCTION

Definition of instruction. Within the scope of the study, library instruction included teaching alphabetization, the use of book

¹⁰Ibid., p. 15.

indexes, the use of reference books, and the use of the dictionary. Instruction was confined to a half-hour period within the regular weekly forty-five minute library period.

Materials. Problems of locating information centered around the use of such aids as table of contents and indexes found in class textbooks and library references; the use of such standard references as encyclopedias, atlases, and the World Almanac; the use of more specialized references as Webster's Biographical Dictionary, Webster's Dictionary of Synonyms, Hammond's Nature Guide; the use of individual comprehensive abridged dictionaries; the use of standard language textbooks, workbooks, and mimeographed seatwork materials confined to work-study skills; the use of library instruction texts, workbooks, and pamphlets; and the use of the library as a working laboratory.

A list of the instructional materials utilized in the library instruction can be found in Appendix A.

Procedure. Both fourth grade groups received a forty-five minute library period one day a week. The experimental group received library instruction during its library period. Within this group teacher-librarian cooperation was emphasized and an effort made to encourage utilization of library facilities in all subject

content areas of the fourth grade program. The control group received no library instruction during its weekly library period. The students of this group were given a general introduction to the library, but no guidance, unless, on an individual basis, there was a direct request for assistance. Neither group beforehand had had access to organized library facilities.

The use of standard textbook lessons and standard mimeographed seatwork materials was advantageous. To a great extent they served as form models for constructing and adapting practice work relative to student interests and use of reference tools at hand. Library instruction books provided useful lesson plans and lesson activities.

Alphabetization was the first work-study skill to be introduced to the experimental group. To some extent standard directions and seatwork pertaining to alphabetization were utilized, but the whole procedure was directed toward a complete understanding of the importance of alphabetical arrangement in the use of the library, and a development of this skill through practical and first-hand application.

Awareness of an individual's need to acquire skill in alphabetization was sought through class discussion about the daily use of alphabetical order. For example, it was found that in addition to all the types of book and catalog indexes and the library card catalog

being in alphabetical order, telephone directories, office and general store building directories, and school class rolls are arranged in alphabetical order.

Seatwork consisting of lists of class names, names of authors and illustrators, or subject headings was prepared for practice alphabetization. Also, seatwork with drawings of book spines and lists of book call numbers was constructed and directions given to put the call numbers in alphabetical and numerical order as the books would be arranged on the shelf. (In this particular school library all the books except the picture books have a Cutter number in addition to a Dewey Decimal classification number on the book spine.) For practical experience, small groups of students were given a stack of books to arrange in order of the author's last initial and book number. When sufficient understanding and skill in shelving library books developed within the class, the students were allowed to shelve books in the fiction, biography, and picture book sections of the library. In shelving the books, the students usually worked in teams of two and then doublechecked the work of other teams. Appraisal of the group's progress consisted of written tests similar to the seatwork material, and a check of how accurately the books were being shelved.

Instruction in the use of the dictionary followed a general course of study outlined in standard fourth grade language texts with emphasis placed on location skills. Teaching dictionary skills, of course, interlocked with teaching alphabetization. The format and use of the dictionary was compared with the format and use of encyclopedias and other reference books. Also, the use of the dictionary as a reference tool was included in the instruction concerning references.

The instructional objectives in the use of the index can be best stated in terms of McKee's list of the most important items required for using the index of a book:

1. An understanding of the content, purpose, and value of the index of a book
2. An understanding of the location of the index
3. Skill in finding a word in an alphabet list
 - (a) Skill in recognizing the form of each letter in the alphabet
 - (b) An understanding of the relative position of the letters in the alphabet
 - (c) Understanding what element in a word determines where that word is placed in an alphabetical list
4. An understanding of the different forms in which the material in the index may be arranged. (This refers to the nature of the different types of indexes, main topic only and main topic--subtopic, to the relation of subtopics to the main topic, and to the different ways in which subtopics are arranged.)

5. Skill in determining which word or words are best to use as key words to look up in the indexes as leads to the needed information

6. Skill in choosing the proper subtopic in the index

7. Understanding the meaning of punctuation marks and other signs, such as boldface type and the dash, as used in the index

8. Skill in using cross references

9. Skill in location quickly on the page information to which the index refers

10. The attitude of "squeezing" from an index all of the references it gives on the problem at hand.¹¹

To accomplish those aims, practice work involving actual use of the index was presented. For example, the students first used the index of their English text. Arrangement of the index was discussed and compared with the arrangement of the table of contents. Page numbers of subject headings and subheadings were looked up in the index. Then the indexes of Compton's Pictured Encyclopedia and Living Together in the Modern World were used. Slight differences in the arrangement of subheadings, and the use of cross references in those indexes were discussed. Page numbers of subject headings and subheadings were found and the pages looked up in the references.

¹¹Paul McKee, The Teaching of Reading in the Elementary School (New York: Houghton Mifflin Company, 1948), pp. 427-428.

The topic of subject headings, and headings with "see" references or cross references was discussed also in relation to a library card catalog. Although no card catalog existed, (the library was in a process of being re-organized and preparations were being made to set up a card catalog) an effort was made to acquaint the students with its purpose and structure, and initiate an understanding to its use with the books on the shelves.

In agreement with McKim:

. . . Three distinct types of abilities were identified as important in locating information. First, the child must become sufficiently well acquainted with different reference sources so that he knows what kind of help to expect from them. Second, he must become increasingly familiar with the format of reference books--alphabetical order, guide words, ways of giving cross references, purposes of various parts of a bibliography, the plan of a library card file. Third, the child must also learn how to decide what topic to look for--how does one look up the industries in the New England states; under what topic would one look to find whether there are coal mines in Canada; where would one look to find out more about the vitamins in milk.¹²

Each presentation of a reference book or reference set was followed by a discussion of the book's format and use, the book's value to the student, and comparison of the book with other reference tools. Practice activities related to classroom work, class interests, and school and community interests were means to motivate and

¹²Margaret Grace McKim, Guiding Growth in Reading in the Modern Elementary School (New York: Macmillan, 1955), p. 442.

stimulate the students' desire to seek immediate answers in the reference books. The practice activities were similar to those found in texts but adapted to meet the needs of the particular group. Actual use of the books was initiated in place of merely identifying books with topics or descriptions. Within class discussions, students quizzed each other in terms of "what is the best reference to use in looking up information about this topic?"

The class first was introduced to standard reference tools as Compton's Pictured Encyclopedia, The World Book, Webster's Dictionary, The World Almanac, and Hammond's World Atlas. Then references specific in subject matter were presented. Those included Hammond's Nature Guide, Living Together in the Modern World, Webster's Biographical Dictionary, and Webster's Dictionary of Synonyms, and Zim's Stars. Also reference material of current nature were discussed, such as the daily newspaper, magazines, Year annuals, and the World Almanac.

In addition to developing understanding and master of the work-study skills, it was the aim of the library instruction to create the "library habit" within the group.

V. LIMITATIONS OF THE STUDY

There are certain limitations to this experimental study that should be noted.

The number of students present for both pre-tests and post-tests was greatly reduced by withdrawals during the school year and the remaining groups might not be representative of average fourth grade classes.

The results of a small sample confined to one particular area would not necessarily indicate that the same results would be produced in a similar experiment using other samples in different areas.

The evidence obtained in this single experiment confined to the comparison of just two groups would not be a reliable basis on which to predict conclusive results in similar experiments.

The only moderate reliability of the subtests of the measuring instrument may influence the results of the experiment.

The fact that the library was in a process of reorganization and that no card catalog was available might influence the effectiveness of the experiment in relation to library techniques.

This chapter has presented the materials and procedures used in the study. The test materials used in the experiment, and the test results used to determine any changes that might take place as outcome of giving library instruction to the experimental group were discussed. Procedures used during the year's library instruction were described. The results of the statistical analysis of the study are discussed in the following chapter.

CHAPTER III

RESULTS

The problem, stated in terms of three questions, is as follows:

1. Will organized library facilities and instruction effect any significant growth in the work-study skills of fourth grade students?
2. Will organized library facilities and instruction effect growth in some work-study skills more significantly than in other work-study skills?
3. Will organized library facilities and instruction effect any significant growth in the general achievement of fourth grade students?

To resolve the problem, certain prerequisites were considered: (1) selection of testing materials, (2) selection of experimental groups, and (3) selection of instructional method.

Prior to this experiment, Metropolitan Achievement Tests had been used by the school as a means of determining general achievement. Consequently they were selected for use in this experiment for the same purpose.

To measure growth in the work-study skills, the Iowa Every-Pupil Tests of Basic Skills, Test B: Work-Study Skills, Elementary, Grades 3-5 was selected as the best available measuring instrument. As discussed in Chapter II, stability-equivalence coefficients for the two tests were computed by the researcher. The stability-equivalence coefficient for the Metropolitan Achievement Tests was found to be .96, and for the Iowa Work-Study Skills Tests, .80. The coefficient correlations had reached a level of significance beyond the one per cent level of confidence for both tests. The coefficient correlations for the Iowa Work-Study Skills subtests were found to be lower, as shown in Table I.

The Metropolitan Achievement Tests, Elementary Battery had been administered in the spring to third grade students. Two fourth grade sections had been formed by choosing in alternate order, students ranking highest in grade-equivalent achievement to those ranking lowest. Of the two fourth grade sections, one was designated as the experimental group, and one as the control group. Inspection of the Metropolitan Achievement Tests grade-equivalent scores revealed a group mean of 4.34 for the experimental group, and 4.18 for the control group. Statistical analysis showed no significant difference existed between the two groups at the beginning of the study.

The instructional method was established as a course of library instruction to be introduced to the experimental group by the

school librarian in the library. Library instruction was to include teaching the use of references, use of index, use of dictionary, and alphabetization. A more thorough discussion of instructional materials and procedures can be found in Chapter II.

To determine whether significant growth in the work-study skills had occurred during the year as a result of library instruction, t-tests of significance were computed. Grade-equivalent scores were obtained from the Iowa Work-Study Skills Tests for the experimental group and the control group. A t-test of significance computed between the pre-tests of the experimental group and the control group revealed that there was no significant difference between the two groups at the beginning of the experiment. As shown in Table II, the group mean of the experimental group was found to be 3.93, and the group mean for the control group, 4.02. The slight difference of .09 (.9 month) was in favor of the control group. Since no significant difference existed between the experimental and control groups on either the Iowa Work-Study Skills Tests or the Metropolitan Achievement Tests, the two groups can be considered relatively equal at the beginning of the experiment.

A t-test between the post-tests of the two groups indicated that the difference between the groups was still not significant at the end of the year. However, the group mean of the experimental group

TABLE II

COMPARISON OF MEAN SCORES FOR FOURTH GRADE PUPILS
ON THE IOWA EVERY-PUPIL TESTS OF BASIC SKILLS
TEST B: WORK-STUDY SKILLS

Test	N	Group Mean Grade Equiv.	Mean Diff.	Std. Error of Mean Difference	D. F.	t	Significance Level
Exp. (Pre) Cont. (Pre)	14 14	3.93 4.02	.09	.36	26	.25	Not Significant
Exp. (Post) Cont. (Post)	14 14	6.12 5.01	1.11	.62	26	1.79	Not Significant
Exp. (Pre) Exp. (Post)	14 14	3.93 6.12	2.19	.55	13	3.98	Beyond 1%
Exp. (Post-Ass)* (Post-Act)	14 14	4.73 6.12	1.39	.41	13	3.39	Beyond 1%
Cont. (Pre) Cont. (Post)	14 14	4.02 5.01	.99	.47	13	2.11	Not Significant

*Mean modified by assuming growth of 8 months (.8).

was 6.12, and the group mean of the control was 5.01, showing an average growth of 1.11 (one year and 1.1 months) for the experimental group over the control group.

Table II presents the means of the pre-tests and post-tests of the Iowa Work-Study Skills Tests. Growth within the experimental group was determined by a t-test. It was shown that significant growth beyond the one per cent level of confidence had been obtained. This means that if the experiment were repeated one hundred times using similar teaching methods and similar groups ninety-nine chances out of that one hundred the difference in the means would be greater than zero.

To substantiate further the evidence of significant growth in the work-study skills of the experimental group, a t-test was computed between an assumed growth score and the actual growth score or post-test of that group. Since children tend to gain on standard tests regardless of school conditions, it seemed necessary to show that the experimental procedure effected growth significantly beyond usual classroom procedure or normal growth. The assumed growth was obtained by adding to the pre-test score an expected growth score of .8 (eight months' growth). This statistical comparison still revealed that the actual growth was above the assumed growth and significant beyond the one per cent level of confidence. This evidence, as shown in Table II, strongly indicates that the instructional method used

within the experimental group was effective in producing significant growth in the work-study skills.

An inspection of Table II also shows that in a t-test computed between the post-tests of the control group no significant growth was obtained in the work-study skills during the school year.

To determine whether growth would be more significant in some work-study skills than in others, t-tests of significance were computed for the four subtests of the Iowa Work-Study Skills Tests.

Table III presents means and differences on Part II (Use of References). A statistical comparison of the pre-tests of the two groups revealed no significant difference between the means of the groups. Post-test comparison of the groups, however, indicated that the experimental group was significantly superior to the control group. In Table III the difference is shown to be beyond the two per cent level of confidence. The t-tests between the pre-test and the post-test within each group revealed that during the school year both groups had reached a level of significant growth in the use of references, although growth was more evident in the experimental group.

Table IV presents data on Part III (Use of Index). Group means obtained in comparing pre-tests of the groups in use of the index showed no significant difference between the groups. Post-test comparisons, in contrast, revealed a significant difference between

TABLE III

COMPARISON OF MEAN SCORES FOR FOURTH GRADE PUPILS
ON THE IOWA EVERY-PUPIL TESTS OF BASIC SKILLS
TEST B: WORK-STUDY SKILLS, PART II: USE OF REFERENCES

TEST	N	GROUP MEAN Raw Scores	Mean Diff.	Std. Error of Mean Difference	D. F.	t	Significance Level
Exp. (Pre)	14	5.57					
Cont. (Pre)	14	5.64	.07	.76	26	.09	Not significant
Exp. (Post)	14	13.21					
Cont. (Post)	14	10.07	3.14	1.18	26	2.66	Beyond 2%
Exp. (Pre)	14	5.57					
Exp. (Post)	14	13.21	7.64	1.10	13	6.95	Beyond 0.1%
Cont. (Pre)	14	5.64					
Cont. (Post)	14	10.07	4.43	.88	13	5.03	Beyond 0.1%

TABLE IV

COMPARISON OF MEAN SCORES FOR FOURTH GRADE PUPILS
ON THE IOWA EVERY-PUPIL TESTS OF BASIC SKILLS
TEST B: WORK-STUDY SKILLS, PART III: USE OF THE INDEX

TEST	N	Group Mean Raw Scores	Mean Diff.	Std. Error of Mean Difference	D. F.	t	Significance Level
Exp. (Pre)	14	5.57	.43	.85	26	.51	Not Significant
Cont. (Pre)	14	5.14					
Exp. (Post)	14	13.57	4.64	1.79	26	2.59	Beyond 5%
Cont. (Post)	14	8.93					
Exp. (Pre)	14	5.57	8.00	1.22	13	6.56	Beyond 0.1%
Exp. (Post)	14	13.57					
Cont. (Pre)	14	5.14	3.79	1.56	13	2.43	Beyond 5%
Cont. (Post)	14	8.93					

the two groups. The experimental group achieved growth above the control group. The difference was significant beyond the five per cent level of confidence. In pre-test and post-test comparisons within the groups, the experimental group also showed growth in the use of the index significant beyond the 0.1 per cent level of confidence, while the control group showed significant growth beyond the five per cent level.

Table V presents means and differences for Part IV (Use of Dictionary). The t-tests between the groups' pre-tests in the use of the dictionary revealed no significant difference in the groups. Comparison of the post-tests of the groups also indicated no significant difference. But, as shown in Table V, t-tests computed between the pre-tests and the post-tests within the groups indicated that the experimental group attained significant growth beyond the one per cent level while the control attained significant growth beyond the two per cent level of confidence. The greater degree of growth within the experimental group can be explained, in part, by examination of the pre-test group means. At the beginning of the experiment a mean difference of .85 was evident in favor of the control group.

Table VI presents data on Part V (Alphabetization). Statistical analysis of the pre-tests and the post-tests revealed that there was no significant difference between the two groups at the

TABLE V

COMPARISON OF MEAN SCORES FOR FOURTH GRADE PUPILS
ON THE IOWA EVERY-PUPIL TESTS OF BASIC SKILLS
TEST B: WORK-STUDY SKILLS, PART IV: USE OF DICTIONARY

Test	N	Group Mean Raw Scores	Mean Diff.	Std. Error of Mean Difference	D. F.	t	Significance Level
Exp. (Pre)	14	4.79	.85	.42	26	2.02	Not Significant
Cont. (Pre)	14	5.64					
Exp. (Post)	14	9.64	.50	1.44	26	.35	Not Significant
Cont. (Post)	14	9.14					
Exp. (Pre)	14	4.79	4.85	1.34	13	3.62	Beyond 1%
Exp. (Post)	14	9.64					
Cont. (Pre)	14	5.64	3.50	1.24	13	2.82	Beyond 2%
Cont. (Post)	14	9.14					

TABLE VI

COMPARISON OF MEAN SCORES FOR FOURTH GRADE PUPILS
ON THE IOWA EVERY-PUPIL TESTS OF BASIC SKILLS
TEST B: WORK-STUDY SKILLS, PART V: ALPHABETIZATION

Test	N	Group Mean Raw Scores	Mean Diff.	Std. Error of Mean Difference	D. F.	t	Significance Level
Exp. (Pre)	14	8.86	1.14	1.69	26	.67	Not Significant
Cont. (Pre)	14	10.14					
Exp. (Post)	14	15.57	2.50	1.66	26	1.51	Not Significant
Cont. (Post)	14	13.07					
Exp. (Pre)	14	8.86	6.71	1.28	13	5.24	Beyond 0.1%
Exp. (Post)	14	15.57					
Cont. (Pre)	14	10.14	2.93	1.99	13	1.47	Not Significant
Cont. (Post)	14	13.07					

beginning of the experiment or at the conclusion of the experiment. Table VI shows also that no significant growth within the control group occurred. In contrast to those findings, a t-test between the pre-test and the post-test of the experimental group revealed growth in alphabetization significant beyond the 0.1 per cent level of confidence. Again, the explanation partly lies in the difference of the pre-tests. Table VI shows a group mean of 8.86 for the experimental group and a group mean of 10.14 for the control group. The mean difference was 1.14 in favor of the control group at the beginning of the experiment.

Statistical analysis of the Iowa Work-Study Skills subtests indicated that significant growth was produced in every subtest, with the exception of the control group in Part V (Alphabetization). It was also indicated that in comparisons between the post-tests of the experimental and control groups significant differences in Part II (Use of References) and Part III (Use of Index) existed between the groups in favor of the experimental group. Those indications suggest the possibility that presentation of the use of references and use of index would be more successful in the library than in the classroom. This hesitance is necessitated because fluctuations in the direction of the subtest results may be due to low reliabilities within the subtests.

Table VII presents means and differences for the Metropolitan

TABLE VII

COMPARISON OF MEAN SCORES FOR FOURTH GRADE PUPILS
ON THE METROPOLITAN ACHIEVEMENT TESTS
ELEMENTARY BATTERY

Test	N	Group Mean Grade Equiv.	Mean Diff.	Std. Error of Mean Difference	D. F.	t	Significance Level
Exp. (Pre) Cont. (Pre)	14 12	4.34 4.18	.16	.32	24	.5	Not Significant
Exp. (Post) Cont. (Post)	14 12	5.60 5.63	.03	.41	24	.07	Not Significant
Exp. (Pre) Exp. (Post)	14 14	4.34 5.60	1.26	.32	13	3.94	Beyond 1%
Cont. (Pre) Cont. (Post)	12 12	4.18 5.63	1.54	.40	11	3.85	Beyond 1%

Achievement Tests. To indicate any growth in general achievement tests of significance were computed. The t-tests revealed no significant difference between the two groups either at the beginning of the experiment or at the conclusion of the experiment. Both groups reached a significant level of growth during the year.

The results presented have shown that the experimental group which received the library instruction showed significant growth in the work-study skills. Moreover, significant change was shown even beyond an assumed normal growth on the Iowa Work-Study Skills Tests.

The results also showed that the school situation provided significant growth in practically all the work-study skills. However, the experimental group was more positively affected in each of the study skill areas.

The results further showed that for the brief period of the experiment the group receiving library instruction did not grow significantly in general achievement, as measured by the Metropolitan Achievement Tests, beyond the control group. This may be due, in part, to the fact that the students did not have adequate time or opportunity to make practical application of work-study skills achieved.

CHAPTER IV

SUMMARY AND CONCLUSIONS

I. SUMMARY

The primary purpose of the study was to determine the effectiveness of a method of teaching the work-study skills to fourth grade students by the school librarian in the library.

A second purpose of the investigation was to determine whether growth would be more significant in some work-study skills than in others.

A third purpose of the study was to indicate any growth in general achievement of the fourth grade students through the influence of library facilities and instruction.

In resolving the problem, the parallel-group technique was employed. Two sections of a fourth grade in a small rural elementary school served as the parallel group. In statistical analysis of Metropolitan Achievement Tests grade-equivalent scores, the groups were found to be relatively equal in their mean scores and range of grade-equivalent achievement. The mean of the group designated as the experimental group was 4.34 and the mean of the control group was 4.18. The difference was not significant.

The two groups were administered one form of the Iowa Every-Pupil Tests of Basic Skills: Work-Study Skills, Test B in September. Throughout the school year the experimental group was subjected to library instruction in location skills. Instruction, confined to a half-hour period within the weekly forty-five minute library period, included teaching the use of references, use of index, use of the dictionary, and alphabetization. The instructional efforts of the librarian were directed toward thorough comprehension and practical application of the location skills. The control group received no library instruction in those skills.

At the end of the school year, the parallel groups were administered a second form of the Iowa Work-Study Skills Tests, and in addition, the elementary battery of the Metropolitan Achievement Tests.

To determine the effect of library facilities and instruction on the work-study skills of the fourth grade, statistical tests of significance, using grade-equivalent scores of the Iowa Work-Study Skills Tests, were computed. The statistical comparisons were made between (1) the pre-test scores of the two groups, (2) the post-test scores of the two groups, (3) the pre-test and the post-test scores of the experimental group, (4) the assumed growth score and the actual or post-test score of the experimental group, and (5) the

pre-test and the post-test scores of the control group.

Results of the tests of significance, or t-tests, revealed that in the pre-tests there was no significant difference between the two groups. A t-test between the pre-test and the post-test of the experimental group revealed significant growth beyond the one per cent level of confidence, while a t-test between the pre-test and the post-test of the control group indicated no significant growth.

To substantiate further the evidence of significant growth in the work-study skills of the experimental group, a t-test was computed between an assumed growth score and the actual growth score or post-test score of that group. The assumed growth was obtained by adding to the pre-test score an expected growth score of .8, or eight months' growth. Actual growth was still found to be above the assumed growth and to be beyond the one per cent level of confidence.

To determine whether growth would be more significant in some work-study skills than in others, t-tests of significance were computed for the four subtests of the Iowa Work-Study Skills Tests. Similar group and score comparisons as used in the statistical analysis of the complete Iowa Work-Study Skills Tests were used to obtain the t-test significance results of the subtests.

The results of those t-tests showed that there was no significant difference between the two groups in any of the subtests

at the beginning of the study. Comparison between the post-tests of the experimental and the control groups revealed significant difference in favor of the experiment group in Part II (Use of References), and in Part III (Use of Index). There was no significant difference between the two groups in Part IV (Use of Dictionary) and Part V (Alphabetization) at the conclusion of the study. The computation of t-tests within each group indicated that significant growth was produced in every subtest, with the exception of the control group in Part V (Alphabetization).

To indicate any growth in general achievement of the fourth grade students through the influence of library facilities and instruction, tests of significance, using grade-equivalent scores of the Metropolitan Achievement Tests, were calculated. The t-tests revealed no significant difference between the two groups either at the beginning of the experiment or at the conclusion of the experiment.

II. CONCLUSIONS

In final resume of the experimental study, certain conclusions and implications are evident.

Significant growth in the work-study skills of fourth grade students was produced through the influence of organized library facilities and instruction. This implies that the method of teaching

the work-study skills by the librarian in the library was effective.

Significant growth in the individual work-study skills area was obtained for both the experimental and control groups. The experimental group was significantly superior in two of the four skills considered. One possible implication is that the use of references and use index would be more advantageously presented in the library than in the classroom. The researcher hesitates to conclude this in view of the low subtest reliabilities, and recommends further research to substantiate this possibility. Previous reviewers have reported low reliabilities for the Iowa Work-Study Skills subtests. The fluctuation in the direction of the results of the subtests may be due, in part, to the low reliabilities found for the subtests. Because of low reliability of the subtests, individual pupil diagnosis on the basis of a single test is seriously questioned.

No significant growth in general achievement of fourth grade students was indicated through the influence of library facilities and instruction. There is an implication that although no significant growth was immediately produced in the general achievement of the fourth grade students, perhaps comprehension of and proficiency in the work-study skills would produce evident growth in general achievement over a longer period of time. Evidence obtained in this experimental study indicates that further investigation would be of value.

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APPENDIX A

INSTRUCTIONAL MATERIALS

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APPENDIX B

SAMPLE DATA AND FORMULA FOR COMPUTING A t-TEST
OF SIGNIFICANCE BETWEEN INDEPENDENT GROUPS

X	X - M	(X - M) ²	X	X - M	(X - M) ²
5.8	1.46	2.13	7.2	1.60	2.56
5.2	.86	.74	6.7	1.10	1.21
5.1	.76	.58	6.8	1.20	1.44
4.4	.06	.0036	5.7	.10	.01
4.7	.36	.13	6.1	.50	.25
4.8	.46	.21	6.2	.60	.36
4.4	.06	.0036	5.4	-.20	.04
3.8	-.54	.29	4.8	-.80	.64
4.1	-.24	.06	5.0	-.60	.36
3.5	-.84	.71	4.5	-1.10	1.21
3.7	-.64	.41	4.8	-.80	.64
4.1	-.24	.06	5.9	.30	.09
3.9	-.44	.19	5.1	-.50	.25
3.3	-1.04	1.08	4.2	-1.40	1.96
60.80		6.60	78.40		11.02

$$M = X \div N = 60.80 \div 14$$

$$M = 4.34$$

$$\sigma = \sqrt{\frac{(X - M)^2}{N - 1}} = \sqrt{\frac{6.60}{13}} = \sqrt{.5}$$

$$\sigma = .71$$

$$\sigma_m = \frac{\sigma}{\sqrt{N - 1}} = \frac{.71}{\sqrt{13}} = \frac{.71}{3.61}$$

$$\sigma_m = .20$$

$$\sigma_{md} = \sqrt{\sigma_{m_1}^2 + \sigma_{m_2}^2} = \sqrt{(.20)^2 + (.25)^2} = \sqrt{.04 + .06} = \sqrt{.10}$$

$$\sigma_{md} = .32$$

$$t = \frac{M_1 - M_2}{\sigma_{md}} = \frac{4.34 - 5.60}{.32} = \frac{1.26}{.32}$$

$t = 3.94$ Using a significance table, 3.012 is necessary for one per cent level of confidence.

$$M = X \div N = 78.40 \div 14$$

$$M = 5.60$$

$$\sigma = \sqrt{\frac{(X - M)^2}{N - 1}} = \sqrt{\frac{11.02}{13}} = \sqrt{.85}$$

$$\sigma = .92$$

$$\sigma_m = \frac{\sigma}{\sqrt{N - 1}} = \frac{.92}{\sqrt{13}} = \frac{.92}{3.61}$$

$$\sigma_m = .25$$

APPENDIX C

SAMPLE DATA AND FORMULA FOR COMPUTING A t-TEST
OF SIGNIFICANCE BETWEEN MATCHED PAIRS

X	Y	D	d	d ²
6.52	8.48	1.96	.57	.32
6.36	8.83	2.47	1.08	1.17
5.50	8.15	2.65	1.26	1.59
3.82	7.80	3.98	2.59	6.71
4.78	7.73	2.95	1.56	2.43
4.26	7.15	2.89	1.50	2.25
5.38	5.38	0.00	-1.39	1.93
4.06	5.28	1.22	-.17	.29
3.82	4.65	.83	-.56	.31
3.58	5.18	1.60	.21	.04
4.50	4.63	.13	-1.12	1.59
3.46	4.43	.97	-.42	.18
5.40	4.35	-1.05	-2.44	5.95
4.80	3.68	-1.12	2.51	6.30
66.24	85.72	19.48		31.06

$$M_1 = X \div N = 66.24 \div 14$$

$$M_2 = Y \div N = 85.72 \div 14$$

$$M_1 = 4.73$$

$$M_2 = 6.12$$

$$MD = D \div N = 19.48 \div 14$$

$$MD = 1.39$$

$$\delta d = \sqrt{\frac{\Sigma d^2}{N}} = \sqrt{\frac{31.06}{14}} = \sqrt{2.22}$$

$$\delta d = 1.49$$

$$\delta_{md} = \frac{\delta d}{\sqrt{N-1}} = \frac{1.49}{\sqrt{13}} = \frac{1.49}{3.61}$$

$$\delta_{md} = .41$$

$$t = \frac{M_1 - M_2}{\delta_{md}} = \frac{1.39}{.41}$$

$t = 3.39$ Using a significance table, 3.012 is necessary for one per cent level of confidence.

10/10/10

10/10/10

APPENDIX D

SAMPLE DATA AND FORMULA FOR THE RANK-ORDER METHOD
OF COMPUTING STABILITY-EQUIVALENCE COEFFICIENTS

Pre-Test	Rank	Post-Test	Rank	D	D ²
5.80	1	7.13	1	0	0
5.68	2	6.43	3	1	1
3.93	7	6.75	2	5	25
4.03	6	5.78	5	1	1
3.75	9	5.60	6	3	9
5.28	3	5.83	4	1	1
3.48	11	4.88	8	3	9
4.40	5	5.23	7	2	4
3.85	8	4.80	9	1	1
4.50	4	4.30	10	6	36
3.58	10	3.68	11	1	1
2.18	13	3.55	12	1	1
3.08	12	3.18	13	1	1
2.78	14	2.93	14	0	0

90

$$\text{Rho} = 1 - \frac{6 \sum D^2}{N(N^2 - 1)}$$

$$\text{Rho} = 1 - \frac{540}{2730} = 1 - .20 = .80$$

$$\text{Rho} = .80$$