

A STUDY OF SELECTED FEDERALLY REIMBURSED  
VOCATIONAL SECRETARIAL PROGRAMS IN  
THE PUBLIC SECONDARY SCHOOLS  
OF MISSOURI

By

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## PREFACE

Although advocates of cooperative education suggest that cooperative programs contribute to the total education of the students, very little formal research has been completed in an attempt to identify the specific areas in which the students experience the greatest growth. The problem of this study is to determine the effect of cooperative education on the development of straight copy typewriting skill, production typewriting skill, transcription of mailable copy skill, and knowledge of business fundamentals and general information.

I am grateful to Dr. Bobbie B. Griffith, who served as chairman of my advisory committee, for his guidance. I also wish to thank Dr. Lloyd L. Garrison, Dr. Harold Coonrad, and Dr. John Wagle, members of my advisory committee, for their time and assistance.

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## CHAPTER I

### INTRODUCTION

To adequately meet the challenge of vocational education at the secondary level, a need was felt in some vocational areas for providing students with actual supervised work experience. Consequently, the cooperative method, utilizing both related classroom instruction and supervised on-the-job training, was developed as one way to contribute to the development of occupational competence. In order to determine whether the cooperative method is an effective way of teaching vocational secretarial skills, the skill improvement of the participants should be evaluated. Evaluation is essential to program development, for evaluative criteria serve a twofold purpose--evaluation and stimulation to improvement.

#### Statement of the Problem

The purposes of the study are (1) to measure the changes in straight copy typewriting skill, production typewriting skill, transcription of mailable copy skill, and knowledge of business fundamentals of students enrolled in federally reimbursed vocational secretarial classes in Missouri and (2) to compare the mean increases in the skills



and knowledge of those participating in cooperative vocational secretarial training with the mean increases in the skills and knowledge of those participating in non-cooperative vocational secretarial training.

Specifically, the problem is to test the null hypothesis that there is no significant difference in the mean increase in (1) straight copy typewriting skill, (2) production typewriting skill, (3) transcription of mailable copy skill, and (4) knowledge of business fundamentals, as measured by a pre-test and a post-test, between those students participating in cooperative vocational secretarial training and those participating in non-cooperative vocational secretarial training.

#### Importance of the Study

Since the passage of the Vocational Education Act of 1963, increased emphasis has been placed upon vocational education in the secondary schools. However, vocational preparation was established as one of the Seven Cardinal Principles of Secondary Education nearly fifty years ago:

Vocational education should equip the individual to secure a livelihood for himself and those dependent on him, to serve society well through his vocation, to maintain the right relationships toward his fellow workers and society, and, as far as possible, to find in that vocation his own best development.<sup>1</sup>

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<sup>1</sup>U.S., Department of Interior, Cardinal Principles of Secondary Education (Washington, D.C.: U.S. Government Printing Office, 1928), p. 7.

The increasing emphasis upon secondary office occupations programs has resulted from the growth of office occupations to the second largest employment classification in the United States. In 1966, studies revealed that 16 percent of all employed persons were classified in the office occupations category.<sup>2</sup> Figures projecting an increase in clerical and kindred workers are directly related to secondary office occupations programs because 40 percent of the high school graduates who do not enter college join the labor force in an office occupation.<sup>3</sup>

The Vocational Education Act of 1963 gave recognition to the increasing importance of vocational office occupations programs since for the first time training for the office occupations was eligible for funds under federal vocational legislation. In 1969, federally supported office occupations programs, with an enrollment of almost 2 million students, were provided in about 65 percent of the high schools in the United States. Office occupations was the second largest program of vocational education and received 16 percent of the total federal vocational funds.<sup>4</sup>

In Missouri, the enrollment in federally reimbursed office occupations programs increased from 10,832 in the

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<sup>2</sup>Bruce I. Blackstone, "Scope and Need for Office Education," Journal of Business Education, LI (May, 1966), p. 335.

<sup>3</sup>Ibid., p. 336.

<sup>4</sup>Bruce I. Blackstone, "VOE 1970 Style," Business Education World, LI (September-October, 1970), p. 27.

1965-66 school year to 16,078 in 1968-69. Federal funds allotted to office occupations programs increased from \$772,097 in the 1964-65 school year to \$2,885,303 in the 1968-69 school year.<sup>5</sup>

The real purpose of office occupations programs, or any vocational education, has been expressed as follows:

To provide training to develop skills, abilities, understandings, attitudes, and working habits; and to impart knowledge and information needed by workers to enter and make progress in employment on a useful and productive basis.<sup>6</sup>

Since the passage of the Vocational Education Act of 1963, very little has been done to develop evaluative criteria for the office occupations programs in Missouri. Therefore, it is anticipated that the results of this study will serve as a guide for state and local administrators to use when planning vocational secretarial programs so that the programs can most effectively serve the educational needs of the youth in the state.

#### Definition of Selected Terms

Vocational secretarial classes. Vocational secretarial classes include advanced shorthand, advanced typewriting, office machines, office procedures, business English and vocabulary building, business principles and organization,

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<sup>5</sup>Missouri. One Hundred Twentieth Report of the Public Schools of the State of Missouri (Jefferson City, 1969), p. 113.

<sup>6</sup>Chester Swanson, A Gateway to Higher Economic Levels (Berkeley, 1966), p. 10.

filing, mail procedures, communication devices, and basic data processing. In addition, mathematics, recordkeeping, law, psychology, supervision, and other business areas may be included. One year of typewriting and one year of shorthand are considered prerequisites for the class.<sup>7</sup>

Federally reimbursed vocational secretarial classes in Missouri. The general requirements regarding eligibility for reimbursement are that classes shall: (1) be limited to students who are specifically enrolled for the purpose of achieving vocational competence and have entered into a curriculum that is established by the school to prepare them for a secretarial occupational objective, (2) contain knowledge or skills designed to meet a career objective and not be regarded as general education suitable for others as well as vocational students, and (3) be taught by those who are qualified under the state plan.<sup>8</sup>

Cooperative training. Cooperative training is a method utilized in vocational programs which permits students, through a cooperative arrangement between the school and employers, to combine related classroom instruction at the high school with supervised on-the-job training through part-time employment. The two experiences are planned, supervised, and coordinated in order to make the maximum

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<sup>7</sup>Missouri. Policies and Procedures Manual for Business and Office Education (Jefferson City, n.d.), p. 14.

<sup>8</sup>Ibid., p. 7

contribution to the students' career objectives.<sup>9</sup>

Cooperative students. Cooperative students are enrolled in vocational classes and are expected to receive a minimum of 15 hours per week in supervised on-the-job training in addition to the classroom instruction.

Non-cooperative students. Non-cooperative students are enrolled in vocational classes, but they do not receive supervised on-the-job training in addition to the classroom instruction.

#### Delimitations

The study was subject to the following delimitations:

1. Vocational secretarial classes were the only classes included.
2. Classes in Missouri public schools which had initiated a federally reimbursed secretarial program on or before September, 1967, constituted the population.
3. Federally reimbursed classes in which some of the students in the class participated in cooperative training and some did not were the only classes included.
4. The 1970-71 school year was the only year considered.

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<sup>9</sup>American Vocational Association, Inc., Definitions of Terms in Vocational Technical and Practical Arts Education (Washington, n.d.), p. 6.

## Summary

In Chapter I, the purposes of the study were identified as an attempt (1) to measure the changes in straight copy typewriting skill, production typewriting skill, transcription of mailable copy skill, and knowledge of business fundamentals of students enrolled in federally reimbursed vocational secretarial classes in Missouri and (2) to compare the mean increases in the skills and knowledge of those participating in cooperative vocational secretarial training with the mean increases in skills and knowledge of those participating in non-cooperative vocational secretarial training.

The growth and significance of the office occupations were discussed, along with the increased emphasis being placed on office occupations programs.

The importance of the study was discussed as the contribution it may make in determining whether the educational experiences provided by cooperative training contribute significantly to the development of secretarial skills and knowledges.

A definition of terms and delimitations were also presented in Chapter I.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

A review of related literature was made by the researcher in order to develop a thorough understanding of the areas of research pertinent to this study. The research is summarized in four categories: (1) federal legislation enacted to support public vocational education, (2) cooperative business and office education, (3) vocational business and office education in Missouri, and (4) research studies relating to cooperative business and office education.

#### Federal Legislation Supporting Public Vocational Education

Federal support of public school occupational education in the United States began with the passage of the Morrill Act of 1862. This Act provided grants of land to endow, support and maintain state colleges devoted to the agricultural and mechanical arts.<sup>1</sup>

The initial support providing financing of vocational education through federal appropriations was stipulated in

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<sup>1</sup>Samuel M. Burt, Industry and Vocational-Technical Education (New York, 1967), pp. 304-305.

the Hatch Act of 1887. Increased federal funds were provided by legislation with the passage of the Second Morrill Act of 1890, the Nelson Amendment in 1907, and the Adams Act in 1906.<sup>2</sup>

In 1911, Congress expanded vocational education through passage of the State Marine School Act which provided training for those planning a seafaring career. The importance of this Act to vocational education was that it introduced, for the first time, the principle of matching federal aid by appropriating funds on the part of the state and local governments.<sup>3</sup>

During the first two decades of the twentieth century, a number of bills concerned with some aspects of vocational education were introduced in Congress. It was not until the Davis Bill of 1909, however, that the term vocational education appeared in the bills.<sup>4</sup>

In 1912, the National Society for the Promotion of Industrial Education, a group organized for the purpose of promoting and revising various state-level vocational programs, began advocating large-scale federal assistance for vocational education. In 1914, Congress passed a resolution authorizing the President to appoint the Commission on

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<sup>2</sup>Roy W. Roberts, Vocational and Practical Arts Education (New York, 1965), p. 127.

<sup>3</sup>Layton S. Hawkins, Charles A. Prosser, and John C. Wright, Development of Vocational Education (Chicago, 1951), p. 22.

<sup>4</sup>Roberts, p. 127.



National Aid to Vocational Education. The Commission was charged with the responsibility of determining (1) the need for vocational education, (2) the need for federal grants, (3) the kinds of vocational education for which grants should be made, (4) the extent and conditions under which aid should be granted, and (5) the need for possible legislation.<sup>5</sup>

The Commission presented its findings and recommendations to Congress five months after it was appointed. The recommendations made by the Commission advocated state aid and cooperation in the development of vocational programs throughout the nation. Vocational training was declared a joint responsibility of both the state and nation.

In its report, the Commission made the following recommendations concerning the need, at that time, for federal aid to commercial education:

1. There was no need for federal appropriations to the states for the benefit of professional, commercial, or nautical education.
2. Although there was a general feeling that the quality of commercial education might be improved, the reports from the country seemed to show that there was no great scarcity of trained workers of that kind.
3. The federal government should give substantial encouragement to commercial education through studies, investigations, and reports which would analyze conditions in commerce and commercial pursuits, and in that way furnish expert information for use in courses

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<sup>5</sup>Ibid., p. 130.

of instruction and methods of teaching commercial subjects.<sup>6</sup>

The Smith-Hughes Act of 1917, which had as its primary objective the promotion of vocational education, was a direct result of the study of the Commission. This Act made provisions for the creation of the Federal Board of Vocational Education and Commercial Education. The Board's second annual report emphasized that:

. . . while no funds were appropriated by the Smith-Hughes Act to stimulate commercial education, definite provisions were made for aiding the states in the solution of problems relating to better training for occupations commonly classified as commercial.<sup>7</sup>

The Federal Board for Vocational Education noted that the needs of commercial education, at that time, were:

1. The necessity for providing competent state supervision.
2. The establishment of more and better commercial teacher training facilities.
3. The outlining of part-time commercial education courses for those who were engaged in retail selling, clerical typewriting, book-keeping, and other commercial occupations.<sup>8</sup>

The George-Reed Act of 1929 provided for the expansion of support of vocational education in agriculture and in home economics that had been included in the Smith-Hughes

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<sup>6</sup>U.S., Congress, House, Report of the Commission on National Aid to Vocational Education, 63rd Cong., 2nd sess., 1914, Rept. 1004, p. 40.

<sup>7</sup>U.S., Federal Board for Vocational Education, Second Annual Report (Washington, D.C.: U.S. Government Printing Office, 1918), p. 65.

<sup>8</sup>Ibid., p. 66.

Act. When the George-Reed Act expired in 1934, the George-Ellzey Act was passed. This Act authorized three annual appropriations for training in agriculture, home economics, and trades and industries.<sup>9</sup>

Not until 1936, with the passage of the George-Deen Act, was legislation passed by Congress that authorized support for vocational education on a continuing basis. The Act provided an annual appropriation for vocational education in agriculture, home economics, trades and industries, and, for the first time, in distributive education.<sup>10</sup>

The George-Barden Act, passed in 1946, amended the George-Deen Act and superseded it. The Act increased the authorization of funds for the vocational areas covered by the George-Deen Act, and many of the limitations on the use of funds were omitted. The provision for distributive education continued to restrict training in the distributive occupations to support for part-time cooperative and evening courses for employed workers. Finally, in 1956, amendments to the George-Barden Act added funds for practical nursing and fishery trades.<sup>11</sup>

Under Title VIII of the National Defense Education Act of 1958, an annual appropriation was authorized for the training of highly skilled technicians. The Area

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<sup>9</sup>Mayor D. Mobley and Melvin L. Barlow, Vocational Education, ed. Melvin L. Barlow (Chicago, 1965), p. 187.

<sup>10</sup>Ibid.

<sup>11</sup>Roberts, pp. 135-136.

Redevelopment Act of 1961 and the Manpower Development and Training Act of 1962 provided for retraining of unemployed workers and those whose skills needed upgrading in order to meet shifting employment needs. Both acts were designed to provide training for adults.<sup>12</sup>

The Manpower Development and Training Act was important to office education:

Of the first ten most commonly trained-for occupations in the MDT institutional training programs, 32 per cent of all those receiving training in these occupations were in the office area. Of the first most commonly trained-for occupations, 26 per cent were in office work.<sup>13</sup>

The Smith-Hughes and George-Barden Acts were amended in 1963 to permit state boards for vocational education, with the approval of the United States Commissioner of Education, to transfer federal and state matching funds formerly earmarked for a special service to another occupational category and to use George-Barden distributive education funds for pre-employment training in schools other than part-time or evening schools.<sup>14</sup>

The Vocational Education Act of 1963 (Public Law 88-210) grew out of the report made by the Panel of Consultants on Vocational Education appointed at the request of President Kennedy. In his message to Congress on American

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<sup>12</sup>Mobley, pp. 189-190.

<sup>13</sup>Paul M. Pair, "The Impact of the Vocational Education Act of 1963 on Business Education," National Business Education Quarterly, XXXIV (Summer, 1966), p. 57.

<sup>14</sup>Roberts, p. 138.

Education, February 20, 1961, President Kennedy said:

The National Vocational Education Acts, first enacted by the Congress in 1917 and subsequently amended, have provided a program of training for industry, agriculture, and other occupational areas. The basic purpose of our vocational education effort is sound and sufficiently broad to provide a basis for meeting future needs. However, the technological changes which have occurred in all occupations call for a review and re-evaluation of these acts, with a view toward their modernization.

To that end, I am requesting the Secretary of Health, Education, and Welfare to convene an advisory body drawn from the educational profession, labor, industry, and agriculture, as well as the lay public, together with representatives from the Departments of Agriculture and Labor, to be charged with the responsibility of reviewing and evaluating the current National Vocational Education Acts, and making recommendations for improving and redirecting the program.<sup>15</sup>

The Panel concluded its work in 1962 and the results of the study were presented in a report, Education for a Changing World of Work, in 1963. Venn,<sup>16</sup> in analyzing the report, presented five major areas of service replacing the occupational categories specified by previous legislation:

1. High school youth. Present occupational programs should be expanded, and to them should be added wider pre-employment courses in office, distributive, and agricultural occupations.
2. High school age youth with academic, socio-economic, or other handicaps. Individualized programs of instruction and guidance should be set up for such youth. Experimental or pilot projects should receive federal support.

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<sup>15</sup>U.S., Office of Education, Education for a Changing World of Work (Washington, D.C.: U.S. Government Printing Office, 1963), p. v.

<sup>16</sup>Grant Venn, Man, Education and Work (Washington, 1964), pp. 123-124.

3. Post-high-school opportunities. Federal support should be increased to provide youth and adults with greater opportunities for full-time, post-high-school vocational technical education. The area schools and specialized vocational schools in large urban centers were singled out for their potential to train highly skilled craftsmen and technicians.
4. The unemployed or underemployed. Youth and adults unemployed or at work who need training or retraining to achieve employment stability should have part-time, short-term training courses available. These courses should be available to others needing occupational updating and upgrading.
5. Services to assure quality. Funds should be made available to improve teacher competence, instructional materials, occupational counseling, and various forms of research and reporting.

The Vocational Education Act of 1963 incorporated many of the recommendations of the Panel, as is indicated by the Declaration of Purpose of the Act:

It is the purpose of this part to authorize federal grants to states to assist them to maintain, extend, and improve existing programs of vocational education, and to provide part-time employment for youths who need the earnings from such employment to continue their vocational training on a full-time basis, so that persons of all ages in all communities of the state-- those in high school, those who have completed or discontinued their formal education and are preparing to enter the labor market, those who have already entered the labor market but need to upgrade their skills or learn new ones, and those with special education handicaps--will have ready access to vocational training or retraining which is of high quality, which is realistic in the light of actual or anticipated opportunities for gainful employment, and which is suited to their needs, interests, and ability to benefit from such training.<sup>17</sup>

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<sup>17</sup>U.S., Congress, Senate, Congressional Record, 88th Cong., 2nd sess., 1963, p. 23299.

Bolger<sup>18</sup> identified six major factors which underscore the main objectives of the Act:

1. Vocational and technical programs will be geared to the real needs of the labor market.
2. Training will be provided across the whole range of occupations in the labor market, except for professional occupations that require a baccalaureate or higher degree.
3. Training programs will be provided for all levels of ability, from the least able to the most capable.
4. Vocational education will be offered in comprehensive high schools; specialized vocational-technical high schools; technical high schools; junior and community colleges; area vocational and technical schools, both secondary and post-secondary; and both public and private four-year colleges and universities.
5. The Act requires evaluation at every level of responsibility.
6. Ten percent of each year's funds are to be allotted for research and development.

Two significant provisions were incorporated in the Vocational Education Act of 1963 that were missing from earlier federal legislation: (1) training for office and business occupations was specifically included for the first time, and (2) the Act called for pre-employment education so that students might use and improve their skills.<sup>19</sup>

The Vocational Education Amendments of 1968 further

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<sup>18</sup>James Bolger, "The New Look in Vocational Education," Business Education World, XLV (November, 1964), p. 28.

<sup>19</sup>Bessie B. Kaufman, "Can Business Education Meet the Challenge of the Vocational Act?" Business Education Forum, XVIII (April, 1964), p. 28.

provided aid to maintain, extend and improve existing programs of vocational and technical education.

#### Cooperative Business and Office Education

Work experience, as an integral part of the educational process, was introduced in American education around the turn of the twentieth century. Prior to that time, youth had to select either an apprenticeship-type training (unrelated to the established school program) or the regular school curriculum that separated occupations from education.

Cooperative education began in the engineering field and was broadened to include many trade and industrial occupations. Cooperative programs in the trade and industrial occupations were given new impetus on the high school and post-high school levels through the federal financial assistance made available to the states under the provisions of the Smith-Hughes Act of 1917. The George-Barden Act of 1946 extended part-time work to the retail selling field.<sup>20</sup>

One of the earliest programs in cooperative part-time training in business education at the high school level was established in 1926 at Wilmington, Delaware. However, unlike the programs of cooperative distributive education and industrial education, the cooperative office education program did not become eligible for reimbursement under provisions of federal vocational education acts until 1963.

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<sup>20</sup>Margaret Andrews and Marguerite Crumley, The Clerical Program in Business Education, ed. Harry Huffman (Somerville, 1959), pp. 334-335.



Since 1963, all states have received federal monies to begin programs of cooperative office education or to expand their programs which had previously been in operation with state vocational funds.<sup>21</sup>

Most educational practices have been questioned and evaluated. The advantages and disadvantages of the cooperative program have likewise been stated by many business educators. Under normal economic conditions, cooperative business education programs have advantages for the school, for the students, and for business. The advantages often include the following:

For the school:

1. Cooperative education provides a medium for carrying out a public relations program.
2. Cooperative education makes it less necessary for the school to invest a large sum of money in equipment.

For the student:

1. Students observe the subjects offered in a business curriculum being actually used in business.
2. Cooperative training functions as a medium of guidance.
3. Vocational courses offered by the school usually do not fully prepare students for vocations.
4. Part-time jobs often develop into permanent positions.

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<sup>21</sup>C. A. Nolan, Carlos K. Hayden, and Dean R. Malsbary, Principles and Problems of Business Education (Cincinnati, 1967), p. 459.

For the business:

1. Graduates enter full-time employment, not only with a background of business principles learned in school, but with practical work experience received as a cooperative student.
2. Employers have the opportunity to discover potential permanent employees.

Some disadvantages of the cooperative program have also been noted.

For the school:

1. Scheduling difficulties are often experienced.
2. Cooperative training programs involve additional expenditures.

For the student:

1. Employers occasionally fail to give trainees the variety of work experience they should receive.
2. Students often find it difficult to participate in extra-curricular activities.

For the employer:

1. Training any new employee is a costly process.
2. Regular employees may resent the use of student workers on the theory that the use of trainees may tend to keep experienced workers out of jobs.<sup>22</sup>

Advocates of cooperative programs are enthusiastic about the value of the work experience because they believe it provides a type of realistic training not otherwise obtainable. Some educators believe that no job instruction is valid unless the students have participated in cooperative training. Other educators have noted that many students

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<sup>22</sup>Ibid., pp. 459-466.

have never had cooperative work experience and yet become good workers. Rowe<sup>23</sup> cites the strengths and the weaknesses of the cooperative program:

#### Strengths

1. It correlates the teaching of business subjects with the needs of the business community.
2. The program serves industry by providing partly trained students for its labor needs.
3. It permits the adolescent to make a gradual adjustment to work and some responsibilities of adulthood.
4. The program serves as a guide for students wishing to explore possible business experiences.
5. It provides an opportunity for both the student and the teacher to evaluate their work.
6. It provides practical motivation to the business student.
7. It provides an opportunity to train on machines not in the school.
8. It permits the students to observe business work cycles.
9. It permits the students to broaden their view of the business field.
10. It provides the students an opportunity to see the close relationship of one skill to another.
11. It increases the opportunities for satisfactory postgraduate employment.
12. It reduces absenteeism, tardiness, and dropouts.

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<sup>23</sup>John L. Rowe, "Work Experience: The Pros and Cons," Business Education World, XXXIX (September, 1958), pp. 23-25, 36-37.

13. It serves as a public relations medium for the school in the community.

#### Weaknesses

1. It limits the period of a student's general education.
2. It limits the period of skill building.
3. It deprives students of participating in extra-curricular activities.
4. It subjects students to limited business experience and/or antiquated methods.
5. It develops an exaggerated sense of the monetary value of services.
6. It creates financial, scheduling, and personnel problems for school administrators.
7. It complicates teacher preparation and class management.
8. It may expose the student to exploitation.
9. It rarely integrates classroom teaching and work experience.
10. It shifts the school's training job to the businessman.
11. It may keep experienced workers out of work.
12. It requires frequent personnel changes.
13. It does not carry credit in certain high schools and colleges.

Assuredly, there are advantages and disadvantages of the cooperative office education program. However, many educators and laymen believe that cooperative programs can meet the need expressed by the National Education Policies Commission when it reported:

All youth need to develop salable skills and those understandings and attitudes that make the worker an intelligent and productive participant in economic life. To this end, most youth need

supervised work experience as well as education in the skills and knowledges of their occupations.<sup>24</sup>

#### Vocational Business and Office Education in Missouri

Although no federal program for funding vocational business and office education was provided by any of the legislative acts passed by Congress prior to 1963, reference to federally funded vocational education in Missouri's public schools is found in the 1918 Sixty-Ninth Report of the Public Schools of the State of Missouri. The detailed "Plans for the Administration of the Smith-Hughes Act in the State of Missouri" include a statement requiring the appointment of "one person of experience in Commerce" to the Advisory Committee appointed by the State Superintendent of Schools.<sup>25</sup> In addition, the report contains the following information relating to the application of the funds which were received:

. . . to promote and aid in the establishment and maintenance of public prevocational and vocational schools, departments and classes giving instruction in agriculture, industrial, home economics, and commercial subjects.<sup>26</sup>

The Seventy-Ninth Report of the Public Schools of the State of Missouri, issued in 1928, contained a statement which reflected the attitude of the State Superintendent of

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<sup>24</sup>Charles A. Prosser and Thomas H. Quigley, Vocational Education in a Democracy (Chicago, 1949), p. 283.

<sup>25</sup>Missouri. Sixty-Ninth Report of the Public Schools of the State of Missouri (Jefferson City, 1918), p. 114.

<sup>26</sup>Ibid., p. 134.

### Public Schools toward business education:

Commercial education, consisting of training in typewriting, bookkeeping, and related subjects, although to some extent vocational, is not yet taught on a vocational basis in the high schools of Missouri and is not considered a part of the program of vocational education.<sup>27</sup>

Even though commercial subjects were eligible to be funded under the provisions of the Smith-Hughes Act, the earliest direct reference to financial aid to "commercial" subjects is provided in a discussion of the George-Deen Bill of 1936, which for the first time distributive education was included on the eligibility for funding list. However, 1938-39 was the first full year distributive education was financed in Missouri.

In 1959, the Commissioner of Education for Missouri appointed a group of business educators to evaluate the secondary school business curriculum and to develop guides in the various subject matter areas. The guide for business education provided several references to the vocational aspect of business education and specific comments concerning the need for supervised work experience programs for office education.

While supervised work experience programs are not without precedent in the high schools of Missouri, such programs have not generally been related to business education. As a result, many students who might have profited from such supervised work experience have been overlooked. It is suggested in this guide, therefore, that such a program be offered for students in business

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<sup>27</sup>Missouri. Seventy-Ninth Report of the Public Schools of the State of Missouri (Jefferson City, 1928), p. 118.

education who aspire to a career in business.

Such a supervised work program should be directed by a professionally trained business education teacher who has also had on-the-job experience and who is allowed sufficient time in his schedule to observe and evaluate the work of students on the job.<sup>28</sup>

The 1966 report of Missouri public schools provided the following comments concerning vocational education in the secondary schools of Missouri:

Vocational education continues to expand and grow in total number of programs offered and individuals served by these programs. Two pieces of Federal legislation have been landmarks for vocational education--the Smith-Hughes Act and the George-Barden Act. In 1963, a third piece of Federal legislation was enacted. It is commonly referred to as the Vocational Education Act of 1963.<sup>29</sup>

Three significant additions were made to the program of vocational education in Missouri as a result of the 1963 vocational legislation: (1) Funds were made available for a work-study program for students enrolled in vocational programs in Missouri, (2) business and office education was included as a part of the reimbursed program, and (3) funds were provided for construction of area vocational schools.

In the fiscal year of 1966, two new staff members were added at the state level to assist in the development of the business and office vocational programs. Vocational

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<sup>28</sup>Business Education Study-Production Committee, A Guide for Business Education: Missouri (Jefferson City, 1959), p. 15.

<sup>29</sup>Missouri. One Hundred Seventeenth Report of the Public Schools of the State of Missouri (Jefferson City, 1966), pp. 20-21.

education has continued to expand and grow in Missouri in total number of programs offered and individuals served by the programs. A total of \$772,097 was expended in 1964-65 for vocational office education; a total of \$2,885,307 was expended in 1968-69. Reimbursable vocational office education programs had a total of 10,832 students enrolled in 1965-66; 16,078 students were enrolled in 1968-69.<sup>30</sup>

#### Related Research Studies

Most of the formal research completed in connection with cooperative programs has consisted of follow-up studies of graduates to determine the effectiveness of the high school courses in preparing the students for office jobs or surveys to determine the status of the programs.

Howell<sup>31</sup> completed a doctoral study involving the investigation of the organization and functioning of cooperative office occupations programs in selected secondary schools in Illinois. Data were collected from seven schools selected for size between five hundred and two thousand students each. Answers were sought to the following questions:

1. What advantages and disadvantages are found in the cooperative office occupations program as indicated by the following groups: a. students, b. coordinators, c. other business

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<sup>30</sup>Missouri. One Hundred Twentieth Report of the Public Schools of the State of Missouri (Jefferson City, 1969), p. 113.

<sup>31</sup>Doris L. Howell, "A Study of the Cooperative Office Occupations Programs in Selected Secondary Schools in Illinois," Dissertation Abstracts (Ann Arbor, 1954), p. 53.



teachers, d. administrators, e. employers, f. employees, and g. parents?

2. What are the objectives of the cooperative office occupations programs in secondary schools of Illinois?
3. What are the problems of organization, administration, and coordination?
4. What are the suggested improvements stated by participants?

Howell used interview guides, validated by the expert jury technique, to obtain data. In a group interview situation, Howell was present at the time 153 cooperative students answered the questionnaire form.

In 1965, Robertson<sup>32</sup> completed a study to determine whether there were significant differences in selected criteria between a group of employees who had participated in a secondary school cooperative education program and a group who had not participated in such a program. Data were compiled from a questionnaire and job-satisfaction scale completed by employees, a job rating scale completed by the employers, and high school records. From the group surveyed, usable data included that supplied by 51 students who had been in a cooperative education program and 70 students who had not.

Robertson found that no significant differences existed between the two groups when compared on the following job

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<sup>32</sup>Leonard F. Robertson, "An Exploratory Study of the Effect of Cooperative Education Programs in Beginning Occupations on Selected Employment Factors," Dissertation Abstracts (Ann Arbor, 1966), p. 7182.

factors: (a) job satisfaction, (b) job performance as determined by employers' ratings, (c) types of duties performed on the job, (d) supervisory responsibilities, (e) salary earned, (f) sizes or types of firms for which employees worked, (g) methods by which employees found employment, (h) job stability as determined by number of employers for whom employees had worked, (i) reasons why employees changed jobs, (j) job aspirations, and (k) expected persistence in present line of work. Robertson concluded that the cooperative education program was beneficial to those students who wanted to begin working immediately after they graduated from high school.

The purpose of a study conducted by Tuttle<sup>33</sup> in 1965 was to investigate the evidence concerning the effectiveness of a cooperative education training program in relation to post-high school employment. The effectiveness was evaluated from graduate and employer opinions. The 135 graduates interviewed indicated the chief reasons for enrolling in the cooperative training program were to gain work experience and the need to earn extra money. The graduates expressed satisfaction with their core area training, present job, and the school counseling and coordinating service. Sixty-two percent of the graduates were working on jobs related to their core area training.

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<sup>33</sup>David C. Tuttle, "A Follow-Up Study of Graduates' and Employers' Opinions of a Cooperative Training Program," Dissertation Abstracts (Ann Arbor, 1967), p. 66A.

The 30 employers interviewed by Tuttle expressed satisfaction with the core area training and felt the training helped the graduates to secure employment and to receive promotions. The employers expressed the belief that more training in production work, business ethics and employment procedures should be included in the core area training.

In 1967, Driska<sup>34</sup> used questionnaires to determine the current and recommended practices and procedures in both cooperative and non-cooperative office education programs at the public secondary school level. Based on the data collected, Driska concluded:

1. Cooperative office education programs and block programs are, and should be, the most frequently offered office education programs at the secondary school level.
2. Cooperative office education classes are, and should be, offered at the senior grade level; non-cooperative office education classes are, and should be, offered at the junior and senior levels.
3. Data processing, human relations, and office machines are the areas of office education in which additional materials are most needed; simulated office materials and programmed materials are the kinds of materials most needed.
4. Non-cooperative office education students are, and should be, selected on the basis of a career objective in office occupations and business course prerequisites.
5. Cooperative office education students are, and should be, selected on the basis of their career objectives in office occupations and

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<sup>34</sup>Robert S. Driska, "Office Education on the Secondary School Level: A Critical Analysis," Dissertation Abstracts (Ann Arbor, 1967), p. 1324-A.

employability from the standpoint of having fundamental skills and personality traits.

Bledsoe<sup>35</sup> completed a doctoral study to determine the difference between the educational development of students (DCE) who had participated in state approved Diversified Cooperative Education programs and that of students (NDCE) who had not participated in cooperative vocational education programs in selected public secondary schools in Indiana. The investigation revealed no significant statistical difference, at the 5 percent level of significance, between the educational development of the DCE students and the NDCE students included in the study. Bledsoe concluded:

1. State approved DCE programs afforded participants an opportunity for general educational development comparable to that offered NDCE students. Therefore, the general educational development of DCE students was not impeded through participation.
2. Rejection of DCE on the basis that it deprives the participant of an opportunity for general education development is neither justified nor realistic.
3. There was something inherent in the DCE experience which compensated for the lack of exposure to certain general education courses. These factors appeared to work as well for DCE students toward general educational development as the array of courses to which NDCE students were subjected worked for them.

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<sup>35</sup>Harry James Bledsoe, "A Comparison of the Educational Development of Diversified Cooperative Education Students and Non-Diversified Cooperative Education Students in Selected Indiana High Schools," Dissertation Abstracts (Ann Arbor, 1968), p. 756-A.

In 1968, Hodge<sup>36</sup> investigated the role of cooperative office education in the development of favorable attitudes toward office work. The Stuart Attitudes Toward Office Employment Scale was administered as a pre- and post-test to determine the effect of one semester of cooperative office education upon the attitudes of 200 students in the public schools in Milwaukee. The study revealed no significant difference in attitudes toward office work between the 100 cooperative office education students and the 100 non-cooperative office education students. Hodge concluded that students enrolled in vocational office education programs have favorable attitudes toward office employment as measured by the Stuart Attitudes Toward Office Employment Scale and that any difference in attitudes toward office employment between the two groups may be attributed to chance.

In 1968, Pierce<sup>37</sup> conducted a study to determine the degree of impact the Vocational Education Act of 1963 had on business education in the public schools of Missouri and the implications this impact had for the institutions preparing teachers for Missouri.

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<sup>36</sup>James L. Hodge, "Cooperative Office Education and Its Effect on Attitudes Toward Office Employment" (unpub. Ed.D. dissertation, Arizona State University, 1968), p. 87.

<sup>37</sup>Robert B. Pierce, "An Analysis of the Impact of the Vocational Education Act of 1963 on Business Education in the Public Secondary Schools of Missouri with Implications for Teacher Preparation" (unpub. Ph.D. dissertation, The University of Iowa, 1968), pp. 162-164.

Some of the conclusions drawn by Pierce were:

1. The vocational business and office education area has been afforded equal status in the Missouri State Plan for Vocational Education with the older vocational programs in agriculture, home economics, and distributive education.
2. Vocational business and office instructional personnel have been motivated by certification requirements to obtain academic preparation in the form of professional vocational courses.
3. A larger percentage of the school districts in the state were offering vocational business and office courses after the passage of the Act than before the passage of the Act.
4. The majority of the certified vocational business and office teachers in Missouri received their most recent degree from an out-of-state institution. Insufficient instructional personnel are being trained by institutions within the state to meet the needs of the vocational business and office program in Missouri.
5. An increasing number of students in the public secondary schools of Missouri are taking advantage of the opportunities provided for vocational business and office training since the passage of the Act.

Another doctoral study concerning the vocational education programs in Missouri was completed in 1968. The primary purpose of the study completed by Welsh<sup>38</sup> was to ascertain and compare input (expenditures and enrollment) and output (graduates, placement, and job success) of vocational education in Missouri in relation to the manpower needs of the state. Factual data concerning expenditures,

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<sup>38</sup>Donald J. Welsh, "An Analysis of Input and Output of Vocational Education in Missouri in Relation to Manpower Needs," Dissertation Abstracts (Ann Arbor, 1969), p. 2546-A.

enrollments, and placement of the vocational graduates in the state were secured from the 1966-67 records and statistical reports on file at the Missouri State Department of Education. Data on job success were obtained from past research on vocational graduates in the state. Welsh found that (1) there is a serious imbalance between funds expended for vocational education and the manpower needs of the state, (2) the state is a defaulting partner in vocational education in Missouri, (3) a greater percentage of secondary students should be directed toward vocational training, (4) Missouri vocational educators are not giving proper emphasis to the training of males who ultimately become the primary wage earners in most families, and (5) the schools of Missouri are not programming secondary youth for available jobs in a realistic manner.

#### Summary

Since the early years of the twentieth century, the allocation of federal funds has influenced the development of vocational education. Unlike the programs of vocational education in several other areas, business and office education programs were not eligible for reimbursement under provisions of federal vocational education acts until the passage of the Vocational Education Act of 1963.

Part-time cooperative classes in vocational education have proved popular for many years as a means of enabling young persons to obtain on-the-job supervised experience in

their area of interest along with organized classroom instruction. Business educators have written extensively on the merits and limitations of cooperative education; however, many believe that the combination of education and experience has definite advantages for the student, the school, and the businessman.

Since 1963, all states have used federal vocational funds to begin cooperative office education programs or to expand their programs which were being operated with state and local vocational funds. In Missouri, the impact of the Vocational Education Act of 1963 is reflected in the amount of money that has been distributed to the schools for vocational programs and in the number of students enrolled in business and office education programs.

Although advocates of cooperative education suggest that cooperative programs contribute effectively to the total education of the students, very little formal research has been completed in an attempt to identify the specific areas in which the students experience the greatest growth. Most of the doctoral studies have been based on data obtained through questionnaires and interviews, and most of the studies have been conducted in an attempt to determine the status of the programs.



## CHAPTER III

### METHODS AND PROCEDURES

The methods and procedures involved in selecting the population and the gathering, analyzing, and interpreting of the data concerning the knowledge of business fundamentals and straight copy typewriting, transcription of mailable copy, and production typewriting skills are explained in this chapter. The discussion is divided into four areas: (1) the population, (2) the instruments, (3) the collection, and (4) the treatment of the data.

#### Population

The population of this study consisted of 10 vocational secretarial classes in secondary schools in Missouri which began participating by September, 1967, in a federally reimbursed vocational secretarial program in which some of the students in the same class received cooperative training and some received only classroom instruction. Three years of participating in the program should have provided sufficient time for the program to become stabilized before being studied.

Cooperative training was the variable factor. The students receiving cooperative training comprised the

cooperative group; the students not receiving cooperative training comprised the non-cooperative group.

The cooperative students and the non-cooperative students in each class were taught by the same teacher. This procedure should have tended to eliminate bias which might have resulted from having different teachers.

A letter was mailed on June 20, 1970, to principals of all secondary schools in Missouri which the Vocational Business and Office Education Division of the Missouri State Department of Education had indicated were offering federally reimbursed vocational secretarial classes during the 1967-68 school year (see Appendix A). The 32 principals were asked to supply the name and address of the individuals who would be teaching the secretarial classes during the 1970-71 school year. A follow-up letter was mailed two weeks later to the seven principals who had not responded, and two additional replies were received.

On July 15, 1970, a letter, together with an enclosure explaining the study, was mailed to 27 teachers asking them to participate (see Appendix B). A follow-up letter was mailed on July 30 to those who had not responded.

Ten of the 23 respondents indicated their classes would not meet all the requirements stipulated for the classes to be included in the study.

Tests and instructions were mailed to the 13 who had indicated a willingness to participate and who had classes that would meet the stipulations outlined. One teacher

returned the tests because she believed they were not appropriate for testing her level of students; another returned the tests without a note of explanation; and a third teacher had to withdraw from the study because the district did not pass a levy until late in September, and the beginning of classes was delayed several weeks.

### Instruments

A five-minute straight copy typewriting test was used to determine the correct words per minute scores for the participants. To assure that the test involved unpracticed material, the copy was selected from College Typewriting, South-Western Publishing Company (see Appendix D).

The National Business Entrance Typewriting, Stenography, and Business Fundamentals and General Information Tests were used to test the knowledge of business fundamentals, production typewriting, and transcription of mailable copy skills of the participants. The National Business Entrance Tests were selected as the instruments to be used since they are recognized nationally, are prepared by testing specialists and business educators, and are reviewed by office executives. In addition, the tests were reviewed by the Psychological Corporation at the request of the Joint Committee on Tests of UBEA and NOMA. The summary of the report made by the Psychological Corporation contained the remark that "as far as total scores are concerned, the tests are almost

certainly as reliable as they need to be."<sup>1</sup>

The Business Fundamentals and General Information Test includes spelling, plurals, grammar, proper use of words, the solving of arithmetic problems, recall ability, judgment, and general information. The participants are allowed 45 minutes to answer the 100 questions; each question counts one point.

The Stenographic Test is a performance test designed to evaluate the ability of the examinee to take dictation and transcribe it in mailable form. The test consists of 13 letters dictated at 80 words per minute, with pauses between parts and for redictation. The participants are allowed 90 minutes for transcription. A total of 172 points is possible.

The two-hour Typewriting Test is designed to evaluate the application of skills and the ability to plan the arrangement of material, to determine machine adjustments necessary to carry out the plan, and to make corrections so that the final product is mailable. The test includes the typewriting of letters, forms, statistical material, tabulated material, envelopes, and material from rough drafts. A total of 270 points is possible.

Since the National Business Entrance Tests are copyrighted, they are not included in the appendix of this study.

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<sup>1</sup>Estelle L. Popham, ed., Evaluation of Pupil Progress in Business Education (Somerville, 1960), p. 344.

### Collection of the Data

Two weeks after the beginning of classes in the 1970-71 school year, the straight copy typewriting, production typewriting, stenography, and business fundamentals and general information tests were administered as a pre-test. It was assumed by the researcher and the coordinators that the two-week period of instruction would provide an opportunity for the students to review the skills they had learned the previous year.

The same straight copy typewriting, production typewriting, stenography, and business fundamentals and general information tests were administered as a post-test. Since high school seniors often participate in many pre-graduation activities, the coordinators suggested that the post-tests should be administered after 30 weeks of instruction.

All tests were scored by the researcher, and the results of the tests were mailed to the participating teachers. In order that all participants would have a positive score on the straight copy typewriting timed writing, correct words per minute was used (net words per minute could have resulted in negative scores). The National Business Entrance Tests were scored according to the instructions contained in the Correction Manual accompanying the tests.

### Treatment of the Data

The analysis of variance procedure was used as the statistical tool for the study.

According to Wert, Neidt, and Ahmann,<sup>2</sup> the analysis of variance is used "to provide an efficient test of the difference between two or more groups simultaneously." This technique is employed when two or more groups are to be compared on the basis of a "variable characteristic."<sup>3</sup>

For each of the four pre-tests, an analysis of variance was used to determine whether there was any significant difference between the mean scores of the cooperative group and the mean scores of the non-cooperative group.

The changes between pre-test scores and post-test scores were calculated and compared. The high, low, median, and mean scores, as well as the range, were determined for the two groups for each test.

Analysis of variance was used to test the null hypothesis that there is no significant difference in the mean increase in (1) straight copy typewriting skill, (2) production typewriting skill, (3) transcription of mailable copy skill, and (4) knowledge of business fundamentals, as measured by a pre-test and a post-test, between those students participating in cooperative vocational secretarial training and those participating in non-cooperative vocational secretarial training.

Prior to the test of significance, a five percent level

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<sup>2</sup>James E. Wert, Charles O. Neidt, and J. Stanley Ahmann, Statistical Methods in Education and Psychological Research (New York, 1954), p. 172.

<sup>3</sup>Ibid.

of confidence was placed on the assertion that there is no difference between the means of the two groups. The Table of F was used to test the obtained F for significance at the .05 level of confidence.<sup>4</sup>

### Summary

The methods and procedures for selecting the population and gathering, analyzing, and interpreting data were explained in Chapter III.

The population for this study consisted of 10 vocational secretarial classes in the secondary schools of Missouri which began participating in a federally reimbursed program by September, 1967.

A straight copy typewriting test and the National Business Entrance Typewriting, Stenography, and Business Fundamentals and General Information Tests were used to determine the knowledge of business fundamentals and the straight copy typewriting, production typewriting, and transcription of mailable copy skills of the participants.

The tests were administered as pre-tests two weeks after the beginning of classes in the 1970-71 school year and again after 30 weeks of instruction. Analysis of variance was used to compare the pre-test mean scores for the two groups and also to compare the mean increases between the scores on the pre-tests and the post-tests.

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<sup>4</sup>Edward C. Bryant, Statistical Analysis (New York, 1966), p. 310.

## CHAPTER IV

### ANALYSIS AND INTERPRETATION OF DATA

The data obtained from the straight copy typewriting test and the National Business Entrance Business Fundamentals and General Knowledge, Stenography, and Production Typewriting Tests were analyzed in this chapter. The data were comprised of scores made by a group of cooperative students and a group of non-cooperative students enrolled in 10 federally reimbursed vocational secretarial classes in the public secondary schools of Missouri. After two weeks of instruction in the 1970-71 school year, the straight copy typewriting, production typewriting, and business fundamentals and general knowledge tests were administered to 173 students as a pre-test. The stenography test was administered to 162 students as a pre-test. The same tests were administered as post-tests after 30 weeks of instruction.

Scores made by the cooperative group were compared with the scores made by the non-cooperative group. Analysis of variance was the statistical tool used to compare the mean pre-test scores for the two groups and also to test the significance of the mean increase between the pre-test scores and the post-test scores for the two groups.

The null hypothesis for the study was that there is



no significant difference in the mean increase in (1) straight copy typewriting skill, (2) production typewriting skill, (3) transcription of mailable copy skill, and (4) knowledge of business fundamentals, as measured by a pre-test and a post-test, between those students participating in cooperative vocational secretarial training and those participating in non-cooperative vocational secretarial training. The obtained F values were tested for significance at the .05 level of confidence.

#### Analysis of Business Fundamentals and General Knowledge Test Results

After two weeks of instruction in the 1970-71 school year, the National Business Entrance Business Fundamentals and General Information Test was administered to 70 cooperative students and 103 non-cooperative students enrolled in 10 federally reimbursed vocational secretarial classes. During the school year, two students graduated and three withdrew from the classes. The post-test was administered after 30 weeks of instruction. Table I lists the 10 classes and shows the number of cooperative students and non-cooperative students enrolled in each class. One hundred sixty-eight students participated in both the business fundamentals and general information pre-test and post-test. The class sizes ranged from one class with 24 participants to two classes with 9 participants. The mean class size was 16.8; however, half of the classes had 20 or more participants.

TABLE I  
 NUMBER OF PARTICIPANTS IN BUSINESS FUNDAMENTALS  
 AND GENERAL INFORMATION TEST

Class Number*	Cooperative Students	Non-Cooperative Students	Total
1	17	7	24
2	6	16	22
3	3	19	22
4	6	15	21
5	12	8	20
6	6	13	19
7	2	10	12
8	6	4	10
9	7	2	9
10	5	4	9
Totals	70	98	168

\*Class identification numbers were assigned on the basis of the total number of participants enrolled in the classes involved in the study. Throughout the study, classes are identified by the number shown in this table.

The data presented in Table II show that the business fundamentals and general knowledge pre-test mean scores for both the cooperative and non-cooperative groups were 62 points. The scores of the cooperative group ranged from a

low of 39 to a high of 80. The range for the non-cooperative group was from a low of 44 to a high of 84.

TABLE II  
PRE-TEST SCORES--BUSINESS FUNDAMENTALS  
AND GENERAL INFORMATION

Students	Scores			
	High	Low	Mean	Median
Cooperative	80	39	62.27	64
Non-Cooperative	84	44	62.04	62.5

The analysis of variance for the business fundamentals and general knowledge pre-test mean scores is given in Table III. The obtained value of 0.032 was tested for significance at the .05 level of confidence. The F value of 0.032 does not exceed the 3.84 found in the Table of F; therefore, there was no significant difference in the business fundamentals and general knowledge pre-test mean score of 62.27 for the cooperative group and the mean score of 62.04 for the non-cooperative group.

TABLE III  
ANALYSIS OF VARIANCE OF MEAN SCORES ON BUSINESS FUNDAMENTALS  
AND GENERAL INFORMATION PRE-TEST

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square
Groups	1	2.172	2.172
Within	166	11059.680	66.624
Total	167	11061.852	

$$F_{1,166} = \frac{2.172}{66.624} = 0.032$$

Tabled  $F_{1,166} = 3.84$  at .05 level of confidence.

A summary of the business fundamentals and general information post-test scores is presented in Table IV. The post-test mean score of 64.33 for the cooperative group is slightly more than one point higher than the mean score for the non-cooperative group. Both the low score of 26 and the high score of 86 were made by non-cooperative students.

TABLE IV  
 POST-TEST SCORES--BUSINESS FUNDAMENTALS  
 AND GENERAL INFORMATION

Students	Scores			
	High	Low	Mean	Median
Cooperative	78	47	64.33	64.5
Non-Cooperative	86	26	63.15	65

The changes between the scores on the business fundamentals and general information pre-test and post-test are shown in Table V. The mean increase of 2.17 points for the cooperative group is only slightly greater than the mean increase of 1.11 for the non-cooperative group. Changes for the cooperative group ranged from an increase of 17 points to a decrease of 11 points. Changes for the non-cooperative group ranged from an increase of 14 points to a decrease of 25 points. Approximately 60 percent of all participants showed some improvement.

TABLE V  
 CHANGES BETWEEN SCORES ON BUSINESS FUNDAMENTALS AND  
 GENERAL INFORMATION PRE-TEST AND POST-TEST

Change	Cooperative Students		Non-Cooperative Students	
	Frequency	Percent of Total	Frequency	Percent of Total
17	1	1.428		
16				
15				
14	1	1.428	1	1.020
13			2	2.040
12	1	1.428	1	1.020
11	1	1.428	1	1.020
10	1	1.428		
9	2	2.857	5	5.102
8	2	2.857	1	1.020
7	2	2.857	9	9.183
6	7	10.000	1	1.020
5	6	8.571	9	9.183
4	4	5.714	2	2.040
3	5	7.142	9	9.183
2	4	5.714	7	7.142
1	5	7.142	8	8.163
0	4	5.714	1	1.020
-1	5	7.142	11	11.224
-2	9	12.857	6	6.122
-3	2	2.857	7	7.142
-4	1	1.428	5	5.102
-5	1	1.428	2	2.040
-6	2	2.857	2	2.040
-7	1	1.428	1	1.020
-8	2	2.857	2	2.040
-9			2	2.040
-10				
-11	1	1.428		
-12			1	1.020
-13				
-14			1	1.020
-15				

TABLE V (Continued)

Change	Cooperative Students		Non-Cooperative Students	
	Frequency	Percent of Total	Frequency	Percent of Total
-16				
-17				
-18				
-19				
-20				
-21				
-22				
-23				
-24				
-25			1	1.020
Totals	70		98	
Mean Increase	2.17		1.11	

The null hypothesis for this part of the study was that there is no significant difference in the mean increase in business fundamentals and general information scores, as measured by a pre-test and a post-test, between cooperative students and non-cooperative students enrolled in 10 federally reimbursed vocational secretarial classes.

Results of the analysis of variance for the mean increase between scores on the business fundamentals and general information pre-test and post-test are shown in

Table VI. The F value of 1.091 was tested for significance at the .05 level of confidence. The obtained value of 1.091 is considered to be insignificant since it does not exceed the value of 3.84 found in the Table of F.

TABLE VI

ANALYSIS OF VARIANCE OF MEAN INCREASE BETWEEN SCORES  
ON BUSINESS FUNDAMENTALS AND GENERAL INFORMATION  
PRE-TEST AND POST-TEST

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square
Groups	1	36.457	36.457
Within	166	5545.538	33.406
Total	167	5581.995	

$$F_{1,166} = \frac{36.457}{33.406} = 1.091$$

Tabled  $F_{1,166} = 3.84$  at .05 level of confidence.



### Analysis of Straight Copy Typewriting Test Results

After two weeks of instruction in the 1970 fall semester, a five-minute straight copy typewriting test (selected from College Typewriting, South-Western Publishing Company) with a syllable intensity of 1.55 was administered to 70 cooperative students and 103 non-cooperative students enrolled in 10 federally reimbursed vocational secretarial classes. During the school year, two students graduated and three withdrew from the classes. One student was not present for the post-test administered after 30 weeks of instruction. Table VII lists the 10 classes and shows the number of cooperative students and non-cooperative students enrolled in each class. One hundred sixty-seven students participated in both the straight copy typewriting pre-test and post-test.

TABLE VII  
NUMBER OF PARTICIPANTS IN STRAIGHT  
COPY TYPEWRITING TEST

Class Number	Cooperative Students	Non-Cooperative Students	Total
1	16	7	23
2	6	16	22
3	3	19	22
4	6	15	21

TABLE VII (Continued)

Class Number	Cooperative Students	Non-Cooperative Students	Total
5	12	8	20
6	6	13	19
7	2	10	12
8	6	4	10
9	7	2	9
10	5	4	9
Totals	69	98	167

The data presented in Table VIII reveal that the pre-test mean correct words per minute typed by the cooperative students was 43.38 and the mean correct words per minute typed by the non-cooperative students was 41.71. The median score of 43 for the cooperative students was 2 words per minute greater than that of the non-cooperative group. The low of 19 correct words per minute typed by a cooperative student was 7 words fewer than the low of 26 correct words per minute typed by a non-cooperative student. The high of 60 correct words per minute typed by a cooperative student was 6 words fewer than the high of 66 correct words per minute typed by a non-cooperative student.

TABLE VIII  
PRE-TEST SCORES--STRAIGHT COPY TYPEWRITING

Students	Scores Correct Words Per Minute			
	High	Low	Mean	Median
Cooperative	60	19	43.38	43
Non-Cooperative	66	26	41.71	41

Results of the analysis of variance for the pre-test scores are shown in Table IX. The F value of 1.560 was tested for significance at the .05 level of confidence. The obtained F value of 1.560 is not significant at the .05 level since it does not exceed the value of 3.84 found in the Table of F. There was no evidence, therefore, of a significant difference in the straight copy pre-test mean correct words per minute typed by the cooperative students and the mean correct words per minute typed by the non-cooperative students.

TABLE IX  
ANALYSIS OF VARIANCE OF MEAN SCORES ON STRAIGHT COPY  
TYPEWRITING PRE-TEST

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square
Groups	1	111.917	111.917
Within	165	11830.203	71.698
Total	166	11942.120	

$$F_{1,165} = \frac{111.917}{71.698} = 1.560$$

Tabled  $F_{1,165} = 3.84$  at .05 level of confidence.

Table X shows that the post-test mean correct words per minute typed by the cooperative students was 52.70 and the post-test mean correct words per minute typed by the non-cooperative students was 51.54. A non-cooperative student typed the greatest number of correct words per minute, and a cooperative student typed the fewest correct words per minute. The cooperative student and the non-cooperative student who typed the greatest number of correct words per minute on the post-test also typed the greatest number of correct words per minute on the pre-test. Both students had a gain of 12 words per minute.

TABLE X  
POST-TEST SCORES--STRAIGHT COPY TYPEWRITING

Students	Scores Correct Words Per Minute			
	High	Low	Mean	Median
Cooperative	72	22	52.70	53
Non-Cooperative	78	33	51.54	50

As shown in Table XI, the mean increase of 9.83 correct words per minute for the 98 non-cooperative students is only .50 more than the mean increase of 9.33 correct words per minute for the 69 cooperative students. Changes for the cooperative students ranged from a decrease of 7 correct words per minute for one student to an increase of 20 correct words per minute for another student. The changes for the non-cooperative students ranged from a decrease of 5 correct words per minute to an increase of 26 correct words per minute.

Approximately 98.5 percent of the cooperative students and 95 percent of the non-cooperative students typed more correct words per minute on the post-test than they did on the pre-test. More than half of the participants increased at least 9 correct words per minute. More than 13 percent

of the cooperative students and more than 20 percent of the non-cooperative students increased at least 15 correct words per minute.

TABLE XI  
CHANGES BETWEEN SCORES ON STRAIGHT COPY TYPEWRITING  
PRE-TEST AND POST-TEST

Correct Word Per Minute Change	Cooperative Students		Non-Cooperative Students	
	Frequency	Percent of Total	Frequency	Percent of Total
26			1	1.020
25				
24				
23				
22				
21				
20	1	1.449	3	3.061
19			5	5.102
18	1	1.449	4	4.081
17	2	2.898		
16	5	7.246	2	2.040
15			6	6.122
14	6	8.695	3	3.061
13	6	8.695	5	5.102
12	4	5.797	6	6.122
11	2	2.898	9	9.183
10	5	7.246	4	4.081
9	3	4.347	10	10.204
8	8	11.594	7	7.142
7	8	11.594	7	7.142
6	7	10.144	6	6.122
5	2	2.898	5	5.102
4	1	1.449	2	2.040
3	4	5.797	4	4.081

TABLE XI (Continued)

Correct Word Per Minute Change	Cooperative Students		Non-Cooperative Students	
	Frequency	Percent of Total	Frequency	Percent of Total
2			3	3.061
1	2	2.898	1	1.020
0	1	1.449	1	1.020
-1			1	1.020
-2				
-3			1	1.020
-4			1	1.020
-5			1	1.020
-6				
-7	1	1.449		
Totals	69		98	
Mean Increase	9.33		9.83	

The null hypothesis for this part of the study was that there is no significant difference in the mean increase in straight copy typewriting skill, as measured by a pre-test and a post-test, between cooperative students and non-cooperative students enrolled in 10 federally reimbursed vocational secretarial classes.

Results of the analysis of variance for the mean increase between scores on the straight copy typewriting pre-test and post-test are shown in Table XII. The F value of

0.353 was tested for significance at the .05 level of confidence. The obtained F value of 0.353 is considered to be insignificant since it does not exceed the value of 3.84 found in the Table of F.

TABLE XII

ANALYSIS OF VARIANCE OF MEAN INCREASE BETWEEN SCORES ON  
STRAIGHT COPY TYPEWRITING PRE-TEST AND POST-TEST

Source of Variance	Degrees of Freedom	Sum of Squares of	Mean Square
Groups	1	10.436	10.436
Within	165	4877.038	29.557
Total	166	4887.474	

$$F_{1,165} = \frac{10.436}{29.557} = 0.353$$

Tabled  $F_{1,165} = 3.84$  at .05 level of confidence.

#### Analysis of Stenography Test Results

After two weeks of instruction in the 1970-71 school year, the National Business Entrance Stenography Test was administered to 64 cooperative students and 98 non-cooperative students enrolled in 10 federally reimbursed



vocational secretarial classes. During the school year, two students graduated and three withdrew from the classes. Two students were not present for the post-test which was administered after 30 weeks of instruction. Table XIII lists the 10 classes and shows the number of cooperative students and non-cooperative students enrolled in each class. One hundred fifty-five students participated in both the stenography pre-test and post-test. The class sizes ranged from one class with 23 participants to one class with 8 participants. The mean class size was 15.5.

TABLE XIII  
NUMBER OF PARTICIPANTS--STENOGRAPHY TEST

Class Number	Cooperative Students	Non-Cooperative Students	Total
1	16	7	23
2	6	16	22
3	3	19	22
4	5	15	20
5	7	4	11
6	6	12	18
7	2	10	12
8	6	4	10
9	6	2	8

TABLE XIII (Continued)

Class Number	Cooperative Students	Non-Cooperative Students	Total
10	5	4	9
Totals	62	93	155

As shown in Table XIV, the stenography pre-test mean score for the cooperative group was 33.95 and the mean score for the non-cooperative group was 32.32. Both the cooperative and non-cooperative groups had at least one participant who had a zero score. One non-cooperative student had a score of 134, twenty points greater than the high for the cooperative group. The median score of 26.5 for the cooperative group was 6.5 points greater than the median score for the non-cooperative group.

TABLE XIV  
PRE-TEST SCORES--STENOGRAPHY

Students	Scores			
	High	Low	Mean	Median
Cooperative	114	0	33.95	26.5
Non-Cooperative	134	0	32.32	20

The analysis of variance for the stenography mean pre-test scores is given in Table XV. The obtained value of 0.103 was tested for significance at the .05 level of confidence. The F value of 0.103 does not exceed the 3.84 found in the Table of F; therefore, there was no significant difference in the stenography pre-test mean score for the cooperative group and the mean score for the non-cooperative group.

TABLE XV  
ANALYSIS OF VARIANCE OF MEAN SCORES ON STENOGRAPHY PRE-TEST

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square
Groups	1	98.719	98.719
Within	153	145331.178	949.876
Total	154	145429.897	

$$F_{1,153} = \frac{98.719}{949.876} = 0.103$$

Tabled  $F_{1,153} = 3.84$  at .05 level of confidence.

A summary of the stenography post-test scores is given in Table XVI. The post-test mean score for the cooperative

group is almost 10 points higher than the mean score for the non-cooperative group. The median for the cooperative group is seven points higher than the median for the non-cooperative group. Three non-cooperative students had a zero score on the post-test; the low score for the cooperative group was eight. Both groups had at least one participant with a post-test score of 170.

TABLE XVI  
POST-TEST SCORES--STENOGRAPHY

Students	Scores			
	High	Low	Mean	Median
Cooperative	170	8	97.90	97
Non-Cooperative	170	0	88.08	90

The changes between scores on the stenography pre-test and post-test are shown in Table XVII. The mean increase of 63.9 points for the cooperative group is approximately 8 points greater than the mean increase of 55.77 for the non-cooperative group. Changes for the cooperative group ranged from an increase of 3 points to an increase of 128 points. Changes for the non-cooperative group ranged from an increase

of 126 points to a decrease of 14 points. All of the cooperative participants showed some improvement; approximately 96 percent of the non-cooperative participants also improved. More than 60 percent of all participants improved at least 50 points.

TABLE XVII

## CHANGES BETWEEN SCORES ON STENOGRAPHY PRE-TEST AND POST-TEST

Class Intervals Score Changes	Cooperative Students		Non-Cooperative Students	
	Frequency	Percent of Total	Frequency	Percent of Total
120 - 129	4	6.451	1	1.075
110 - 119	3	4.838	4	4.301
100 - 109			2	2.150
90 - 99	5	8.064	12	12.903
80 - 89	6	9.677	8	8.602
70 - 79	10	16.129	4	4.301
60 - 69	8	12.903	14	15.053
50 - 59	4	6.451	9	9.677
40 - 49	6	9.677	11	11.827
30 - 39	6	9.677	9	9.677
20 - 29	6	9.677	3	3.225
10 - 19	2	3.225	3	3.225
0 - 9	2	3.225	9	9.667

TABLE XVII (Continued)

Class Intervals Score Changes	Cooperative Students		Non-Cooperative Students	
	Frequency	Percent of Total	Frequency	Percent of Total
-1 - -9			2	2.150
-10 - -19			2	2.150
Totals	62		93	
Mean Increase	63.9		55.77	

The null hypothesis stated for this part of the study was that there is no significant difference in the mean increase in shorthand transcription skill, as measured by a pre-test and a post-test, between cooperative students and non-cooperative students enrolled in 10 federally reimbursed vocational secretarial classes.

Results of the analysis of variance for the mean increase between scores on the stenography pre-test and the post-test are shown in Table XVIII. The F value of 2.314 was tested for significance at the .05 level of confidence. The obtained value of 2.314 is shown to be insignificant since it does not exceed the value of 3.84 found in the Table of F.

TABLE XVIII

ANALYSIS OF VARIANCE OF MEAN INCREASE BETWEEN SCORES ON  
STENOGRAPHY PRE-TEST AND POST-TEST

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square
Groups	1	2493.672	2493.672
Within	153	164867.167	1077.563
Total	154	167360.839	

$$F_{1,153} = \frac{2493.672}{1077.563} = 2.314$$

Tabled  $F_{1,153} = 3.84$  at .05 level of confidence.

## Analysis of Production Typewriting Test Results

After two weeks of instruction in the 1970-71 school year, the National Business Entrance Typewriting Test was administered to 70 cooperative students and 103 non-cooperative students enrolled in 10 federally reimbursed vocational secretarial classes. During the school year, two students graduated and three withdrew from the classes. Six students were not present when the post-test was administered after 30 weeks of instruction. Table XIX shows the number of cooperative students and non-cooperative students in each class.

TABLE XIX  
NUMBER OF PARTICIPANTS--PRODUCTION TYPEWRITING

Class Number	Cooperative Students	Non-Cooperative Students	Total
1	16	7	23
2	6	16	22
3	3	19	22
4	5	15	20
5	12	8	20
6	6	12	18
7	2	8	10
8	6	4	10
9	6	2	8
10	5	4	9
Totals	67	95	162

The data presented in Table XX show that the production typewriting pre-test mean score of 120.51 for the cooperative group was approximately 10 points higher than the pre-test mean score for the non-cooperative group. The median for the cooperative group was 13 points higher than the median for the non-cooperative group. The scores for the cooperative group ranged from a low of 15 to a high of 191, a



difference of 176 points. The scores for the non-cooperative group ranged from a low of 21 to a high of 225, a difference of 204 points.

TABLE XX  
PRE-TEST SCORES--PRODUCTION TYPEWRITING

Students	Scores			
	High	Low	Mean	Median
Cooperative	191	15	120.51	125
Non-Cooperative	225	21	110.18	112

The analysis of variance for the production typewriting pre-test mean scores is given in Table XXI. The obtained value of 2.296 was tested for significance at the .05 level of confidence. The obtained F value of 2.296 does not exceed the 3.84 found in the Table of F; therefore, there was no significant difference in the production pre-test mean score for the cooperative group and the mean score for the non-cooperative group.

TABLE XXI  
ANALYSIS OF VARIANCE OF MEAN SCORES ON  
PRODUCTION TYPEWRITING PRE-TEST

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square
Groups	1	4191.400	4191.400
Within	160	292020.705	1825.129
Total	161	296212.105	

$$F_{1,160} = \frac{4191.400}{1825.129} = 2.296$$

Tabled  $F_{1,160} = 3.84$  at .05 level of confidence.

A summary of the production typewriting post-test scores is given in Table XXII. The post-test mean score of 184.52 for the cooperative group is 11 points higher than the mean score for the non-cooperative group; the median for the cooperative group is 14 points higher than the median for the non-cooperative group. The range of scores was approximately 195 points for each group, and each group had essentially the same high and low scores.

TABLE XXII  
 POST-TEST SCORES--PRODUCTION TYPEWRITING

Students	Scores			
	High	Low	Mean	Median
Cooperative	269	76	184.52	183
Non-Cooperative	268	73	173.56	169

The changes between the scores on the production typewriting pre-test and post-test are shown in Table XXIII. The mean increase of 64.04 for the cooperative group is only slightly greater than the mean increase of 62.905 for the non-cooperative group. Changes for the cooperative group ranged from an increase of 195 to a decrease of 32 points. Changes for the non-cooperative group ranged from an increase of 176 points to a decrease of 98 points. Approximately 93 percent of all participants showed some improvement. Twenty-one percent of all participants had an increase of at least 100 points.

TABLE XXIII  
 CHANGES BETWEEN SCORES ON PRODUCTION TYPEWRITING  
 PRE-TEST AND POST-TEST

Class Intervals Score Changes	Cooperative Students		Non-Cooperative Students	
	Frequency	Percent of Total	Frequency	Percent of Total
190 - 199	1	1.492		
180 - 189				
170 - 179	1	1.492	1	1.052
160 - 169			1	1.052
150 - 159			2	2.105
140 - 149	2	2.985	4	4.210
130 - 139	3	4.477	1	1.052
120 - 129	2	2.985	5	5.263
110 - 119	2	2.985		
100 - 109	4	5.970	5	5.263
90 - 99	5	7.462	10	10.526
80 - 89	5	7.462	11	11.578
70 - 79	7	10.447	4	4.210
60 - 69	3	4.477	6	6.315
50 - 59	3	4.477	9	9.473
40 - 49	8	11.940	10	10.526
30 - 39	4	5.970	5	5.263
20 - 29	2	2.985	9	9.473
10 - 19	5	7.462	3	3.157
0 - 9	6	8.955	1	1.052
-1 - -9	1	1.492	1	1.052
-10 - -19	1	1.492	2	2.105
-20 - -29			1	1.052
-30 - -39	2	2.985	1	1.052
-40 - -49				
-50 - -59				
-60 - -69			1	1.052
-70 - -79				
-80 - -89				
-90 - -99			2	2.105
<b>Totals</b>	<b>67</b>		<b>95</b>	
<b>Mean Increase</b>	<b>64.04</b>		<b>62.905</b>	

The null hypothesis for the production typewriting part of the study was that there is no significant difference in the mean increase in production typewriting skill, as measured by a pre-test and a post-test, between cooperative students and non-cooperative students enrolled in 10 federally reimbursed vocational secretarial classes.

Results of the analysis of variance for the mean increase between the scores on the production typewriting pre-test and post-test are shown in Table XXIV. The F value of 0.006 was tested for significance at the .05 level of confidence. The obtained value of 0.006 is considered to be insignificant since it does not exceed the value of 3.84 found in the Table of F.

TABLE XXIV

ANALYSIS OF VARIANCE OF MEAN INCREASE BETWEEN SCORES ON  
PRODUCTION TYPEWRITING PRE-TEST AND POST-TEST

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square
Groups	1	15.891	15.891
Within	160	387633.344	2422.708
Total	161	387649.235	

$$F_{1,160} = \frac{15.891}{2422.708} = 0.006$$

Tabled  $F_{1,160} = 3.84$  at .05 level of confidence.

### Summary

Data presented in this chapter were obtained from the pre-test and post-test scores made by cooperative and non-cooperative students enrolled in 10 federally reimbursed vocational secretarial classes in the public secondary schools of Missouri. A straight copy typewriting test and the National Business Entrance Typewriting, Stenography, and Business Fundamentals and General Information Tests were used as the instruments to gather the data.

Results of the analysis of variance of the pre-test scores indicated that there was no significant difference at the .05 level of confidence between the mean score of the cooperative group and the mean score of the non-cooperative group at the time the tests were administered after two weeks of instruction in the 1970-71 school year.

The mean increases between the pre-test scores and the post-test scores for the cooperative group and the non-cooperative group were analyzed for variance.

The obtained F values of 1.091 for the business fundamentals and general information test, 0.353 for the straight copy typewriting test, 2.314 for the stenography test, and 0.006 for the production typewriting test were tested for significance at the .05 level of confidence. The obtained values are considered insignificant since they do not exceed the value of 3.84 found in the Table of F.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter contains a summary of the problem, review of the literature, methods and procedures, and analysis and interpretation of the data relating to the study. Conclusions and recommendations for further study are also presented in this chapter.

#### The Problem

The purposes of the study were (1) to measure the changes in straight copy typewriting skill, production typewriting skill, transcription of mailable copy skill, and knowledge of business fundamentals of students enrolled in federally reimbursed vocational secretarial classes in Missouri and (2) to compare the mean increases in the skills and knowledge of those participating in cooperative vocational secretarial training with the mean increases in the skills and knowledge of those participating in non-cooperative vocational secretarial training.

#### Review of the Literature

A review of the related literature was made to develop a thorough understanding on the part of the researcher of

the areas of research pertinent to this study. The research was presented in four categories: (1) Federal legislation enacted to support public school vocational education, (2) cooperative business and office education, (3) vocational business and office education in Missouri, and (4) formal research studies relating to cooperative business and office education.

### Methods and Procedures

The population used for this study consisted of 10 vocational secretarial classes in the public secondary schools of Missouri which began participating in a federally reimbursed vocational secretarial program by September, 1967. Some of the students received cooperative training, and some received only classroom instruction. The study involved a cooperative group of 70 students and a non-cooperative group of 98 students.

A five-minute straight copy typewriting test and the National Business Entrance Typewriting, Stenography, and Business Fundamentals and General Information Tests were administered as a pre-test two weeks after the beginning of classes in the 1970-71 school year.

Analysis of variance was used to determine whether a significant difference in knowledge of business fundamentals and straight copy typewriting, production typewriting, and transcription of mailable copy skills was evident between the cooperative and the non-cooperative groups.



The same four tests were administered as post-tests after 30 weeks of instruction. The changes between pre-test scores and post-test scores were calculated and compared. The high, low, median, and mean scores, as well as the range, were determined for the two groups taking each test.

Analysis of variance was used to determine whether there was a significant difference in the mean increase, at the .05 level of confidence, in (1) straight copy typewriting skill, (2) production typewriting skill, (3) transcription of mailable copy skill, and (4) knowledge of business fundamentals, as measured by the pre-tests and post-tests, between those students participating in cooperative vocational secretarial training and those students participating in non-cooperative vocational secretarial training.

#### Analysis and Interpretation of the Data

An analysis of variance for the pre-test scores revealed there was no significant difference at the .05 level of confidence between the mean scores of the cooperative group and the mean scores of the non-cooperative group at the time the tests were administered after two weeks of instruction in the 1970-71 school year.

The mean increases between the pre-test scores and the post-test scores for the cooperative group and the non-cooperative group were analyzed for variance. The analysis of variance of the obtained F values of 1.091 for the business fundamentals and general information test, 0.353 for

the straight copy typewriting test, 0.006 for the production typewriting test, and 2.314 for the stenography test were tested for significance at the .05 level of confidence. The obtained values are considered insignificant since they do not exceed the value of 3.84 found in the Table of F.

### Conclusions

The problem in this study involved the testing of the following null hypothesis:

There is no significant difference in the mean increase in (1) straight copy typewriting skill, (2) production typewriting skill, (3) transcription of mailable copy skill, and (4) knowledge of business fundamentals, as measured by a pre-test and a post-test, between those students participating in cooperative vocational secretarial training and those participating in non-cooperative vocational secretarial training.

Interpretation of the data involved in this study fails to provide proof that the mean increases in knowledge of business fundamentals and typewriting and transcription of mailable copy skills of the cooperative students are significantly different from the mean increases in the skills and knowledge of the non-cooperative students enrolled in 10 vocational secretarial classes in Missouri during the 1970-71 school year. The null hypothesis cannot be rejected when the mean increases are compared at the .05 level of confidence.

From the findings presented in this study, it is concluded:

1. That any difference in the mean increase in the

knowledge of business fundamentals and in the straight copy typewriting skill, production typewriting skill, and transcription of mailable copy skill between cooperative students and non-cooperative students can be attributed to chance.

2. That cooperative training did not have any significant effect upon the development of knowledge of business fundamentals, straight copy typewriting skill, production typewriting skill, and transcription of mailable copy skill.

3. That the majority of the students enrolled in a vocational secretarial class improve their transcription of mailable copy skill, production typewriting skill, and straight copy typewriting skill.

4. That students' knowledge of business fundamentals does not change significantly during the year they are enrolled in a vocational secretarial class.

5. That all students who have been enrolled in a vocational secretarial class for one year do not possess the minimum skills and knowledges necessary for successful performance in a secretarial position, since post-test scores reveal that not all students can transcribe mailable copy. Also, some students have low scores on other tests which may indicate they possess marginal skills.

#### Recommendations

Based upon the findings and conclusions of this study, the following recommendations are made:

1. Research studies should be undertaken to develop

instruments for evaluating the relevancy of curriculum content of vocational business and office education programs.

2. Research studies should be undertaken to develop instruments for evaluating instructional methodology used in vocational business and office education programs.

3. Minimum preparation for an office occupation should be expressed in some way other than by the completion of a vocational program.

4. Instruments for measuring secretarial skills and knowledges should be updated and tested for relevancy.

5. Efforts should continue to be made to determine the skills and knowledges required for successful performance in secretarial positions.

6. Variables, other than cooperative training, should be considered in future attempts to measure the improvement of the skills and knowledges of those in vocational programs.

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APPENDIX A

LETTERS TO PRINCIPALS

CENTRAL MISSOURI STATE COLLEGE  
Warrensburg, Missouri

June 20, 1970

Dear

Mr. Charles Henry, state supervisor of business education, has indicated your high school offers the type of secretarial practice class which would be of value for me to include in a study I am making of selected vocational programs in Missouri.

So that I may write to the teacher of your secretarial class and seek her cooperation in this study, I shall appreciate your indicating at the bottom of this letter the name of the teacher and her summer address.

Sincerely yours,

Emmett N. McFarland  
Assistant Professor

Enclosure--Stamped Envelope

Name of Secretarial  
Practice Teacher

Summer Address

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CENTRAL MISSOURI STATE COLLEGE  
Warrensburg, Missouri

July 3, 1970

Dear

About two weeks ago I mailed a letter to your office asking that you supply the name and address of the teacher who will be working with your secretarial practice class during the 1970-71 school year. Since I have not received a reply, perhaps my letter did not reach you.

Mr. Charles Henry, state supervisor of business education, has indicated your high school offers the type of secretarial practice class which would be of value for me to include in a study I am making of vocational programs in Missouri.

So that I may write to the teacher of your secretarial class and seek her cooperation in this study, I shall appreciate your indicating at the bottom of this letter the name of the teacher and her summer address.

Sincerely yours,

Emmett N. McFarland  
Assistant Professor

Enclosure  
Stamped Envelope

Name of Secretarial  
Practice Teacher

Summer Address

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APPENDIX B

LETTERS AND ENCLOSURES MAILED TO TEACHERS

CENTRAL MISSOURI STATE COLLEGE  
Warrensburg, Missouri

July 15, 1970

Dear

I am planning to study vocational secretarial programs in Missouri during the 1970-71 school year. Mr. Charles Henry, until recently a state supervisor of business education, told me High School offers the type of program he believes would be of value for me to include in the study.

The study involves vocational secretarial classes in which some of the students receive cooperative training and some receive only classroom instruction. The purpose of the study is to compare the changes in skills and business knowledge exhibited by the two groups. As indicated in the enclosure, four tests will be administered at the beginning of the school year and again at the end of the year. Your participation in the study will involve administering the tests and mailing them to me.

Your school will, of course, be identified by a number. After I have scored the tests, I will supply you with the test results for your students as well as those of the other classes in the study.

I shall appreciate your indicating your willingness to participate in this study by completing the enclosed form and returning it to me. I must order the tests by August 10 to ensure having them available for you at the beginning of the school year.

Sincerely,

Emmett N. McFarland  
Assistant Professor

Enclosures--3  
Explanation of the Study  
Participation Form  
Stamped Envelope

## DEFINITIONS OF SELECTED TERMS

Vocational secretarial classes. Vocational secretarial classes include advanced shorthand, advanced typewriting, office machines, office procedures, business English and vocabulary building, business principles and organization, filing, mail procedures, communication devices, and basic data processing. In addition, mathematics, recordkeeping, law, psychology, supervision, and other business areas may be included.

Federally reimbursed vocational secretarial classes in Missouri. The general requirements regarding eligibility for reimbursement are that classes shall: (1) be limited to students who are specifically enrolled for the purpose of achieving vocational competence and have entered into a curriculum that is established by the school to prepare them for a secretarial occupational objective, (2) contain knowledge or skills designed to meet a career objective and is not regarded as general education suitable for others as well as vocational students, and (3) be taught by those who qualify under the State plan.

Cooperative training. Cooperative training is a method utilized in vocational programs which permits students, through a cooperative arrangement between the school and employers, to combine related classroom instruction at the high school and supervised on-the-job training through part-time employment. The two experiences are planned, supervised, and coordinated in order to make the maximum contribution to the students' career objectives.

Cooperative students. Cooperative students are enrolled in vocational classes and are expected to receive a minimum of 15 hours per week in supervised on-the-job training in addition to the classroom instruction.

Non-cooperative students. Non-cooperative students are enrolled in vocational classes, but they do not receive supervised on-the-job training in addition to the classroom instruction.

## PURPOSES OF THE STUDY

The purposes of the study are (1) to measure the changes in the straight copy typewriting skill, production typewriting skill, transcription of mailable copy skill, and knowledge of business fundamentals of students enrolled in federally reimbursed vocational secretarial classes in Missouri and (2) to compare the mean increases in straight copy typewriting skill, production typewriting skill,

transcription of mailable copy skill, and knowledge of business fundamentals of those participating in cooperative vocational secretarial training with the mean increases of those participating in non-cooperative vocational secretarial training.

## PROCEDURES

A straight copy typewriting test and the National Business Entrance Typewriting, Stenography, and Business Fundamentals and General Information Tests will be administered as a pre-test. After the students have participated in the vocational secretarial program for two semesters, the same tests will be administered as a post-test to determine the change in the straight copy typewriting skill, production typewriting skill, transcription of mailable copy skill, and knowledge of business fundamentals.

Correct words per minute will be used to determine the scores on the straight copy typewriting timed writing. The National Business Entrance Tests will be scored according to the instructions contained in the Correction Manual accompanying the tests.

## STATISTICAL DESIGN

The general design of the study will be based on the group mean increase of post-test scores over pre-test scores for the cooperative students and the non-cooperative students for each area tested.

An analysis of variance will be used to examine the data for the two groups to determine whether students receiving cooperative training change significantly more than those students receiving non-cooperative training.

An analysis of variance will be used to examine the significance of the mean increase in the skills for each of the following areas:

1. straight copy typewriting
2. production typewriting
3. transcription of mailable copy
4. knowledge of business fundamentals.

## TESTING SCHEDULE

The pre-tests will be administered on the eleventh, twelfth, and thirteenth days after the beginning of classes in the 1970-71 school year. The post-tests will be administered on the one hundred fifty-first, fifty-second, and fifty-third days of instruction.



## PARTICIPATION FORM

\_\_\_\_\_ High School offers the type of vocational secretarial class identified in the Explanation of the Study, and I will have my class participate in the study.

First day of classes for the  
1970-71 school year

\_\_\_\_\_

Number of students enrolled  
for cooperative vocational  
secretarial training

\_\_\_\_\_

Number of students enrolled  
for non-cooperative  
vocational secretarial  
training

\_\_\_\_\_

\_\_\_\_\_  
Instructor of Class

CENTRAL MISSOURI STATE COLLEGE  
Warrensburg, Missouri

July 30, 1970

Dear

I recently wrote to you and several other high school instructors and explained a study of vocational secretarial programs I am planning for the 1970-71 school year. Perhaps the letter and enclosures did not reach you; therefore, I am enclosing copies with this letter.

So that I may include High School in this study, please let me know by August 10 that you and your students will participate.

Sincerely,

Emmett N. McFarland  
Assistant Professor

Enclosures--4

July 15 Letter  
Explanation of the Study  
Participation Form  
Stamped Envelope

**APPENDIX C**

**LIST OF PARTICIPATING SCHOOLS**

## LIST OF PARTICIPATING SCHOOLS

Area Vocational School, Hannibal

Cape Girardeau Vocational-Technical School, Cape Girardeau

Hickman High School, Columbia

Laura Speed Elliott High School, Boonville

Mexico High School, Mexico

Poplar Bluff High School, Poplar Bluff

R-XI High School, Dexter

Raytown High School, Raytown

Raytown South High School, Raytown

Washington High School, Washington

APPENDIX D

STRAIGHT COPY TYPEWRITING TEST

As a rule, people having nothing to say manage to spend the longest time saying it. Available evidence indicates, however, that those who do listen while others speak have something less than a perfect batting average. Numerous studies have been conducted to ascertain the listening ability of college students and business people. How much of what these people hear would you estimate they can recall? How much of what you hear in class can you recall when the class has ended? The studies revealed that the average person remembered approximately half of what he heard just a few seconds after he heard it, even though he listened very carefully to the speaker. Several months later, he did well to remember 25 percent of what he had heard.

Few people ever take enough time to learn to listen. Numerous studies show that office workers earn approximately 80 percent of their salaries by using their ears. When errors are made because they do not hear what they should have heard, office work bogs down and expenses increase. Much of the frustrating confusion that exists in offices today could be eliminated if the people who work in them acquired listening skill.

Before establishing any formula for acquiring listening competence, it may be wise to study the particular problems of the listener. The average person speaks at about 125 words a minute, but most of us think at nearly four times that rate. Thus, we have time on our hands and tend to take mental excursions leading away from the points being

developed by the speaker. We become so interested in our mental reflections that the speaker is simply burning oxygen--we do not hear a word he is saying.

Listening skill can be developed in exactly the same manner that any other skill is developed. Here are some helpful suggestions. First, attempt to determine what important point the speaker will eventually make by analyzing what he has already said. Play a game, and see if you can possibly beat him to the punch line. Second, summarize briefly the essential points he has already made. Do this several times during the speech; do not wait for the speaker to do this for you. Third, critically analyze the facts he employs to support his points. Ask yourself if his facts are accurate and pertinent. Moreover, read between the lines. You may be able to detect various shades of meaning by listening attentively to his changing voice tones.

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Source: D. D. Lessenberry, S. J. Wanous, and C. H. Duncan, College Typewriting (7th ed., Cincinnati, 1965), pp. 367-368.

APPENDIX E

PRE-TEST AND POST-TEST DATA--BUSINESS FUNDAMENTALS  
AND GENERAL INFORMATION



TABLE XXV

PRE-TEST AND POST-TEST DATA--BUSINESS FUNDAMENTALS  
AND GENERAL INFORMATION

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
1	53	52	-1	59	67	8
	65	67	2	63	62	-1
	56	57	1	74	75	1
	73	76	3	49	47	-2
	80	78	-2	68	69	1
	79	77	-2	62	71	9
	61	68	7	66	70	4
	64	73	9			
	62	67	5			
	66	72	6			
	63	60	-3			
	46	58	12			
	40	57	17			
	61	72	11			
	55	52	-3			
	61	59	-2			
	52	58	6			
2	73	71	-2	56	68	12
	68	66	-2	66	65	-1
	67	62	-5	61	65	4
	70	74	4	68	71	3
	49	57	8	73	72	-1
	60	49	-11	64	71	7
				67	70	3
				58	67	9
				61	49	-12
				64	61	-3
				60	61	1
				65	61	-4
				68	54	-14
				69	78	9
			65	58	-7	
			84	86	2	
3	52	57	5	65	70	5
	66	59	-7	60	65	5
	56	54	-2	54	63	9

TABLE XXV (Continued)

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
				53	52	-1
				63	66	3
				60	58	-2
				65	67	2
				69	72	3
				62	61	-1
				62	64	2
				71	78	7
				47	61	14
				66	67	1
				50	63	13
				72	73	1
				61	52	-9
				64	71	7
				52	51	-1
				69	65	-4
4	71	74	3	54	57	3
	68	67	-1	71	73	2
	57	55	-2	66	65	-1
	67	59	-8	63	55	-8
	59	64	5	60	61	1
	69	73	4	46	52	6
				50	61	11
				64	62	-2
				60	65	5
				56	53	-3
				68	66	-2
				52	50	-2
				49	54	5
				58	65	7
				70	65	-5
5	53	57	4	72	73	1
	67	66	-1	55	56	1
	54	55	1	60	54	-6
	67	73	6	46	51	5
	57	60	3	56	51	-5
	71	70	-1	60	59	-1
	51	58	7	62	61	-1
	66	71	5	63	70	7

TABLE XXV (Continued)

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
	65	75	10			
	39	48	9			
	49	55	6			
	70	64	-6			
6	74	76	2	65	70	5
	68	69	1	55	51	-4
	47	47	0	55	52	-3
	63	65	2	61	70	9
	64	64	0	51	26	-25
	67	68	1	60	67	7
				60	63	3
				50	52	2
				77	74	-3
				76	73	-3
				62	53	-9
				60	65	5
				70	69	-1
7	62	60	-2	70	66	-4
	69	74	5	56	63	7
				59	55	-4
				65	63	-2
				64	67	3
				74	76	2
				73	70	-3
				70	77	7
				66	68	2
				59	53	-6
8	71	77	6	58	61	3
	61	75	14	73	76	3
	68	70	2	66	79	13
	65	68	3	54	61	7
	64	70	6			
	67	70	3			
9	62	61	-1	70	62	-8
	70	62	-8	44	43	-1
	53	61	8			
	68	64	-4			

TABLE XXV (Continued)

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
	45	50	5			
	62	56	-6			
	55	55	0			
10	76	76	0	53	50	-3
	67	65	-2	70	75	5
	65	69	4	55	55	0
	68	74	6	63	68	5
	60	61	1			

APPENDIX F

PRE-TEST AND POST-TEST DATA--STRAIGHT COPY TYPEWRITING

TABLE XXVI

## PRE-TEST AND POST-TEST DATA--STRAIGHT COPY TYPEWRITING

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
1	37	44	7	42	57	15
	46	51	5	36	47	11
	48	54	6	41	50	9
	48	49	1	36	43	7
	44	50	6	45	40	-5
	57	65	8	55	62	7
	46	60	14	48	68	20
	39	53	14			
	40	48	8			
	51	54	3			
	34	51	17			
	37	45	8			
	37	53	16			
	43	54	11			
	48	56	8			
	44	57	13			
2	36	29	-7	26	36	10
	58	59	1	55	63	8
	48	64	16	55	52	-3
	52	63	11	39	52	13
	28	45	17	38	49	11
	40	52	12	50	46	-4
				50	61	11
				41	47	6
				41	55	14
				50	55	5
				51	55	4
				26	35	9
				53	64	11
				45	60	15
				52	55	3
			43	54	11	
3	32	46	14	41	49	8
	33	41	8	36	44	8
	45	52	7	39	51	12
				39	46	7
				39	42	3

TABLE XXVI (Continued)

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
				38	46	8
				30	38	8
				34	39	5
				32	41	9
				52	62	10
				34	48	14
				35	44	9
				42	45	3
				30	41	11
				28	47	19
				42	55	13
				37	41	4
				50	56	6
				57	72	15
4	52	52	0	31	51	20
	42	60	18	45	61	16
	47	57	10	37	50	13
	43	57	14	28	41	13
	41	54	13	29	38	9
	45	55	10	28	47	19
				40	58	18
				29	47	18
				30	56	26
				29	48	19
				30	33	3
				33	38	5
				37	56	19
				47	59	12
				35	53	18
5	35	42	7	50	64	14
	45	48	3	36	48	12
	39	42	3	41	43	2
	41	54	13	41	50	9
	42	48	6	51	63	12
	40	47	7	37	38	1
	24	30	6	37	37	0
	44	50	6	51	64	13
	57	64	7			
	20	28	8			

TABLE XXVI (Continued)

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
	19	22	3			
	50	64	14			
6	53	61	8	53	62	9
	40	50	10	45	54	9
	52	64	12	53	60	7
	40	54	14	45	47	2
	51	58	7	39	58	19
	57	66	9	57	59	2
				56	55	-1
				66	78	12
				51	56	5
				53	61	8
				44	50	6
				44	50	6
				40	49	9
7	31	47	16	48	64	16
	42	62	20	38	47	9
				41	47	6
				41	51	10
				48	59	11
				46	66	20
				48	63	15
				35	46	11
				45	51	6
				42	49	7
8	52	58	6	39	49	10
	47	59	12	40	55	15
	52	62	10	41	53	12
	60	72	12	40	48	8
	35	48	13			
	32	48	16			
9	42	48	6	34	52	18
	46	59	13	37	48	11
	51	59	8			
	53	60	7			
	43	52	9			
	40	53	13			



TABLE XXVI (Continued)

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
	40	56	16			
10	56	63	7	33	40	7
	44	54	10	54	59	5
	44	48	4	39	54	15
	52	61	9	48	55	7
	41	45	4			

APPENDIX G

PRE-TEST AND POST-TEST DATA--STENOGRAPHY

TABLE XXVII  
PRE-TEST AND POST-TEST DATA--STENOGRAPHY

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
1	14	24	10	23	117	94
	9	81	72	9	47	38
	24	143	119	59	131	72
	114	151	37	5	29	24
	90	125	35	8	45	37
	104	141	37	45	144	99
	60	89	29	69	165	96
	31	71	40			
	26	90	64			
	21	98	77			
	5	30	25			
	0	81	81			
	0	83	83			
	17	96	79			
	0	93	93			
	17	90	73			
	2	12	15	3	8	53
59		89	30	27	90	63
81		105	24	51	81	30
51		104	53	37	87	50
9		50	41	15	45	30
7		35	28	13	63	50
				78	161	83
				63	111	48
				23	27	4
				68	125	57
				18	78	60
				16	36	20
				13	65	52
				65	125	60
			17	80	63	
			90	91	1	
3	0	95	95	69	152	83
	0	8	8	12	108	96
	8	60	52	30	39	9
				14	98	84
				11	137	126

TABLE XXVII (Continued)

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
				65	51	-14
				0	50	50
				53	138	85
				15	33	18
				14	74	60
				50	142	92
				9	57	48
				101	110	9
				15	3	-12
				8	50	42
				12	77	65
				90	150	60
				20	90	70
				111	160	49
4	74	116	42	22	30	8
	68	134	66	11	125	114
	29	78	49	51	119	68
	27	125	98	29	21	-8
	76	138	62	6	78	72
				9	15	6
				11	42	31
				11	69	58
				24	56	32
				39	119	80
				0	0	0
				20	80	60
				23	71	48
				6	42	36
				11	98	87
5	98	128	30	134	170	36
	12	36	24	20	113	93
	53	116	63	5	54	49
	57	90	33	8	72	64
	62	137	75			
	83	125	42			
	72	134	62			
6	31	96	65	96	122	26
	68	138	70	9	90	81

TABLE XXVII (Continued)

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
	13	80	67	38	87	49
	50	126	76	0	2	2
	54	128	74	33	51	18
	41	136	95	21	129	108
				0	114	114
				132	170	38
				60	126	66
				44	116	72
				18	71	53
				72	120	48
7	7	93	86	15	117	102
	29	123	94	0	117	117
				36	101	65
				81	144	63
				30	123	93
				11	101	90
				92	159	67
				24	116	92
				42	98	56
				19	107	88
8	29	114	85	0	41	41
	0	69	69	39	129	90
	32	155	123	9	107	98
	42	170	128	6	0	-6
	0	18	18			
	5	53	48			
9	54	132	78	67	84	17
	14	92	78	0	0	0
	14	137	123			
	0	50	50			
	14	39	25			
	20	103	83			
10	53	170	117	3	53	50
	30	114	84	45	158	113
	12	126	114	5	50	45
	5	129	124	0	99	99
	18	75	57			

APPENDIX H

PRE-TEST AND POST-TEST DATA--PRODUCTION TYPEWRITING

TABLE XXVIII

## PRE-TEST AND POST-TEST DATA--PRODUCTION TYPEWRITING

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
1	135	172	37	115	161	46
	125	182	57	123	204	81
	87	136	49	184	256	72
	176	188	12	109	123	14
	116	237	121	181	265	84
	153	260	107	69	225	156
	187	269	82	92	268	176
	147	193	46			
	119	124	5			
	92	177	85			
	73	175	102			
	100	184	84			
	191	240	49			
	111	173	62			
	100	211	111			
	79	221	142			
	2	131	132	1	107	152
187		156	-31	119	267	148
132		129	-3	171	141	-30
131		192	61	95	263	168
49		141	92	155	185	30
143		159	16	172	167	-5
				165	268	103
				100	152	52
				132	161	29
				136	232	96
				144	175	31
				85	174	89
				53	108	55
				124	228	104
				107	193	86
			80	227	147	
3	63	155	92	96	190	94
	117	196	79	85	147	62
	47	193	146	65	125	60
				73	193	120
				115	165	50

TABLE XXVIII (Continued)

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
				85	205	120
				87	167	80
				73	171	98
				73	85	12
				225	250	25
				117	177	60
				21	105	84
				115	125	10
				79	169	90
				71	168	97
				36	193	157
				119	148	29
				120	169	49
				76	224	148
4	135	121	-14	99	145	46
	116	150	34	145	165	20
	105	122	17	87	139	52
	73	207	134	141	81	-60
	107	139	32	60	148	88
				60	95	35
				33	88	55
				146	107	-39
				87	73	-14
				62	128	66
				112	135	23
				79	109	30
				45	141	96
				115	123	8
				132	175	43
5	68	108	40	144	228	84
	155	226	71	108	141	33
	101	125	24	108	130	22
	120	251	131	113	158	45
	165	205	40	100	161	61
	184	200	16	75	159	84
	45	76	31	116	172	56
	147	151	4	160	141	-19
	187	192	5			
	15	92	77			



TABLE XXVIII (Continued)

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
	25	83	58			
	185	189	4			
6	128	266	138	129	183	54
	92	267	175	89	151	62
	169	241	72	167	193	26
	89	204	115	111	156	45
	148	153	5	152	180	28
	144	233	89	189	91	-98
				104	184	80
				192	243	51
				131	225	94
				125	259	134
				88	165	77
				132	175	43
7	125	183	58	159	262	103
	67	167	100	64	169	105
				112	160	48
				147	219	72
				144	169	25
				104	199	95
				140	260	120
				27	172	145
8	120	241	121	40	149	109
	147	115	-32	156	179	23
	168	265	97	115	187	72
	73	268	195	80	179	99
	129	173	44			
	127	172	45			
9	152	167	15	113	156	43
	85	159	74	33	125	92
	69	152	83			
	119	181	62			
	80	155	75			
	123	147	24			
10	143	221	78	145	231	86
	167	266	99	181	225	44

TABLE XXVIII (Continued)

Class Number	Cooperative Students			Non-Cooperative Students		
	Pre- Test Score	Post- Test Score	Change	Pre- Test Score	Post- Test Score	Change
	180	227	47	47	176	129
	137	240	103	175	153	-22
	169	268	99			

VITA

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Candidate for the Degree of

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