A COMPARISON OF THE EFFECTS OF NUMBER AND ALPHABETIC DRILLS ON STRAIGHT-COPY AND NUMBER-COPY SPEED AND ACCURACY OF COLLEGE INTERMEDIATE TYPEWRITING STUDENTS

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CHAPTER I

THE PROBLEM

Introduction

Teaching students to type numbers is a part of the task facing typewriting teachers as they assist students prepare themselves to use a typewriter efficiently and effectively. Featheringham (1974) wrote that teaching number typing continues to be a challenge to instructors. Robinson, Erickson, Beaumont, Crawford and Ownby (1979) maintained that generally students do not enjoy typing figures or symbols and do not develop the number typewriting speed and accuracy which teachers want and which some employers in business and government expect. They further pointed out the following causes of lack of proficiency in typing numbers and symbols:

1. insufficient practice at the time of initial learning to develop efficient motion patterns on the figures and symbols
2. inadequate follow-up practice on figures and symbols in context
3. inadequate and too infrequent demonstrations of correct motion patterns of the top-row keys
4. fear of making errors when typing figures and symbols.

Additional factors which complicate learning to type numbers accurately and rapidly noted by Willins (1970) were: (1) the long reaches involved in striking the keys, (2) the relative infrequency of numbers in copy as compared with alphabetic characters, and (3) the fact that there is no context in typed numbers.

The arrangement of keys on most typewriters has not changed significantly in the years since 1872 when Christopher Shoales developed a revised keyboard to replace the original one on the first practical typewriter which he and co-workers, Carlos Glidden and Samuel W. Soule, invented in 1867. The latter keyboard minimized the problem of jammed or clashing typebars at the point of printing and improved the performance of the machine (Russon and Wanous, 1973).

On the 1872 keyboard, which has come to be known as the "universal" keyboard, the number or figure keys were placed on the top row, beginning with two and continuing through nine. Those figures remain on the top row today, although their relationship with the keys on the row below has been changed by a move of the numbers one key to the right. Another change in typewriters produced today is the addition of a key for the number "one" on the top row.

Whether or not Shoales and his co-workers had in mind a touch system of typewriting using all eight fingers and with the typist's eyes directed to the material to be copied, such a system was developed by Frank McGurrin in 1878. By the year 1900, that system was accepted throughout the United States (Russon and Wanous, 1973). A quick glance at the keyboard will show that the number keys on the top row constitute the longest reaches possible for the fingers if typists use the touch system and keep their fingers on the "home row" keys when not actually striking other keys.

Featheringham (1974) concluded that the majority of research has not shown any method of teaching numbers to be significantly superior. Even though the research is not conclusive concerning the method by which the number keys are initially presented, skillbuilding techniques

should be examined to determine if students' number-typing skills can be developed to a higher level without adversely affecting other typing skills.

The typing of drill lines is an accepted strategy in keyboard learning and skillbuilding phases of typewriting instruction. Robinson et al. (1979, p. 63) reported, "properly managed repetition with appropriate improvement goals and at varying levels of practice speed is essential for any skill that must be performed with speed, poise, and finesse." The nature of the drill material is another important consideration. Robinson and Lessenberry (1977) noted the value of providing students with structured materials which systematically incorporate less-used components as well as high-frequency ones.

If the premises are valid that repetitive practice is essential to developing typewriting skill and that structured instructional materials are beneficial, then it should follow that students can increase their skill in typing numbers if drills containing mostly numbers are practiced. Caution must be exercised when adding a specific type of drill material because limited class time is available for the variety of skills that must be taught. The positive and the negative effects of any proposed activity must be evaluated.

The focus of this study was to compare the number-copy and straight-copy speed and accuracy skills of students typing drills consisting primarily of numbers and symbols with those same skills of students typing drills consisting primarily of alphabetic characters. The objective was to determine if students could improve their number-typing skill by concentrating on short number drills rather than short alphabetic drills without a detrimental effect on their alphabetic typewriting skill.

Need for the Study

There have been few research studies completed regarding the effects of number drills on the speed and accuracy of typists. Grill (1965, p. 9) observed that there has been little research conducted toward the specialized matter of digit and symbol typewriting and that "the development of digit and symbol proficiency is apparently a neglected area in the business education program." He concluded (1965, p. 203) that "research in the teaching of numbers and symbols by touch is needed in the area of typwriting methodology." Rowe and Thoreson (1976) noted that the average typist has more numbers to type than in the past because of such factors as the use of social security numbers on documents, ZIP codes, and the fact that the general public and business are "increasingly data conscious." They also pointed out the growing importance of data processing as a cause of the increased use of numbers.

In the typewriting section of the 1979 Delta Pi Epsilon Research Bulletin entitled, "Needed Research in Business Education," Poland (1979, p. 23) posed the following question as an area needing investigation: "What effect do special-focus drills (left hand, right hand, top row, etc.) have in the development of typing skills?" Two effects of top-row number drills as opposed to primarily alphabetic drills were examined in this study: (1) their effect on the number-copy typing skills of intermediate typewriting students, and (2) their effect on the straight-copy typing skills of intermediate typewriting students. To examine the effects of such drills on the number-copy typing skills would not give a true picture of their worth if the possible effects on students' straight-copy speed and accuracy were ignored.

Purpose of the Study

The principal purpose of this study was to compare the effects of number drills and alphabetic drills on straight-copy and number-copy speed and accuracy of college intermediate typewriting students. A second purpose was to compare the effects of number and alphabetic drills on the straight-copy and number-copy speed and accuracy of students classified as having low typewriting skill and of students classified as having high typewriting skill. The final purpose of the study was to determine if the effects of number drills on straight-copy and number-copy speed and accuracy were the same for students with low typewriting skill levels as for students with high typewriting skill levels.

Statement of Problem

This study was undertaken to compare the effects of number drills and alphabetic drills on straight-copy and number-copy speed and accuracy of collegiate intermediate typewriting students. The questions answered were:

1. Are the effects of number drills and alphabetic drills practiced for five-week and for ten-week periods of time the same on straight-copy and number-copy speed and accuracy?

2. Are the effects of number drills and alphabetic drills practiced for five-week and for ten-week periods of time the same on straight-copy and number-copy speed and accuracy of students classified as having low typewriting skill?

3. Are the effects of number drills and alphabetic drills practiced for five-week and for ten-week periods of time the same on straight-

copy and number-copy speed and accuracy of students classified as having high typewriting skill?

4. Are the effects of number drills practiced for five-week and for ten-week periods of time on straight-copy and number-copy speed and accuracy the same for students classified as having low typewriting skill and for students classified as having high typewriting skill?

Hypotheses

In order to compare the effects of number and alphabetic drills on straight-copy and number-copy speed and accuracy, the following null hypotheses were tested. Those students receiving the number-copy drills made up the experimental group; students who received alphabetic drills comprised the control group.

1. There will be no statistically significant difference in straight-copy speed scores between the control group and the experimental group after five weeks.

2. There will be no statistically significant difference in straight-copy error scores between the control group and the experimental group after five weeks.

3. There will be no statistically significant difference in number-copy speed scores between the control group and the experimental group after five weeks.

4. There will be no statistically significant difference in number-copy error scores between the control group and the experimental group after five weeks.

5. There will be no statistically significant difference in straight-copy speed scores between the control group and the experimental group after ten weeks.

6. There will be no statistically significant difference in straight-copy error scores between the control group and the experimental group after ten weeks.

7. There will be no statistically significant difference in number-copy speed scores between the control group and the experimental group after ten weeks.

8. There will be no statistically significant difference in number-copy error scores between the control group and the experimental group after ten weeks.

9. There will be no statistically significant difference after five weeks in straight-copy speed scores between the control group and the experimental group for students classified as having low typewriting skill.

10. There will be no statistically significant difference after five weeks in straight-copy accuracy scores between the control group and the experimental group for students classified as having low typewriting skill.

11. There will be no statistically significant difference after five weeks in number-copy speed scores between the control group and the experimental group for students classified as having low typewriting skill.

12. There will be no statistically significant difference after five weeks in number-copy accuracy scores between the control group and the experimental group for students classified as having low typewriting skill.

13. There will be no statistically significant difference after ten weeks in straight-copy speed scores between the control group and

the experimental group for students classified as having low typewriting skill.

14. There will be no statistically significant difference after ten weeks in straight-copy accuracy scores between the control group and the experimental group for students classified as having low typewriting skill.

15. There will be no statistically significant difference after ten weeks in number-copy speed scores between the control group and the experimental group for students classified as having low typewriting skill.

16. There will be no statistically significant difference after ten weeks in number-copy accuracy scores between the control group and the experimental group for students classified as having low typewriting skill.

17. There will be no statistically significant difference after five weeks in straight-copy speed scores between the control group and the experimental group for students classified as having high typewriting skill.

18. There will be no statistically significant difference after five weeks in straight-copy accuracy scores between the control group and the experimental group for students classified as having high typewriting skill.

19. There will be no statistically significant difference after five weeks in number-copy speed scores between the control group and the experimental group for students classified as having high typewriting skill.

20. There will be no statistically significant difference after five weeks in number-copy accuracy scores between the control group and the experimental group for students classified as having high typewriting skill.

21. There will be no statistically significant difference after ten weeks in straight-copy speed scores between the control group and the experimental group for students classified as having high typewriting skill.

22. There will be no statistically significant difference after ten weeks in straight-copy accuracy scores between the control group and the experimental group for students classified as having high typewriting skill.

23. There will be no statistically significant difference after ten weeks in number-copy speed scores between the control group and the experimental group for students classified as having high typewriting skill.

24. There will be no statistically significant difference after ten weeks in number-copy accuracy scores between the control group and the experimental group for students classified as having high typewriting skill.

25. Within the experimental group, there will be no statistically significant difference after five weeks in straight-copy speed scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

26. Within the experimental group, there will be no statistically significant difference after five weeks in straight-copy error scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

27. Within the experimental group, there will be no statistically significant difference after five weeks in number-copy speed scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

28. Within the experimental group, there will be no statistically significant difference after five weeks in number-copy error scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

29. Within the experimental group, there will be no statistically significant difference after ten weeks in straight-copy speed scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

30. Within the experimental group, there will be no statistically significant difference after ten weeks in straight-copy error scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

31. Within the experimental group, there will be no statistically significant difference after ten weeks in number-copy speed scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

32. Within the experimental group, there will be no statistically significant difference after ten weeks in number-copy error scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

Delimitations

The number drill lines used in the study were developed by the

researcher in accordance with the findings of Grill's (1965) study of digit and symbol patterns found in business communications with regard to (1) frequency of digits, (2) frequency of contiguous digraphs, (3) frequency of noncontiguous digraphs, (4) frequency of double-number digraphs, and (5) length of numbers.

The alphabetic drill lines typed by the control group were the four-line "Preparatory Practice" drills found at the beginning of lessons 51 through 90 of College Typewriting, Intensive Course, Ninth Edition, published by South-Western Publishing Company, by Lessenberry, Wanous, Duncan and Warner (1975).

The effects on straight-copy and number-copy speed and accuracy were studied. The scope of this study did not include possible effects on production typewriting skills.

No attempt was made to identify or classify students by IQ, age, sex, socio-economic, cultural, or ethnic background.

Straight-copy speed and accuracy measurements were five minutes long; number-copy speed and accuracy measurements were one minute in length.

No attempt was made to assess student attitude toward the tasks of typing number or alphabetic drills.

The study was limited to students enrolled in the intermediate typewriting course offered at Oklahoma State University, OFFMG 2313, during the spring semester of 1981.

Limitations

The effect of using intact classes rather than random assignment of students to treatments is not known.

The effect of students' attitudes toward typing numbers on their number-copy speed and accuracy scores is not known.

It was not possible for both sections of OFFMG 2313 to meet at the same time during the day. The effect of the difference in meeting times on scores is not known.

Definitions

Contiguous Digraph: Two digits occurring in sequential numeric order, such as 34, 98, and 54.

Control Group: The group of students who typed drill lines taken from the typewriting textbook and consisting primarily of alphabetic strokes.

Digit: One of the Arabic figures: 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9.

Digraph: Any combination of two alphabetic symbols, digits, non-alphabetic symbols, or any combination of these.

Error Score: The percentage score obtained by dividing the number of errors made on a timed writing by the total number of words typed.

Experimental Group: The group of students who typed drill lines consisting mostly of number strokes.

Five-Minute Straight-Copy Timed Writing: Material typed by students for a five-minute period of time composed of letters of the alphabet and of common punctuation. The material was triple controlled for syllabic intensity (1.5 syllables), average word length (5.6 strokes), and percentage of high-frequency words (80 percent), and was defined as being of average difficulty by South-Western Publishing Company.

Gross Words Per Minute: Number of standard five-stroke words divided by number of minutes in a timed writing.

High-Typewriting-Skill Students: Those students who typed 50 or more gross words per minute on a five-minute straight-copy timed writing pretest.

Low-Typewriting-Skill Students: Those students who typed 49 or fewer gross words per minute on a five-minute straight-copy timed writing pretest.

Noncontiguous Digraph: Combination of two digits occurring in non-sequential number order, such as 13, 86, 19.

Number: One digit or a group of digits with a space preceding and a space following. Symbols may be interspersed with the digits and the group of digits and symbols still be considered a number. Examples of numbers are: 5, $39.42, 50-11, and 1,204.

One-Minute Number-Copy Timed Writing: Copy composed entirely of number and space strokes which students type for a one-minute period of time.

Speed Scores: The gross-words-per-minute score obtained by dividing the number of strokes typed during a specified time period by five, then dividing that number by the number of minutes typed.

Symbols: Includes those keys on the keyboard not considered letters or numbers.

Assumptions

Several assumptions were made concerning student population, data collection, and materials. They include:

1. Students enrolled in the intermediate typewriting classes who participated in the study were representative of students who have enrolled in similar classes at Oklahoma State University in the past and those who will enroll in the future.

2. The pretests and the measurements taken after five weeks and after ten weeks were of equal difficulty and were valid and reliable indicators of students' skill levels.

3. A five-minute straight-copy timed writing is an accurate measurement of straight-copy typewriting skill.

4. A one-minute number-copy timed writing consisting of four-digit numbers is an accurate measure of number-copy typewriting skill.

5. The percentages indicated for the occurrence of digits, non-contiguous digraphs, contiguous digraphs, double-number digraphs and the length of the average number noted in Grill's (1965) study are representative of those found in typical correspondence.

CHAPTER II

REVIEW OF LITERATURE

Introduction

Business education literature was reviewed relating to the following specific topics: (1) the importance of having students learn to type numbers, (2) factors affecting skillbuilding in typing numbers, and (3) the characteristics and patterns of numbers found in typewritten business communications. Numerous journal articles and textbook references were found; however, few research studies addressing the specific topics listed above were located.

Importance of Learning to Type Numbers

With regard to frequency of occurrence of numbers in business settings, Rowe (1975) noted:

> There is hardly any office today where the use of numbers and symbols is not required somewhere in the work assignments. The typing of vouchers and payroll checks, budgets, financial reports, purchase requisitions and orders, and numerous other types of reports required for government are likely to be required of any individual who is an office employee (p. 154).

Several authors have pointed to the increasing use of computers as a cause of the increasing incidence of numbers in business typewriting. Wood (1971, p. 3) stated that, "Numbers are increasing in frequency because of automated data processing." In an article regarding future needs of office workers, Willins (1970) said that job requirements today

are often more demanding than in the past. She indicated that "most of these demands are based on the use of computers and the greatly increased use of numbers in all business communications and records" (p. 3). Graf (1971) also pointed out the greatly increased use of numbers and stated that automation has been the cause. While they did not hypothesize a reason for the trend, both Meehan (1977) and Rhodes (1971) noted an increase in the occurrence of numbers in typewriting in office work.

Although there seems to be agreement among most authors that the use of numbers is increasing in business correspondence, there is a definite disagreement about the importance of students learning to type figures by touch. West (1974) wrote:

> Poor mastery over numbers and symbols is a common complaint, especially for the frequency of visual typing of those keys. Except for statistical typists, who presumably compose only a small proportion of all typists, alphabetic typing greatly exceeds number and symbol typing. Surely, investing time in number/symbol practice sufficient for facility approaching alphabetic skills is unwarranted (p. 10).

Rhodes (1971, p. 218) believed that skill typing in numbers is essential; however, he noted that "typewriting instructors cannot justify spending additional instruction time on numbers at the expense of alphabetic copy typing." His solution was to improve skill development procedures for attaining number stroking proficiency.

The opposite point of view was taken by other authors who stressed the importance of insuring sufficient practice time for students to learn to type numbers accurately by the touch method. In the 1978 National Business Education Association Yearbook, Hoskinson (1978, p. 205) listed as the third objective of a beginning course in typewriting that students "should be able to type numerals and special symbols by

touch as they occur in contextual materials." His view was in accordance with those of Russon and Wanous (1973, p. 172) who noted that "an important skill of the office typist is the ability to type numbers and symbols quickly and accurately, and yet many typing students fail to master this portion of the keyboard."

Meehan (1977) wrote that numbers should be stressed in typewriting classrooms until they can be typed quickly and with a high degree of accuracy. Lamb (1959) pointed out the importance of accuracy in typing numbers. She maintained, "The fact is that the most serious typing mistakes involve numbers," (pp. 112-113) and cited examples illustrating the seriousness of errors made in typing--such as in an address or a prescription for eye glasses. On that same note, Willins (1970, p. 3) pointed out the importance of accuracy in number typewriting in her comment, "Consider the chaos that might result from one wrongly typed number fed into a computer used in the space program, for example."

In a report on the UCLA portion of the NOBELS study on the basic components of office work, Erickson (1971) noted that 25 percent of the 147 office workers reporting typewriting as a basic component of their jobs indicated a need for high statistical typewriting skills. That data confirmed the opinions of other writers that number typewriting skills are important to many employed persons today.

Wood (1971) wrote that although it is tempting to presume that traditional skills are so basic that few or no adjustments need to be made to prepare students for work in modern offices, it is not true. He maintained that students must develop number-typing skill in order to key data into data processing machines which are becoming more common in offices.

Wise (1968) found in a survey of typewritten business materials collected from Denver offices that numbers under five digits comprised 11 percent of the actual words typed, and numbers with five or more digits accounted for 3 percent of the actual words typed. She noted the lack of a nationwide study to determine the frequency of occurrence of numbers in business communications.

Stewart (1970) conducted an analysis of typewriting activities in insurance offices in which she found that 37 percent of all typewriting strokes were number and symbol strokes. As noted, however, that study was limited to communications in insurance offices and, therefore, cannot be considered representative of all business office communications.

The importance of learning to type numbers was summed up quite effectively by Crawford (1967):

> Both government and business run on paper and thrive on statistical data: contract numbers, order numbers, voucher numbers, invoice numbers, account numbers, form numbers, policy numbers, part numbers, stock numbers, check numbers, and the like. Almost everything that can be seen or touched in factory or office has had (or may still bear) a number. Furthermore, most of the personal and business records that are kept consist primarily of numbers and symbols (p. 31).

Factors in Developing Number Typewriting Skills

Number typewriting skillbuilding, as other areas of typewriting skillbuilding, is a complex procedure and is affected by many factors. Some of those factors are: presentation of the number keys; teacher attitude toward number typewriting; number typewriting skillbuilding approaches; and the importance placed on numbers in typewriting textbooks.

Presentation of Number Keys

Robinson et al. (1979) pointed out the meagerness of research on the comparative effects of different sequences of presenting figure and symbol keys. They suggested "delaying introduction of number keys until good techniques are consistently used in typing alphabetic copy," and concluded, "Little, if anything, is gained and considerable breakdown can result if figures are taught along with letter keys or immediately thereafter" (pp. 54-55).

In her study of methods of number presentation and the effects of number drills, Jarrett (1969) found that junior high school beginning typewriting students to whom alphabet and number keys were introduced intermittently typed significantly faster on number copy than did those who were introduced to numbers after some degree of skill was evident on alphabet keys. It should be noted, however, that the significant difference was a composite difference found by comparing four timings during the semester, the first timing having been taken after all students had been introduced to both alphabet and number keys. At the end of the semester, there was only .1 word per minute difference in number-copy speed scores of students who learned number and alphabet keys together and those who learned number keys after the alphabet keys had been presented. It would appear, therefore, that no long-lasting difference in number-copy speed was evident between the groups. As far as accuracy on number copy was concerned, she concluded that students who were introduced to the number keys after alphabet keys had been presented typed numbers more accurately than did those who learned number and alphabet keys intermittently.

In her dissertation entitled, "A Simultaneous Approach Compared With a Nonsimultaneous Approach in Presenting the Alphabetic and Number Keys on the Typewriter," Johnson (1971) reported that the nonsimultaneous approach in which the number keys were not presented until some skill was attained on letter keys proved to be significantly better at the end of 48 lessons. Erickson (1967) in reporting his findings of an experiment made with beginning typewriting classes over a period of several years, concluded:

> Regardless of the method used, better results were obtained with all classes when the teaching of numbers was delayed for a period from eight to ten days following the completion of the teaching of the letter keyboard. This period of time appeared to be needed by most students for establishing control over letter locations and various reach patterns. Emphasis during this period, it would seem, should be upon the building of good typewriting techniques (p. 27).

Teacher Attitude

There was agreement among several authors on the importance of a positive attitude on the part of typewriting teachers when assisting students to learn to type numbers and build skill in number typewriting. No reference was found in the literature to indicate that the teacher's attitude was unimportant.

Boyer (1968) stated, "Typewriting teachers must possess the conviction that the top row can be mastered by touch" (p. 19). In their article on top-row proficiency, Brittain and Copeland (1979) suggested that teachers should introduce numbers as enthusiastically as other keys are introduced, with no indication that students may have problems with them.

With regard to the anxiety on the part of students when typing

numbers, Rowe and Thoreson (1976) speculated that some of the fear is the result of teacher attitudes toward numbers. They wrote,

> Much of this fear would be eliminated if the teacher would refer to number typing activities as something to anticipate. Such activities can be highly motivational and nearly every teaching device can be applied to the presentation of numbers (p. 109).

The negative attitude toward number typewriting on the part of some students was recognized by Wood (1971). He stated that students enter a beginning class with no prejudice against typing numbers and suggested, "They must learn this negative attitude from something we do--or don't do--in the typing class" (p. 9).

Crawford (1967) pointed out the importance of teacher attitude in presenting top-row keys in the following statement:

> The prime essential, then, in developing top-row skill is a positive belief on the part of the teacher that students can learn to type numbers and symbols efficiently; and that positive attitude must be transmitted to all students if maximum skill is to be realized from the practice time invested (p. 31).

Number Typewriting Skillbuilding

Erickson, (1967) observed the importance of daily practice in his report of a long-term experiment with beginning typists. He wrote: "All students developed greater number competency regardless of the method used when daily practice was made a part of the daily typewriting practice plan" (p. 27).

The lack of sufficient practice on numbers was noted by several authors. Lamb (1959, p. 112) concluded, "Unfortunately, many teachers overlook the importance of accuracy in typing numbers and fail to require enough practice on them throughout the typing program." Insufficient practice at the time of initial learning and inadequate follow-up

practice of figures and nonalphabetic symbols in context were pinpointed by Robinson et al. (1979) as reasons students have difficulty with numbers.

Russon and Wanous (1973, p. 173) observed, "Another point to keep in mind about developing number-row mastery is the need for scheduling frequent reviews, drills and writings." For beginning typists, Brittain and Copeland (1979) recommended stressing numbers throughout the semester. Crawford (1967, p. 33) wrote that number and symbol instruction should "commence early and be continued throughout the entire learning period, from the first semester to the last."

Referring again to Jarrett's (1969) experiment, two groups of ninth grade beginning typewriting students, each of which were introduced to numbers in a different manner, typed number drills for a threeminute period each class session from the time all number and alphabet keys had been introduced until the end of the semester. A third group of junior high school students did not practice on number drills, but instead typed mixed-copy textbook drill lines. She found that students who typed number-copy drill lines typed numbers faster than those who used textbook drills. She also concluded that "no harm, as far as GWAM on straight copy was concerned, was done by spending extra time on numbers" (p. 49). One of her recommendations was that if instructors are interested in achieving results with students in typing numbers, number drills should be practiced daily.

Dorn (1966) conducted a classroom experiment with junior high students who had completed one semester of typewriting instruction to determine if special drills presented with an overhead projector and with chalkboard and supplementary drills improved number typing speed

and accuracy. He concluded that those students who were taught using the supplementary visual teaching aids improved on straight number-copy speed more than students who used regular textbook materials in developing straight number-copy speed.

In a study conducted by Meiley (1968) with high school first-year typewriting students, experimental group students practiced mixed-copy and number-copy drills for five minutes per day as well as typing from a special warm-up line containing numbers on the chalkboard at the beginning of the class period. The control group used only textbook materials. Speed and error scores were compiled for the experimental group and the control group members at the end of the 9th, 18th, 27th, and 36th weeks on straight copy, mixed copy, and number copy. Although no statistically significant differences between the groups were noted, Meiley (1968) felt the following observations were worth noting:

1. Straight Copy - the experimental group attained the higher mean at all four testing periods.

2. Mixed Copy - the experimental group attained the higher mean at all four testing periods.

3. Number Copy - the experimental group had the higher mean at all four testing periods.

4. Straight Copy Errors - the experimental group attained a better mean at all four testing periods.

5. Mixed Copy, Letter Errors - the experimental group had the better mean, except at the 18th week.

6. Mixed Copy, Number Errors - the experimental group had the better mean at the 9th and the 36th week. The control group was better at the 18th and 27th weeks.

7. Mixed Copy, Letter and Number Errors combined - the experimental group had the better mean at all except the 18th week.

8. Number Copy - the control group had the better mean, except at the 27th week (pp. 51-52).

On the measurements taken at the end of the 36th week, the following mean scores were noted:

	Control group	Experimental group
Straight-Copy Speed	44.62	48.00
Mixed-Copy Speed	42.31	49.04
Number-Copy Speed	18.81	25.59
Straight-Copy Errors	3.88	2.96
Mixed-Copy Errors	2.12	1.63
Number-Copy Errors	1.65	1.85

No research studies could be located which involved attempts to increase speed in typing numbers with groups of college students or with second-year high school typewriting students.

Textbooks

The quality of the contents of textbooks used in typewriting classrooms is of great importance. Lessenberry (1967) observed:

> Well-organized textbook materials are an aid to teachers through freeing them from having to make lesson plans, organize the sequence of learning materials and determine the relative emphasis on each lesson part; but it will be the teachers, not the textbooks, who make learning to typewrite an exciting and satisfying experience (p. 30).

Although the importance of drills seems apparent, no research was found regarding the frequency or content of number drills in typewriting textbooks. Wise (1968) analyzed materials which were representative of typewritten business communications in the Denver area and compared the incidence of numbers, among other factors, with the incidence of numbers in production typewriting activities in four typewriting textbooks normally used for second-semester high school students. She recommended that textbooks increase numbers with less than five digits in production materials to approximate the 11 percent figure she found in the business correspondence surveyed. She also recommended that numbers with five or

more digits be increased in textbook production materials to total 3 percent of all words. In her conclusions, Wise cautioned that she had made no analyses of straight-copy material, exercises, and other skill-building materials in the textbooks and that her conclusions were directed exclusively toward production materials.

Characteristics of Numbers in Business Communications

In his dissertation, Grill (1965) analyzed digit and symbol patterns in selected business communications from Administrative Management Society firms across the country. A total of 2,963 samplings from 349 firms were used in the study and included the following types of selected business communications: balance sheets, bills of lading, business letters, contracts, credit memorandums, interoffice memorandums, invoices, manuscripts, minutes of meetings, profit and loss statements, purchase requisitions, and statistical tables. The firms were classified according to type of business: advertising, printing, and publishing; banking, insurance and finance; educational institutions; governmental agencies; manufacturing; public utilities and transportation; retail and wholesale sales and distribution; and unclassified. In his extensive study, Grill analyzed digits for: frequency; double number patterns; like-number patterns through eight like digits; double number patterns interjected by an interceding character; number digraphs; and contiguous and non-contiguous digraphs. His study also included analyses of alphabetic and nonalphabetic symbols.

A summary of selected findings of Grill's study is given in this review. The data regarding alphabetic and nonalphabetic symbols is not

covered, and some of the data less consequential to this study regarding digits is omitted.

A total of 208,552 digits were analyzed and the percentage of occurrence for each digit was computed:

Digit	Frequency of Occurrence
0	15.4%
1	14.7
2	11.3
3	9.4
4	9.0
5	9.5
6	8.5
7	7.4
8	7.3
9	7.5

The frequencies of double number patterns were figured and it was found that the double number pattern occurring most frequently was 00. The double number patterns and their frequencies as found in Grill's study are:

Double Number	Frequency of Occurrence
00	44.0%
11	11.5
22	7.8
33	6.2
44	5.3
55	5.8
66	5.0
77	4.6
88	4.9
99	4.9

With regard to digraphs, Grill found that noncontinguous digraphs, such as 68, 47, and 95, were most common, occurring 65.8 percent of the time. Contiguous digraphs, such as 12, 98, and 34, were next in frequency, occurring in 19.4 percent of all digraphs. The final digraph grouping was double number digraphs, occurring 14.8 percent of the time.

A total of 53,933 numbers were analyzed ranging in length from 1 through 18 spaces. The number of spaces for each number included spaces for symbols; the number 1,963 would, therefore, be described as having five spaces. The average length for all numbers was 3.86 spaces. The total average percentage for numbers with punctuation was 37.3 percent, while numbers without punctuation averaged 62.7 percent.

Grill recommended that the digits and nonalphabetic symbols occurring most frequently should be practiced extensively by typewriting students. He also recommended that drills and practice materials incorporating the digit and symbol patterns found in business communications should be prepared and used in typewriting classrooms. Another recommendation was that teacher-directed practice in the development of digit and symbol control should be incorporated in the daily typewriting instruction program.

Summary

A review of literature in the field of business education related to number typewriting revealed that a majority of authors believe it is important that students be taught to type numbers quickly, by touch, and with a high degree of accuracy. Several sources indicated that there had been an increase in numbers used in business communications although no research studies could be found to substantiate that claim. The importance of accuracy and the effects of inaccurate typewriting of numbers were noted.

Factors in developing number-typewriting skills include: presentation of the number keys, teacher attitude toward number typewriting, number typewriting skillbuilding approaches, and the importance placed

on numbers in textbooks. Each factor plays a role in developing the speed and accuracy of students when learning to type numbers. Few research studies have been done on the effects of different sequences of presenting the number and symbol keys; however, the most accepted practice is that of presenting number keys after students have attained some degree of skill in typing letters. A positive attitude on the part of the teacher was cited by several writers as an important factor in teaching students to type numbers. In order to build skill in typewriting of numbers, the consensus of opinion was that there is a need for frequent practice, drills, and timings. Such practice should be made a part of the daily classroom routine in order to be most effective. No research studies were found dealing with the occurrence of numbers in typewriting textbooks as far as straight-copy material, drills, and other skillbuilding materials are concerned. There was, however, a comparison of the occurrence of numbers in business communications and the occurrence of numbers in production typewriting materials of four textbooks used by second-semester high school typewriting students. One recommendation made by the author of that study was that occurrence of numbers in textbook production materials should be increased to equal occurrence found in business communications.

In an exhaustive study of digit and symbol patterns found in business communications from across the country, frequencies of occurrence were identified for: digits, double numbers, digraphs, noncontinguous digraphs, contiguous digraphs, and double number digraphs. The average length of numbers found in the communications was also computed. It was recommended that practice materials be prepared incorporating the digit and symbol patterns found in real-life business communications.

CHAPTER III

METHODOLOGY

Environmental Factors

This research study was conducted at Oklahoma State University, located in Stillwater, Oklahoma, during the 1981 spring semester. Founded as a land-grant institution in 1890, OSU has three goals as an educational institution: to instruct, to do research, and to offer educational assistance to the public through extension. The total enrollment at Oklahoma State University during the 1980-81 academic year was over 22,000 on the main campus.

Design of Study

An "intact nonequivalent comparison group" experimental design as described by Huck, Cormier and Bounds (1974) was used to compare the effects of number drills and alphabetic drills on the typewriting speed and accuracy of college intermediate typewriting students on straight-copy and number-copy timed writings. In the diagram presented below, "O" stands for observation, "X" stands for the experimental group treatment, and "Y" stands for the control group treatment.

Experimental Group	O X O X O
Control Group	O Y O Y O

The diagram shows that: (1) two groups were involved in the design; (2) each group was measured at the same time before the treatments were

applied; (3) each group was measured at the same time at the conclusion of five weeks and again at the conclusion of ten weeks; (4) the first group received treatment X (drill lines consisting mainly of number strokes); and (5) the second group received treatment Y (drill lines consisting primarily of alphabetic strokes).

The measurements were five-minute straight-copy and one-minute number-copy timed writings which were scored for speed and accuracy. The scores for the control and experimental groups taken after five weeks of experimental treatment were compared to determine the effects of number drills on straight-copy and number-copy speed and accuracy. The same analysis was made using the scores on measurements taken after ten weeks.

Selection of Study Participants

Two intact classes of intermediate typewriting students participated in the study, one as the control group and one as the experimental group. Section 001 of OFFMG 2313, which met at 10:30 on Mondays, Wednesdays, Thursdays, and Fridays, was randomly assigned as the control group. The students in Section 002 of OFFMG 2313, which met at 12:30 Mondays through Thursdays, comprised the experimental group. Because the two sections of the class were offered at different times to allow for flexibility of scheduling, it was not possible to randomly assign students to the two groups; however, the assignment of the experimental and control treatments to the class sections was random. Both sections were taught by the researcher.

Before the project began, the following requirements were established in order for a student's scores to be included in the study:

1. Pretest speed and error scores were to be recorded during the third week of the semester for a five-minute straight-copy timed writing and a one-minute number-copy timed writing.

2. After five weeks of the experimental period had elapsed (during the ninth week of the semester), speed and error scores were to be recorded for a five-minute straight-copy timed writing and a one-minute number-copy timed writing.

3. After ten weeks of the experimental period had elapsed (during the fourteenth week of the semester), speed and error scores were to be recorded for a five-minute straight-copy timed writing and a one-minute number-copy timed writing.

4. The students were to have attended at least 15 of the 20 class sessions during the first five weeks and the same number during the sixth through tenth weeks of the experimental period.

Thirty-six students enrolled in the control group, OFFMG 2313, Section 001, at the beginning of the 1981 spring semester. During the ten-week experimental period, absences of eight students exceeded the number allowed; their scores were eliminated from the study. Therefore, the number of participants in the control group whose scores were used was 28.

There were 37 students enrolled in the experimental group, Section 002, OFFMG 2313, at the beginning of the semester. Three students dropped the course, and the scores of nine students were discarded because of excessive absences. The scores of 25 experimental group students were included in the study.

Selection of Skill Groups

Participants were classified as having high or low typewriting skill

based on their pretest five-minute straight-copy timed writing speed scores. Scores in the control group ranged from 35 to 87; experimental group scores ranged from the low of 33 to the high of 69. Those students with less than 50 gross words per minute were designated as low-typewriting-skill students; those typing 50 or more gross words per minute were classified as having high typewriting skill. The dividing point of 50 gross words per minute was arbitrarily chosen by the researcher.

The grouping of students in relation to typewriting skill was for statistical comparison only. The students were not aware of the classifications. The difference in treatment of participants was based on the control and experimental group classifications rather than on the skill group classifications.

A total of 20 students were classified as having low typewriting skill, eight in the control group and 12 in the experimental group. Thirty-three students were classified as being high-typewriting-skill students, 20 in the control group and 13 in the experimental group.

Treatment of Control and Experimental Groups

The control and experimental groups were given the same assignments during the entire semester. The same lesson plan was used for both groups for each 50-minute class session, the only difference being the content of the drill lines typed by the groups during the ten-week experimental period. The control group typed textbook drill lines which consisted primarily of alphabet strokes; the experimental group's drill lines were written by the researcher and were primarily number strokes. The students were not told they were participants in an experimental study.

During the third week of the semester, students in both groups typed two five-minute straight-copy timed writings and two one-minute number-copy timed writings. Students turned in the better straight-copy and the better number-copy timed writings. Speed and error scores on the timed writings were considered their "pretest scores" and were used in the statistical comparison of scores taken after five and ten weeks of experimental treatment. The pretest speed scores were also used to divide the students into low- and high-typewriting-skill groups for statistical purposes.

Beginning with the fourth week of the semester and continuing for each class session through the thirteenth week, for a total of ten weeks, both groups practiced drill lines for five minutes at the end of the class period. The drill sessions were begun approximately seven minutes before the 50-minute classes ended and lasted for five minutes. Students typed the drill lines from drill sheets, one for each day, handed out by the instructor just prior to the drill period. The instructions to both groups were the same. Students were directed to type each line three times: first, slowly and concentrating on the content of the line, technique and continuity; second, quickly and pushing for speed; third, dropping back in speed and typing with control. After three minutes of such practice, the instructor selected one line and timed students as they typed for a 15- or a 30-second period. Students were directed to determine a goal for the next timing--three to four words per minute faster. Then additional timings of the same length were administered. Students were instructed to choose a new goal if the first goal was attained. The entire drill session including the teacher-directed timings lasted for five minutes.

After five weeks of the experimental period, during the ninth week of the semester, students again took two five-minute straight-copy and two one-minute number-copy timed writings and turned in the ones they considered better. During the fourteenth week of the semester, after students had typed drills for five minutes each class session for ten weeks, timed writings were administered in the same manner as had been at the end of the five-week period. Also during the fourteenth week of the semester, students filled out questionnaires with data regarding: hours typed per week for personal reasons unrelated to a job or to OFFMG 2313 assignments; hours per week of job-related typewriting; and number of semesters of college including the one in which they were currently enrolled.

Design of Number Drills

Four drill lines of approximately 70 spaces were written by the researcher for each of the 40 class sessions during the 10-week experimental period. The drill materials for each day are shown in Appendix A. The four types of drill lines are described below:

1. Alphabet/number: designed to reinforce the use of the proper finger for each number key.

Example: wit 285 wee 233 wet 235 wow 292 woe 293 woo 299 wry 246

2. Contiguous and double number: written to provide practice on number combinations which are frequently used.

Example: 2100 9988 0100 8900 5543 7778 2100 0012 1100 1112 5676

3. Number/symbol: intended to provide practice on numbers with symbols.

Example: 4.91% 37.5% 24.1% 14.2% 19.5% 42.1% 15.0% 11.2% 16.1%

4. Balanced-hand: designed to encourage stroking fluency and speed.

Example: 3846 7294 3658 1830 7463 6475 4928 2718 9403 2838 8404

The second, third and fourth lines were written in accordance with Grill's (1965) study of digit and symbol patterns in business communications with regard to:

1. Frequency of digits. The frequency of occurrence of digits noted by Grill were:

Digit	Frequency of Occurrence
0	15.4%
1	14.7
2	11.3
3	9.4
4	9.0
5	9.5
6	8.5
7	7.4
8	7.3
9	7.5

2. Frequency of double digits. The double number patterns and their frequencies found by Grill were:

Double Number	Frequency of Occurrence
00	44.0%
11	11.5
22	7.8
33	6.2
44	5.3
55	5.8
66	5.0
77	4.6
88	4.9
99	4.9

3. Digraph types. The three types of digraphs identified by Grill and their frequencies were:

Noncontiguous Digraphs:	65.8%
Contiguous Digraphs:	19.4
Double Number Digraphs:	14.8

4. Length of numbers. Grill found that the average length of numbers in the business communications he analyzed was 3.86 spaces including symbols.

Because of the difficulty of incorporating all of the above characteristics into each day's drill lines, the decision was made to design each week's drill lines to conform with the findings of Grill's study noted above. A one-percent variance was allowed between the percentages for digit and digraph occurrences noted in Grill's study and the percentages found in each week's drill lines. A two-percent variance was allowed between Grill's findings on occurrence of double digits and that found in the drill lines. The length of the average number varied from 3.85 to 3.87 spaces; Grill noted an average number length of 3.86. Over 60 percent of the strokes contained in all four drill lines typed by the experimental group students each day were number strokes. The remaining strokes were letters, symbols, or spaces. A sample of the summary sheet used in writing the second through fourth lines may be seen in Appendix B.

Selection of Textbook Drills

The drill lines typed by the control group were those found in the "Preparatory Practice" section at the beginning of Lessons 51 through 90 of the South-Western Publishing Company textbook, College Typewriting, Intensive Course, Ninth Edition, by Lessenberry, Wanous, Duncan and Warner (1975). The drill materials for each day may be seen in Appendix A.

Each "Preparatory Practice" drill contained four 70-space lines, as described below:

1. An alphabetic line which included all letters in the alphabet.

2. A figure/symbol line which contained each of the figures 0 through 9 at least once.

3. A fluency line which contained a high percentage of balanced-hand words.

4. A miscellaneous line which stressed one of the following patterns or keys: direct reaches; long words; double letters; one hand; home row; first row; third row; hyphen; shift key; left hand; adjacent keys; c, d; i, o; d, e; e, i; a, e; and a, u.

Less than five percent of the strokes in all four drill lines typed by the control group students during the ten-week period were numbers. The remaining strokes were letters, symbols, or spaces.

Timed Writing Measurement Copy

The straight-copy material used for the five-minute timed writings taken by all students before the experimental period began and after five and ten weeks of the project were from College Typewriting, Intensive Course, by Lessenberry, Wanous, Duncan and Warner (1975). Lessons 60, 80 and 93, and may be seen in Appendix A, pages 119 through 121. The copy for all three writings was controlled at the same level for syllabic intensity, average word length, and high frequency words. There were an average of 1.5 syllables per word; the average word length was 5.6 strokes; and the copy contained 80 percent high frequency words.

Number-copy material used for the one-minute timed writings was written by the researcher to conform to Grill's (1965) findings regard-

ing frequency of occurrences of digits. The number-copy timed-writing materials may be seen in Appendix A, pages 116 through 118.

Data Gathering

Speed and error scores were collected from students for three five-minute straight-copy timed writings and three one-minute number-copy timed writings as follows:

1. Pretest timed writings. During the third week of the semester, students typed two five-minute straight-copy timed writings and two one-minute number-copy timed writings. The students determined the gross words per minute typed and the number of errors made on all timings and turned in the straight-copy and number-copy timed writings they considered better.

2. Five-week timed writings. During the ninth week of the semester after five weeks of the project had been completed, students again typed two five-minute straight-copy and two one-minute number-copy timed writings. Gross words per minute and number of errors made were noted on all timed writings, and students submitted the better straight-copy and number-copy timed writings.

3. Ten-week timed writings. After the ten-week experimental period, during the 14th week of the semester, students once again typed two five-minute straight-copy and two one-minute number-copy timed writings. The students determined the gross words per minute typed and the number of errors made on all timed writings and submitted the writings they considered better.

The researcher proofread each timed writing to insure that all errors had been counted and refigured the gross-words-per-minute score

to assure that it was correct. The number of errors was converted to a percent-of-error score for each timing by dividing the number of errors by the total number of words typed.

During the fourteenth week of the semester, students filled out questionnaires with data regarding: hours typed per week for personal reasons unrelated to a job; hours per week of job-related typewriting; and the number of semesters of college experience including the one in which they were currently enrolled.

Analysis of Data

Multiple regression was chosen for the statistical analyses of data. Hillestad (1977) described multivariate regression analysis as follows:

> In effect this tells us whether the total variance is reduced a significant amount (the percentage of reduction in variance is actually calculated) if a particular variable is eliminated from consideration. One of the main advantages of this technique is that randomization is not a prerequisite, and non-quantitative data may be included as variables, such as prior study in bookkeeping (pp. 94-95).

Houston and Teglovic (1971) stated:

> The researcher has discovered that most current research designs can be formulated with multiple regression procedures, often with greater conceptual clarity and possibly more easily than with classical approaches (p. 312).

They also noted that one of the advantages of multiple regression is the need for equal or proportional cell frequencies is eliminated.

The straight-copy and number-copy speed and error scores on the timed writings taken after five weeks of the experimental period were analyzed separately to determine if differences existed between the control group and the experimental group after five weeks of experimental

treatment. The same procedure was followed using the straight-copy and number-copy speed and error scores on timed writings taken after the ten-week experimental period had been completed.

The dependent variables used in the testing of the hypotheses were the speed and error scores on the timed writings taken after five weeks and after ten weeks. The two treatments, number drills and alphabet drills, were considered to be the experimental independent variables. Logically, it must be assumed that other variables which were not manipulated by the researcher had an effect on the students' performances as measured by the timed writings. In order to explain any differences found between the groups as accurately as possible, the researcher felt it was necessary to control through statistical methods the effects of several variables which could not be manipulated. Following is a list of all the independent variables considered in the analyses of data and the rationale for inclusion of each variable in the analyses:

1. Pretest scores. The pretest scores were viewed as control variables to account for previous typewriting experience, whether it took place in a classroom, office, or personal-use setting.

2. Hours typed per week for personal reasons unrelated to a job. The estimated number of hours per week each student used the typewriter for personal reasons unrelated to the typewriting class assignments or a job was selected as a control variable because of the possible effects of such typewriting on the dependent variables.

3. Hours per week of job-related typewriting. The estimated number of hours per week each student used the typewriter in a job setting was viewed as another control variable because of the possible effects of such typewriting on the dependent variables.

4. Number of semesters of college experience. Because of the possible effects of previous college experience on the motivation and performance of the student, the number of semesters of college work, including the one in which the research was conducted, was considered as a control variable.

5. Treatment assigned to each student. Each student was assigned to either the number or alphabet drill treatment. This independent variable was the experimental variable.

The equation for the full regression model using all the independent variables noted above follows:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + e$$

where:

Y = speed or error score on straight-copy or number-copy timed writing (the dependent variable)

b_0 = intercept term

X_1 = pretest score

X_2 = hours typed per week for personal reasons unrelated to a job

X_3 = hours per week of job-related typewriting

X_4 = number of semesters of college experience including the one in which the research took place

X_5 = treatment assigned to each student: 1 if student was in experimental group; 0 if student was in the control group (the experimental variable)

$b_1 - b_5$ = regression coefficients determined by least squares method

e = error involved with using this particular predictive system with a given individual

To show how well the five independent variables predicted the dependent variable, a multiple correlation coefficient was obtained and squared to give R^2, representing the amount of dependent variable variance accounted for by the independent variables.

In order for a test of significance to be performed to test for differences between the two groups when the control variables were taken into consideration, a restricted model equation was formulated using every variable except the experimental variable:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + e$$

The test of significance to test for differences between the two groups with the control variables taken into consideration was then accomplished by using the squared correlation coefficients obtained from the full and restricted model equations in the following variance ratio test:

$$F = \frac{(R^2_{FM} - R^2_{RM}) \ / \ (k_1 - k_2)}{(1 - R^2_{FM}) \ / \ (N - k_1 - 1)}$$

where:

R^2_{FM} = the squared correlation coefficient obtained from the full model

R^2_{RM} = the squared correlation coefficient obtained from the restricted model

k_1 = number of control variables in full model

k_2 = number of control variables in restricted model

N = number of subjects in the study

The F-value obtained was considered significant if it equalled or exceeded the tabled F value necessary to indicate a difference at the .05 level of confidence.

CHAPTER IV

FINDINGS

Introduction

The findings described in this section were derived from a study conducted at Oklahoma State University during the spring semester of 1981. The main purpose of the study was to determine whether or not alphabetic drills and number drills performed for five-week and for ten-week periods of time have significantly different effects on college intermediate typewriting students' speed and accuracy on straight-copy and number-copy timed writings. Additionally, this study was undertaken to determine whether or not alphabetic drills and number drills have significantly different effects on the straight-copy and number-copy speed and accuracy of college intermediate typewriting students classified as having low typewriting skills and those classified as having high typewriting skills based on beginning straight-copy speeds. The final purpose of the study was to determine if number drills have different effects on the straight-copy and number-copy speed and accuracy scores of students classified as having low typewriting skills and students classified as having high typewriting skills.

Two classes of intermediate typewriting students participated in the experiment. Both groups typed drill lines for five minutes per class session for ten weeks: the control group typed drill lines which were composed mainly of alphabetic symbols; the experimental group typed

drills composed primarily of numbers.

Pretest gross-words-per-minute and error scores on five-minute straight-copy and one-minute number-copy timed writings were collected from each student before the ten-week treatment period began. After five weeks of the treatment period, gross-word-per-minute and error scores were obtained for five-minute straight-copy and one-minute number-copy timed writings from each student. After the end of the ten-week period, similar scores were again obtained. The number of errors of each student on each test was converted to a percentage of the total number of words typed. The scores may be seen in Appendix C, Tables V and VI, pages 125 and 126.

At the beginning of the 1981 spring semester, there were 36 students enrolled in the control group, Section 001, OFFMG 2313. During the ten-week experimental period, eight control group students were absent more than ten class sessions; the scores of those students were not included. The total number of student scores included in the study for the control group was 28.

In the experimental group, Section 002, OFFMG 2313, 37 students were enrolled at the beginning of the 1981 spring semester. Three students dropped the course, and the scores of nine students were discarded because they missed more than ten class sessions during the experimental period. The total number of student scores included in the study for the experimental group was 25.

The control and experimental group students were classified as having low or high typewriting skill on the basis of the pretest gross-words-per-minute straight-copy scores. Students with gross-words-per-minute of 49 or less were classified as having low typewriting skill.

Students with gross-words-per-minute scores of 50 or above were classified as having high typewriting skill. In the control group, there were eight students classified as having low typewriting skill; in the experimental group, 12 students were classified as having low typewriting skill. Students classified as having high typewriting skill numbered 20 in the control group and 13 in the experimental group. In the control and experimental groups, a total of 20 students were classified as having low typewriting skill and 33 were classified as having high typewriting skill.

The students in both the control and experimental groups filled out questionnaires at the end of the semester from which the following information was taken: the number of hours per week the student typed for personal reasons not related to OFFMG 2313 assignments outside the time the class met or not related to a job; the number of hours the student typed per week in connection with a job; and the number of semesters the student had attended college, including the 1981 spring semester.

In order to explain any differences found between the two groups as accurately as possible, the pretest scores, number of hours per week of personal typewriting, hours per week of job-related typewriting, and the semester in college for each student were used as control variables. These control variables were used in the multiple regression analyses of data to test each of the null hypotheses.

The speed and error scores taken after five weeks and after ten weeks were analyzed to determine if there were statistically significant differences between the two groups involved in the study. A summary of the means of the scores may be seen in Appendix C, Table VII, page 127.

The speed and error scores of students in the control group classified as having low beginning scores were compared with similarly classified students in the experimental group. The scores of students classified as having high beginning scores in the two groups were compared in the same manner. Summaries of the group means of the five- and ten-week scores for low-typewriting-skill and high-typewriting-skill students may be seen in Appendix C, Tables VIII and IX, respectively, pages 128 and 129.

The scores of students in the experimental group were analyzed to determine if differences existed between the students in that group classified as having low typewriting skill and those classified as having high typewriting skill. The mean scores for the experimental group students classified according to typewriting skill may be seen in Appendix C, Table X, page 130.

Statistical Analysis of Test Results

The results of the multiple regression statistical analyses used to test the 24 null hypotheses are presented in this section. The general equation for the full regression model using all the control variables is:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + e$$ where:

Y = speed or error score on five-week or ten-week straight-copy or number-copy timed writing

b_0 = intercept term

X_1 = appropriate speed or error pretest score

X_2 = number of hours student used a typewriter for personal use per week

X_3 = number of hours student used a typewriter at a job per week

X_4 = number of semesters of college experience including the one in which the research took place

X_5 = group membership: 1 if student was in experimental group; 0 if student was in control group (the experimental variable)

$b_1 - b_5$ = regression coefficients determined by least squares method

e = error involved with using this particular predictive system with a given individual

A multiple correlation coefficient for the full model was obtained and squared to give R^2 representing the amount of dependent variable variance accounted for by the independent variables. The R^2 value for a restricted model was obtained using the following equation:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + e$$

The following variance ratio test was used to test for differences between the two groups with the control variables taken into consideration using the squared correlation coefficients from the full and restricted models:

$$F = \frac{(R^2_{FM} - R^2_{RM}) \; / \; (k_1 - k_2)}{(1 - R^2_{FM}) \; / \; (N - k_1 - 1)}$$

where:

R^2_{FM} = the squared correlation coefficient obtained from the full model

R^2_{RM} = the squared correlation coefficient obtained from the restricted model

k_1 = number of control variables in full model

k_2 = number of control variables in restricted model

N = number of the subjects in the study

The F value obtained in each case was compared with the tabled F value necessary to indicate a difference at the .05 level of confidence. The

5 percent level of confidence indicates that one can be 95 percent confident that the difference between the groups is real rather than chance or accidental.

Summary of Analyses of Control and Experimental Group Scores

The null hypotheses numbered one through eight relate to the control group (those typing alphabetic drills) and experimental group (those typing number drills) speed and error scores on straight-copy and number-copy timed writings after five weeks of treatment and after ten weeks. Below is a list of the first eight null hypotheses:

1. There will be no statistically significant difference in straight-copy speed scores between the control group and the experimental group after five weeks.

2. There will be no statistically significant difference in straight-copy error scores between the control group and the experimental group after five weeks.

3. There will be no statistically significant difference in number-copy speed scores between the control group and the experimental group after five weeks.

4. There will be no statistically significant difference in number-copy error scores between the control group and the experimental group after five weeks.

5. There will be no statistically significant difference in straight-copy speed scores between the control group and the experimental group after ten weeks.

6. There will be no statistically significant difference in straight-copy error scores between the control group and the experimental group after ten weeks.

7. There will be no statistically significant difference in number-copy speed scores between the control group and the experimental group after ten weeks.

8. There will be no statistically significant difference in number-copy error scores between the control group and the experimental group after ten weeks.

R^2 values obtained from the full and restricted models with multiple regression statistical techniques were used to calculate an F value. In order to be statistically significant and thus indicate a significant difference probably exists between the control and experimental group, an F ratio of 4.08 was necessary for a .05 percent level of confidence with 1 and 46 degrees of freedom. An F ratio of 7.31 is necessary for a .01 level of confidence.

The group means for straight-copy speed and accuracy and number-copy speed and accuracy are shown in Appendix C, Table VII. The data used to test hypotheses numbered 1 through 8 may be seen in Appendix C, Tables XI through XVIII. A summary of the analyses is listed in Table I on page 50.

Two significant F values are shown in Table I. The first is for the five-week number-copy speed scores; the second is for the ten-week number-copy speed scores.

The F ratio associated with the five-week number-copy speed scores to test hypothesis 3 was 13.306590. That figure exceeded the tabled F value of 4.08 necessary for the .05 level of confidence as well as the

TABLE I

SUMMARY OF MULTIPLE REGRESSION ANALYSES FOR HYPOTHESES 1-8: TESTING FOR DIFFERENCES BETWEEN CONTROL AND EXPERIMENTAL GROUP SCORES

Hypothesis Number	Type of Score	Degrees of Freedom	Full Model R^2	Restricted Model R^2	F
1	Straight-Copy Speed after Five Weeks	46	.857652	.857361	.097038
2	Straight-Copy Error after Five Weeks	46	.261576	.259823	.109203
3	Number-Copy Speed after Five Weeks	46	.722487	.642211	13.306590**
4	Number-Copy Error after Five Weeks	46	.076752	.074732	.100645
5	Straight-Copy Speed after Ten Weeks	46	.800654	.798564	.482278
6	Straight-Copy Error after Ten Weeks	46	.385345	.378616	.503592
7	Number-Copy Speed after Ten Weeks	46	.756372	.606234	28.458379**
8	Number-Copy Error after Ten Weeks	46	.057105	.054324	.135674

* $p < .05$.
** $p < .01$.

tabled F value of 7.31 necessary for the .01 level of confidence. The control group mean score was 29.3571 gross words per minute and the experimental group mean score was 32.16 gross words per minute. Because the multiple regression analysis showed a statistically significant difference between the two groups and because the experimental group mean score exceeded that of the control group, it was concluded that the experimental group typed significantly more gross words per minute than did the control group on one-minute number-copy timed writings after five weeks of treatment. Null hypothesis number 3 was rejected.

The analysis of speed scores of students on one-minute number-copy timed writings after ten weeks used to test null hypothesis number 7 produced an F value of 28.348249. That value exceeded the tabled F values of 4.08 and 7.31 necessary to show a difference between the two groups' number-copy speed scores at the .05 and the .01 levels of confidence. By comparing the control group's mean gross-words-per-minute score of 30.0714 with the experimental group's corresponding score of 35.28, it was concluded that the experimental group typed significantly faster on one-minute number-copy timed writings than did the control group. Hypothesis number 7 was, therefore, rejected.

Null hypotheses 1, 2, 4, 5, 6, and 8 were accepted because no statistically significant differences between the two groups were indicated by the calculated F values on straight-copy speed and accuracy and on number-copy accuracy. Therefore, the conclusion was reached that there were no significant differences in the effects of number drills and alphabetic drills on straight-copy speed and accuracy and number-copy accuracy.

Summary of Analyses of Control and Experimental Group Scores for Students Classified as Having Low Typewriting Skill

Hypotheses 9 through 16 relate to the differences between scores of the control group (those typing alphabetic drills) and experimental group (those typing number drills) students classified as having low typewriting skill. The hypotheses are listed below:

9. There will be no statistically significant difference after five weeks in straight-copy speed scores between the control group and the experimental group for students classified as having low typewriting skill.

10. There will be no statistically significant difference after five weeks in straight-copy accuracy scores between the control group and the experimental group for students classified as having low typewriting skill.

11. There will be no statistically significant difference after five weeks in number-copy speed scores between the control group and the experimental group for students classified as having low typewriting skill.

12. There will be no statistically significant difference after five weeks in number-copy accuracy scores between the control group and the experimental group for students classified as having low typewriting skill.

13. There will be no statistically significant difference after ten weeks in straight-copy speed scores between the control group and the experimental group for students classified as having low typewriting skill.

14. There will be no statistically significant difference after ten weeks in straight-copy accuracy scores between the control group and the experimental group for students classified as having low typewriting skill.

15. There will be no statistically significant difference after ten weeks in number-copy speed scores between the control group and the experimental group for students classified as having low typewriting skill.

16. There will be no statistically significant difference after ten weeks in number-copy accuracy scores between the control group and the experimental group for students classified as having low typewriting skill.

The data used to test hypotheses 9 through 16 may be seen in Appendix C, Tables XIX through XXVI. The group means for the low-typewriting-skill students are shown in Appendix C, Table VIII, page 128. In order to be statistically significant, thereby indicating that a difference probably exists between the control and experimental groups, F ratios of 4.67 and 9.07 were necessary for .05 and .01 levels of confidence, respectively, with 1 and 13 degrees of freedom. Results of the multiple regression analyses for hypotheses numbered 9 through 16 are summarized in Table II on the following page.

The analyses indicated no statistically significant differences between low-typewriting-skill students in the control and experimental group students after five weeks of treatment on straight-copy speed and accuracy and on number-copy speed and accuracy. Therefore, null hypotheses 9, 10, 11, and 12 were accepted.

TABLE II

SUMMARY OF MULTIPLE REGRESSION ANALYSES FOR NULL HYPOTHESES 9-16: TESTING FOR DIFFERENCES BETWEEN GROUPS FOR STUDENTS CLASSIFIED AS HAVING LOW-TYPEWRITING SKILL

Hypothesis Number	Type of Score	Degrees of Freedom	Full Model R^2	Restricted Model R^2	F
9	Straight-Copy Speed after Five Weeks	13	.561793	.542433	.574341
10	Straight-Copy Error after Five Weeks	13	.365116	.248190	2.394200
11	Number-Copy Speed after Five Weeks	13	.626379	.599392	.939005
12	Number-Copy Error after Five Weeks	13	.327400	.251217	1.472465
13	Straight-Copy Speed after Ten Weeks	13	.596635	.533665	2.029472
14	Straight-Copy Error after Ten Weeks	13	.489994	.337464	3.887977
15	Number-Copy Speed after Ten Weeks	13	.555852	.316752	6.998349*
16	Number-Copy Error after Ten Weeks	13	.235581	.204609	.526722

* $p < .05$.
** $p < .01$.

After ten weeks, there was a significant difference noted between the control and experimental groups at the .05 level of confidence on number-copy timed writing speed scores. Hypothesis 15 was rejected because the calculated F value of 6.998349 exceeded the tabled F value of 4.67 necessary to show a significant difference at the .05 level of confidence. The calculated F value, however, was not large enough to show a significant difference at the .01 level. The experimental group mean on number-copy speed after ten weeks was 30.33 and the control group mean was 26.63. It was concluded that the low-typewriting-skill experimental group students typed significantly faster than did their counterparts in the control group on number-copy timed writings after ten weeks of treatment.

After ten weeks of treatment, the analyses indicated no significant differences between the low-typewriting-skill students in the control and experimental groups on straight-copy speed and accuracy and on number-copy accuracy. Accordingly, hypotheses 13, 14, and 16 were accepted.

Summary of Analyses of Control and Experimental Group Scores for Students Classified as Having High Typewriting Skill

Hypotheses 17 through 24 relate to the differences between scores of the students classified as having high typewriting skill in the control group (those typing alphabetic drills) and experimental group (those typing number drills). The hypotheses are listed below:

17. There will be no statistically significant difference after five weeks in straight-copy speed scores between the control group and

the experimental group for students classified as having high typewriting skill.

18. There will be no statistically significant difference after five weeks in straight-copy accuracy scores between the control group and the experimental group for students classified as having high typewriting skill.

19. There will be no statistically significant difference after five weeks in number-copy speed scores between the control group and the experimental group for students classified as having high typewriting skill.

20. There will be no statistically significant difference after five weeks in number-copy accuracy scores between the control group and the experimental group for students classified as having high typewriting skill.

21. There will be no statistically significant difference after ten weeks in straight-copy speed scores between the control group and the experimental group for students classified as having high typewriting skill.

22. There will be no statistically significant difference after ten weeks in straight-copy accuracy scores between the control group and the experimental group for students classified as having high typewriting skill.

23. There will be no statistically significant difference after ten weeks in number-copy speed scores between the control group and the experimental group for students classified as having high typewriting skill.

24. There will be no statistically significant difference after ten weeks in number-copy accuracy scores between the control group and the experimental group for students classified as having high typewriting skill.

The data used to test hypotheses 17 through 24 may be seen in Appendix C, Tables XXVII through XXXIV. The group means for scores of high-typewriting-skill students are shown in Appendix C, Table IX, page 129. F ratios of 4.23 and 7.72 or greater were necessary to conclude that the group scores differed at the .05 and .01 levels of confidence, respectively, with 1 and 26 degrees of freedom. Results of the multiple regression analyses for hypotheses numbered 17 through 24 are summarized in Table III on the next page.

After five weeks of treatment, there was a statistically significant difference between the scores of high-typewriting-skill students in the control and experimental groups on number-copy speed scores. The calculated F value for the multiple regression analyses was 12.050085 which exceeded the tabled F values of 4.23 and 7.72 necessary to indicate a significant difference between the control and experimental groups at the .05 and the .01 levels of significance. Hypothesis 19 was, therefore, rejected. The group means, shown in Appendix C, Table IX, indicate that the experimental group typed 36.92 gross words per minute on number-copy timed writings and the control group typed 30.65 gross words per minute. It was concluded that the high-typewriting-skill students in the experimental group typed significantly faster than the similarly classified students in the control group on number-copy timed writings after five weeks of treatment.

TABLE III

SUMMARY OF MULTIPLE REGRESSION ANALYSES FOR NULL HYPOTHESES 17-24: TESTING FOR DIFFERENCES BETWEEN GROUPS FOR STUDENTS CLASSIFIED AS HAVING HIGH-TYPEWRITING SKILL

Hypothesis Number	Type of Score	Degrees of Freedom	Full Model R^2	Restricted Model R^2	F
17	Straight-Copy Speed after Five Weeks	26	.916165	.916098	.020779
18	Straight-Copy Error after Five Weeks	26	.421670	.421419	.011284
19	Number-Copy Speed after Five Weeks	26	.758817	.647038	12.050085**
20	Number-Copy Error after Five Weeks	26	.105123	.86258	.536793
21	Straight-Copy Speed after Ten Weeks	26	.822809	.821226	.232282
22	Straight-Copy Error after Ten Weeks	26	.359108	.349187	.402481
23	Number-Copy Speed after Ten Weeks	26	.781555	.622881	18.885939**
24	Number-Copy Error after Ten Weeks	26	.034491	.029189	.142777

* $p < .05$.
** $p < .01$.

There were no significant differences indicated by the analyses between the groups on straight-copy speed and accuracy and on number-copy accuracy after five weeks. Hypotheses 17, 18, and 20 were accordingly accepted.

After ten weeks of treatment, as was true after five weeks, a statistically significant difference was noted between high-typewriting-skill students in the control and experimental groups on number-copy speed. The calculated F ratio was 18.885939 which exceeded the tabled F values of 4.23 and 7.72 required to indicate a significant difference between the groups at confidence levels of .05 and .01; hypothesis 23 was, consequently, rejected. The high-typewriting-skill experimental group mean on number-copy speed after ten weeks was 39.85 and the corresponding mean for the control group was 31.45. Because the calculated F value exceeded the tabled F values and because the experimental group mean was higher, it was concluded that students with high-typewriting skill in the experimental group typed number-copy material significantly faster than did similarly classified students in the control group.

Because there were no statistically significant differences indicated by the analyses between the high-typewriting-ability students in the control and experimental groups on straight-copy speed and accuracy and number-copy accuracy, hypotheses 21, 22, and 24 were accepted.

Summary of Analyses of Scores of Low-Typewriting-Skill and High-Typewriting-Skill Students in the Experimental Group Only

Scores of the 25 students in the experimental group, all of whom typed number drills, were analyzed to determine if differences existed

between low-typewriting-skill students and high-typewriting-skill students on straight-copy and number-copy speed and error timed-writing scores. Hypotheses 25 through 32 were tested using multiple regression statistical methods. The hypotheses are listed below:

25. Within the experimental group, there will be no statistically significant difference after five weeks in straight-copy speed scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

26. Within the experimental group, there will be no statistically significant difference after five weeks in straight-copy error scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

27. Within the experimental group, there will be no statistically significant difference after five weeks in number-copy speed scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

28. Within the experimental group, there will be no statistically significant difference after five weeks in number-copy error scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

29. Within the experimental group, there will be no statistically significant difference after ten weeks in straight-copy speed scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

30. Within the experimental group, there will be no statistically significant difference after ten weeks in straight-copy error scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

31. Within the experimental group, there will be no statistically significant difference after ten weeks in number-copy speed scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

32. Within the experimental group, there will be no statistically significant difference after ten weeks in number-copy error scores between students classified as having low typewriting skill and those classified as having high typewriting skill.

The means for the 13 low-typewriting-skill students and the 12 high-typewriting-skill students in the experimental group are shown in Appendix C, Table X, page 130. Data used to test hypotheses numbered 25 through 32 using multiple regression may be seen in Appendix C, Tables XXXV through XLII. In order to indicate a statistically significant difference between the two skill levels in the experimental group at the .05 and .01 levels of confidence, the calculated F values must exceed 4.41 and 8.29, respectively. The results of the multiple regression analyses of scores for each hypothesis are shown in Table IV on the following page.

None of the calculated F scores exceeded the tabled F values necessary to indicate statistically significant differences between the scores of the two skill levels of students in the experimental group on straight-copy or number-copy timed writings after five and after ten weeks of experimental treatment. It was concluded that number drills typed by the students in the experimental group did not have different effects on the low- and high-typewriting-skill students' straight-copy and number-copy speed and accuracy. The null hypotheses numbered 25 through 32 were, therefore, accepted.

TABLE IV

SUMMARY OF MULTIPLE REGRESSION ANALYSES FOR NULL HYPOTHESES 25-32: TESTING FOR DIFFERENCES BETWEEN LOW- AND HIGH-TYPEWRITING-SKILL STUDENTS IN THE EXPERIMENTAL GROUP ONLY

Hypothesis Number	Type of Score	Degrees of Freedom	Full Model R^2	Restricted Model R^2	F
17	Straight-Copy Speed after Five Weeks	18	.659127	.741665	.609652
18	Straight-Copy Error after Five Weeks	18	.410694	.375916	1.062910
19	Number-Copy Speed after Five Weeks	18	.762148	.708483	3.313616
20	Number-Copy Error after Five Weeks	18	.098354	.097578	.015492
21	Straight-Copy Speed after Ten Weeks	18	.691361	.650391	2.389395
22	Straight-Copy Error after Ten Weeks	18	.536591	.490783	1.779304
23	Number-Copy Speed after Ten Weeks	18	.771795	.730946	3.222038
24	Number-Copy Error after Ten Weeks	18	.191366	.092771	1.956188

* $p < .05$.
** $p < .01$.

Summary

Straight-copy and number-copy speed and accuracy scores of control group and experimental group students on timed writings taken after five weeks and after ten weeks of experimental treatments were analyzed in four ways using multiple regression. First, the control group and experimental group scores were analyzed to determine if there were differences between the two groups. Analyses of the score data indicated a significant difference between the experimental and control groups only on the speed scores on number-copy timed writings. The difference between the groups for number-copy speed was evident from the analyses of both the five-week and ten-week scores. The experimental group mean was higher than the control group mean on scores for both periods of time, indicating that the experimental group typed significantly faster. Analyses of straight-copy speed and error scores and of number-copy error scores did not show statistically significant differences between the groups.

Secondly, low-typewriting-skill students were identified in the control and experimental groups. The comparison of the scores in the two groups revealed no significant differences on straight-copy speed and accuracy and on number-copy accuracy after five or ten weeks of treatment. Further, no difference was shown by the statistical analysis of the five-week number-copy speed scores. However, the number-copy speed scores after ten weeks of the experimental period were significantly different. The group means indicated the low-typewriting-skill students in the experimental group typed significantly faster after ten weeks on number-copy timed writings than did the low-typewriting-skill control group students.

Results of the statistical analyses of high-typewriting-skill control and experimental group scores followed the same pattern as the low-typewriting-skill students with one exception: the high-typewriting-skill students in the experimental group typed significantly faster than did the control group high-typewriting-skill students on number copy after both five and ten weeks of experimental treatment.

Finally, the scores of the students in the experimental group were examined to determine if the number drills which the experimental group typed had different effects on the straight-copy and number-copy speed and accuracy of low- and high-typewriting-skill students. Multiple regression analyses of the scores on the five-week and ten-week timed writings did not indicate significant differences existed between the two skill level groups in the experimental group on straight-copy or on number-copy speed and accuracy.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The main purpose of this study was to compare the effects of alphabetic drills and number drills on straight-copy and number-copy speed and accuracy of college intermediate students. Additionally, this study was undertaken to compare the effects of number drills on straight-copy and number-copy speed and accuracy of low-typewriting-skill students. The same comparisons were made for students classified as having high typewriting skill. The final reason for undertaking this study was to determine whether or not number drills affect low- and high-typewriting-skill students differently.

Two classes of intermediate typewriting students at Oklahoma State University participated in the experiment during the spring semester of 1981. The control group typed drill lines found in a textbook which were composed primarily of alphabetic strokes. Four drill lines were typed for five minutes each class session for ten weeks. The experimental group students typed for five minutes per class session on four drill lines consisting primarily of number strokes composed by the author of this paper.

Pretest speed and accuracy scores were recorded for five-minute straight-copy and one-minute number-copy timed writings. Similar scores were obtained after five weeks of the experimental period had passed and

at the end of the ten-week period. The pretest scores were used as control variables in the multiple regression analysis of the control and experimental group five-week and ten-week straight-copy and number-copy speed and error scores. Other control variables used were: the hours per week each student typed for personal reasons; hours per week each student typed at a job; and the number of semesters of college experience of each participant including the one during which the experiment took place. The data for the last three control variables were collected from questionnaires filled out by the students at the conclusion of the experiment.

Multiple regression analyses of the scores revealed that number-copy speed was significantly greater after five weeks and after ten weeks for the participants in the experimental group. Straight-copy speed and accuracy and number-copy accuracy were not significantly different for the two groups after five weeks or after ten weeks.

Low-typewriting-skill students' speed scores on number-copy timed writings were not significantly higher for the experimental group after five weeks. A significant difference, however, did appear in the analysis of the ten-week number-copy speed scores; the experimental group typed significantly faster than the control group. The straight-copy speed and error and number-copy error scores did not differ significantly at the end of five weeks or ten weeks.

High-typewriting-skill students in the experimental group had significantly higher speed scores on number-copy timed writings after five weeks and after ten weeks than did those in the control group. No significant differences were found after five weeks or ten weeks between the scores of students with high typewriting skill in the experimental

and control groups on straight-copy speed and accuracy or number-copy accuracy.

Analyses of the speed and error scores of low-typewriting-skill and high-typewriting-skill students in the experimental group showed no significant differences between the groups on five-week or ten-week straight-copy and number-copy timed writings.

Conclusions

The conclusions set forth in this section are based upon the results of the research study reported in Chapter IV.

1. The findings of this study showed significant differences in favor of the experimental group on number-copy speed after five weeks and after ten weeks of experimental treatment. It can therefore be concluded that number drills practiced for five minutes per class session for five-week and ten-week periods are effective in increasing the speed on number-copy timed writings of college intermediate typewriting students.

2. The findings showed no significant difference between groups on straight-copy speed and accuracy and number-copy accuracy after five or ten weeks. The lack of significant differences leads to the conclusion that number drills substituted for alphabetic-copy drills do not adversely affect straight-copy speed and accuracy. Likewise, they do not affect number-copy accuracy.

3. The number-copy speed of students classified as having low typewriting skill at the beginning of the experimental period was significantly and positively affected by number drills after ten weeks of practice. However, there was no significant difference noted after five

weeks. It was concluded that number drills do have a positive effect on the number-copy speed of low-typewriting-skill students when such drills are continued for a ten-week period of time.

4. No significant differences between low-typewriting-skill students in the control and experimental groups were found for straight-copy speed and accuracy and number-copy accuracy, leading to the conclusion that number drills may be substituted for alphabetic drills without adversely affecting those scores of low-typewriting-skill students.

5. The findings of this study showed a significant difference in number-copy timed writing speed between students classified as having high typewriting skills in the control group and experimental group after five and after ten weeks. It can be concluded, therefore, that high-typewriting-skill students' speed on number copy is positively affected by typing number drills for five-week and for ten-week periods of time.

6. Because there were no significant differences found between the experimental and control group students classified as having high typewriting skill as far as straight-copy speed and accuracy and number-copy accuracy were concerned, it is concluded that number drills have neither a significant positive nor negative effect on those scores of high-typewriting-skill students. Number drills, therefore, may be substituted for alphabetic drills without adversely affecting the straight-copy achievement of high-typewriting-skill students.

7. Since no significant differences were found between experimental group students classified as having low typewriting skill and experimental group students classified as having high typewriting skill,

the conclusion was reached that number drills have essentially the same effect on the straight-copy speed and accuracy and number-copy speed and accuracy of both students classified as having low typewriting skill and those classified as having high typewriting skill.

Recommendations

The following recommendations are made as a result of the findings of this study:

1. Since number drills used in this study have a positive effect on the number-copy speed of college intermediate typewriting students and since those drills do not have a negative effect on straight-copy speed and accuracy, number drills should be included in college intermediate typewriting course materials. However, since number drills have no positive effect on number-copy accuracy, other methods must be used to develop number accuracy.

2. Because students classified as having low typewriting skill based on gross-word-per-minute straight-copy timed writings do not show a significant positive difference in number-copy speed after five weeks of practicing number drills when compared with low-typewriting-skill students who typed alphabet drills but do show a significant difference after ten weeks, it is recommended that number drills be assigned for more than five weeks for low-typewriting-ability students. The exact number of weeks necessary for a significant increase in number-copy speed was not determined in this study.

3. Based on the findings that there were no significant differences noted between students who typed number drills classified as having high typewriting skill and students who typed number drills

classified as having low typewriting skill, it is recommended that the same type of number drills be used for all students.

4. A study should be conducted to determine the effect of number drills on production speed and accuracy of college intermediate typewriting students.

5. Additional studies should be conducted to find if number drills affect beginning and advanced typewriting students' straight-copy and number-copy speed and accuracy and production speed and accuracy.

6. Studies should be conducted to determine which specific type of number drills are the most beneficial in improving students' number-copy speed.

7. Studies should be designed and undertaken to determine the most effective means of improving number-copy accuracy.

8. Additional research should be directed toward determining if the same positive effects on number-copy speed could be obtained with number drill sessions of shorter duration.

9. Follow-up studies should be conducted to determine if the positive effect of number drills on number-copy speed are retained after students have stopped practicing the drills.

10. A research study should be conducted to determine if alphabetic drill lines could be written that would effectively increase straight-copy speed and accuracy.

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APPENDIXES

APPENDIX A

STUDENT DRILL AND TEST MATERIALS

NUMBER DRILL NO. 1

Location Drill	wit 285 wee 233 wet 235 wow 292 woe 293 woo 299 wry 246 err 344 ewe 323
Cont. & Double	2100 9988 0100 8900 5543 7778 2100 0012 1100 1112 5676 1001 6566 0011
Symbol/Number	4.91% 37.5% 24.1% 14.2% 19.5% 42.1% 15.0% 11.2% 16.1% 52.0% 25.1% 14.0%
Balanced Hand	3846 7294 3658 1830 7463 6475 4928 2718 9403 2939 9404 7281 9383 1659
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 2

Location Drill	weep 2330 were 2343 wept 2305 wipe 2803 wire 2843 wore 2943 writ 2485
Cont. & Double	344 000 789 900 767 333 100 455 554 888 656 566 001 233 567 009 900 432
Symbol/Number	$351.61 $253.93 $153.03 $529.05 $135.00 $152.92 $203.93 $152.53 $520.41
Balanced Hand	810 281 172 364 205 261 462 461 291 462 481 391 563 171 010 462 375 272
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 3

Location Drill	ewe 323 eye 363 rip 480 rye 463 rut 475 row 492 toe 593 try 546 tot 595
Cont. & Double	22 78 00 12 55 89 00 23 66 11 34 00 87 11 45 99 65 22 56 99 43 33 00 90
Symbol/Number	750,500 351,519 152,061 420,203 462,059 283,141 240,502 319,191 148,131
Balanced Hand	30 62 82 46 72 04 36 39 85 83 29 37 26 47 65 71 50 63 64 75 49 20 27 48
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 4

Location Drill	wrote 24953 worry 29446 witty 28556 write 24853 wrote 24953 wiper 28034
Cont. & Double	9000 4567 2122 7878 1100 0100 7654 8900 9000 4445 1222 7877 7676 8900
Symbol/Number	302-81-9351 242-06-8174 619-50-1940 131-47-1830 131-61-8203 716-17-1625
Balanced Hand	2610 6594 4639 1038 6492 8563 5710 7572 2947 9185 2836 4919 7494 3818
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 5

Location Drill	tot 595 too 599 toy 596 tip 580 top 590 tow 592 two 529 tie 583 tee 533
Cont. & Double	0009 7654 7878 2212 0098 6767 7787 2221 5544 0009 0098 7654 0010 0011
Symbol/Number	19.4% 57.3% 14.2% 24.1% 59.1% 14.2% 15.0% 21.1% 16.1% 52.0% 15.2% 14.0%
Balanced Hand	8183 4947 9194 6382 5819 7492 2757 1950 6385 2946 1830 9364 6495 1620
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 6

Location Drill	tote 5953 toot 5995 type 5603 tree 5433 trip 5480 tire 5843 tore 5943
Cont. & Double	09 00 33 34 99 65 22 57 99 54 11 78 00 43 11 66 32 00 98 55 21 00 87 22
Symbol/Number	$161.35 $303.50 $303.51 $509.25 $135.00 $920.51 $393.02 $350.51 $410.50
Balanced Hand	84 72 02 94 57 46 36 50 17 58 74 62 73 92 83 85 93 63 40 27 64 26 26 30
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 7

Location Drill	tee 533 yet 635 you 697 yip 680 ire 843 opt 905 wry 246 try 546 pie 083
Cont. & Double	433 000 987 009 767 333 100 554 445 888 656 665 100 233 567 900 009 432
Symbol/Number	500,750 915,153 160,251 302,024 950,264 141,382 205,042 161,913 131,841
Balanced Hand	272 573 174 020 272 363 195 184 462 291 164 264 162 502 463 271 182 830
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 8

Location Drill	error 34494 route 49753 roper 49034 upper 70034 utter 75534 otter 95534
Cont. & Double	0012 9988 2100 8900 5543 8777 1001 0012 0011 1112 5676 1001 6566 0011
Symbol/Number	6231-71-617 3028-16-131 0381-74-131 0419-05-916 4718-61-242 1539-18-203
Balanced Hand	6483 5916 3839 1827 4048 8382 3049 8172 8294 5746 3647 1830 6385 4927
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 9

Location Drill	pit 085 prop 0490 pot 095 pup 070 pet 935 pry 046 pop 090 pep 030 put 075
Cont. & Double	00 34 00 66 76 21 12 44 00 67 65 00 11 45 66 90 11 12 33 78 98 00 32 44
Symbol/Number	273-80-2585 515-26-8581 161-72-0253 315-27-2635 171-51-8325 509-29-3924
Balanced Hand	26 74 87 48 61 59 94 46 62 30 40 81 71 95 18 64 40 17 91 85 63 50 19 75
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 10

Location Drill	rote 4953 rope 4903 root 4995 your 6974 quit 1785 quip 1780 pier 0834
Cont. & Double	100 788 900 900 122 545 889 454 900 332 667 222 678 001 009 100 122 099
Symbol/Number	$10,271.91 $97,635.31 $86,279.74 $15,171.81 $46,203.51 $35,162.81
Balanced Hand	816 202 381 946 716 940 182 504 020 204 630 173 620 593 305 184 619 920
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 11

Location Drill	wit 285 wee 233 wet 235 wow 292 woe 293 woo 299 wry 246 err 344 ewe 323
Cont. & Double	2112 1122 3455 1112 8900 6776 9000 1000 2334 6556 2234 9000 8987 8900
Symbol/Number	31.462% 41.751% 33.008% 28.197% 24.815% 13.091% 51.351% 28.102% 31.515%
Balanced Hand	4030 7174 8392 9504 3816 2736 6403 4716 2040 6185 3646 1640 6161 5837
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 12

Location Drill	writer 248534 wetter 235534 terror 534494 totter 595534 poorer 099434
Cont. & Double	100 556 900 455 998 212 443 900 321 345 887 434 000 112 234 776 334 321
Symbol/Number	21,091,628 15,071,920 26,371,035 53,774,153 19,400,520 24,611,716
Balanced Hand	292 475 850 816 273 503 295 501 628 619 303 718 404 918 749 950 750 640
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 13

Location Drill	ewe 323 eye 363 rip 480 rye 463 rut 475 row 492 toe 593 try 546 tot 595
Cont. & Double	11 34 66 89 76 21 12 44 67 99 65 00 22 00 45 77 00 54 23 55 78 98 43 00
Symbol/Number	2.41% 71.3% 42.9% 14.2% 25.1% 42.8% 15.0% 11.3% 16.1% 52.0% 25.0% 14.0%
Balanced Hand	71 29 47 92 85 28 81 95 30 49 75 83 59 74 26 60 27 94 38 58 02 93 50 57
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 14

Location Drill	pipe 0803 prop 0490 pert 0345 purr 0744 putt 0744 poor 0994 peep 0330
Cont. & Double	2100 8989 6766 1112 5556 9000 5433 3211 8900 8767 2234 2211 5677 3456
Symbol/Number	$131.61 $252.93 $131.30 $925.05 $131.00 $192.52 $302.92 $261.51 $250.14
Balanced Hand	3030 1747 9262 1718 7573 1940 2859 1636 5846 1920 5936 1950 6374 1730
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 15

Location Drill	tot 595 too 599 toy 596 tip 580 top 590 tow 592 two 529 tie 583 tee 533
Cont. & Double	100 676 000 445 211 876 100 345 332 900 332 000 543 900 112 000 543 999
Symbol/Number	170,500 131,916 152,061 240,202 642,091 828,141 420,602 319,191 841,318
Balanced Hand	575 736 171 959 161 040 284 583 060 750 618 850 141 594 828 930 840 391
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 16

Location Drill	prior 04894 peppy 03006 poppy 90996 power 90234 petty 03556 puppy 07006
Cont. & Double	2100 2223 3445 4545 9000 7887 6776 4545 1233 5665 9000 9888 1000 0001
Symbol/Number	202-81-7361 242-60-8147 416-06-1490 313-74-1855 313-61-8302 617-16-1726
Balanced Hand	4030 7171 8392 9584 3016 2736 6403 1746 2948 6285 3040 2640 8205 5827
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 17

Location Drill	tee 533 yet 635 you 697 yip 680 ire 843 pot 905 wry 246 try 546 pie 083
Cont. & Double	9878 6765 7877 5667 0009 4455 8900 0098 4321 1112 4566 7677 2111 9000
Symbol/Number	15203-1619 15131-6152 15162-0252 15151-5135 02024-1392 24160-5142
Balanced Hand	4927 3858 4829 8471 3937 4838 6404 9303 1820 6182 3948 5736 6305 8404
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 18

Location Drill	pure 0743 peer 0334 prep 0430 pity 0856 port 0945 quit 1785 tier 5834
Cont. & Double	878 787 000 112 887 900 767 900 889 765 900 333 890 543 566 112 334 890
Symbol/Number	(1,413) (1,531) (1,692) (1,526) (4,202) (3,516) (2,416) (3,161) (4,150)
Balanced Hand	264 593 361 930 171 292 293 263 471 461 391 275 463 383 103 402 502 171
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 19

Location Drill	pit 085 pro 049 pot 095 pup 070 pet 035 pry 046 pop 090 pep 030 put 075
Cont. & Double	78 55 00 55 76 89 00 00 88 00 22 90 55 98 00 45 87 44 33 65 22 00 11 00
Symbol/Number	26.31% 20.41% 51.31% 26.02% 20.41% 19.72% 30.41% 51.30% 91.51% 20.51%
Balanced Hand	26 03 50 63 17 92 85 40 61 46 95 36 47 36 57 10 29 63 26 64 64 94 40 17
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 20

Location Drill	quite 17853 quiet 17835 query 17346 quote 17953 upper 70034 utter 75534
Cont. & Double	8900 4567 8900 1000 2223 9000 4321 8900 7899 4544 4322 8999 7787 1000
Symbol/Number	$13,131 $25,302 $16,281 $15,002 $35,201 $53,712 $15,131 $14,201 $26,202
Balanced Hand	1647 8305 9164 1049 8562 5740 6305 7184 6173 7172 9405 1820 4058 3027
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 21

Location Drill	wit 285 wee 233 wet 235 wow 292 woe 293 woo 299 wry 246 err 344 ewe 323
Cont. & Double	0012 9988 2100 8900 5543 8777 1001 0012 0011 1112 5676 1001 6566 0011
Symbol/Number	6231-71-617 3028-16-131 0381-74-131 0419-05-916 4718-61-242 1539-18-203
Balanced Hand	6483 5916 3839 1827 4048 8382 3049 8172 8294 5746 3647 1830 6385 4927
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 22

Location Drill	weep 2330 were 2343 wept 2305 wipe 2803 wire 2843 wore 2943 writ 2485
Cont. & Double	443 000 987 009 767 333 100 554 445 888 656 665 100 233 567 900 009 432
Symbol/Number	500,750 915,153 160,251 302,024 950,264 141,382 205,042 161,913 131,841
Balanced Hand	272 573 174 020 272 363 195 184 462 291 164 264 162 502 463 271 182 830
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 23

Location Drill	ewe 323 eye 363 rip 480 rye 463 rut 475 row 492 toe 593 try 546 tot 595
Cont. & Double	09 00 33 34 99 65 22 56 99 54 11 78 00 43 11 66 32 00 98 55 21 00 87 22
Symbol/Number	$161,35 $303.50 $303.51 $509.25 $135.00 $920.51 $393.02 $350.51 $410.50
Balanced Hand	84 72 02 94 57 46 34 50 17 58 74 62 73 92 83 85 93 63 40 27 64 26 26 30
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 24

Location Drill	pretty 043556 pitter 085534 putter 075534 pepper 030034 proper 049034
Cont. & Double	0009 7654 7878 2212 0098 6767 7787 2221 5544 0009 0098 7654 0010 0011
Symbol/Number	19.4% 57.3% 14.2% 24.1% 59.1% 14.2% 15.0% 21.1% 16.1% 52.0% 15.2% 14.0%
Balanced Hand	8183 4947 9194 6382 5819 7492 2757 1750 6385 2946 1830 9364 6495 1620
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 25

Location Drill	tot 595 too 599 toy 596 tip 580 top 590 tow 592 two 529 tie 583 tee 533
Cont. & Double	00 43 00 66 67 12 21 44 00 76 65 00 11 54 66 90 11 21 33 87 89 00 23 44
Symbol/Number	585-20-8372 185-86-2515 352-02-7161 735-27-2513 523-81-5171 429-39-1905
Balanced Hand	57 92 50 36 58 19 71 40 46 81 59 17 18 40 30 26 64 49 95 16 84 48 47 62
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 26

Location Drill	tote 5953 toot 5995 type 5603 tree 5433 trip 5480 tire 5843 tore 5943
Cont. & Double	099 100 001 900 100 876 222 766 233 009 454 988 545 221 009 990 887 001
Symbol/Number	$19,172.01 $13,536.97 $47,972.68 $18,171.52 $15,302.64 $18,261.53
Balanced Hand	618 202 183 649 617 940 281 405 020 402 630 371 026 395 503 481 916 920
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 27

Location Drill	tee 533 yet 635 you 697 yip 680 ire 843 opt 905 wry 246 try 546 pie 083
Cont. & Double	2112 0098 8987 9000 4322 6556 2334 1000 9000 0098 2111 5543 6776 2211
Symbol/Number	(31462) (41751) (33008) (28197) (24815) (13291) (51351) (28102) (31515)
Balanced Hand	4030 4717 2938 4059 6183 6372 30416 6174 2040 5816 6463 1640 1616 6385
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 28

Location Drill	twirp 52840 tweet 52335 tower 59234 trite 54853 quite 17853 quiet 17835
Cont. & Double	123 433 677 432 211 000 434 788 543 123 009 344 212 899 554 900 655 100
Symbol/Number	82,610,023 15,271,920 53,017,362 35,147,735 19,400,520 61,711,642
Balanced Hand	272 574 850 618 372 305 592 105 826 916 303 817 404 819 947 950 750 640
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 29

Location Drill	pit 085 pro 049 pot 095 pup 070 pet 035 pry 046 pop 090 pep 030 put 075
Cont. & Double	00 34 89 87 55 32 45 00 77 54 00 22 00 56 99 76 44 21 12 67 98 66 43 11
Number/Symbol	163-71-8202 741-82-6242 416-06-1490 558-14-7313 202-81-6313 627-16-1716
Balanced Hand	7385 5028 2640 3040 5826 8492 6471 3046 6372 6103 4859 2938 1717 4030
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 30

Location Drill	rote 4953 rope 4903 root 4995 your 6974 quit 1785 quip 1780 pier 0834
Cont. & Double	6543 7765 1122 4322 7678 8900 1123 3345 9000 6555 2111 6676 9898 2100
Number/Symbol	170,500 813,148 191,913 206,024 141,828 190,246 202,024 160,251 619,131
Balanced Hand	193 840 830 828 495 161 850 618 750 040 385 482 040 161 959 171 736 575
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 31

Location Drill	wit 285 wee 233 wet 235 wow 292 woe 293 woo 299 wry 246 err 344 ewe 323
Cont. & Double	999 345 000 211 900 543 000 233 900 233 543 100 876 122 544 000 676 001
Number/Symbol	$410.25 $251.62 $292.03 $252.91 $131.00 $505.29 $131,30 $392.52 $161.31
Balanced Hand	1730 4736 1950 5936 1820 6485 6361 9582 1940 3757 8171 2629 7471 3030
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 32

Location Drill	wrote 24953 worry 29446 witty 28556 write 24853 wrote 24953 wiper 28034
Cont. & Double	1000 0001 8889 9000 5665 3321 5454 6776 7887 9000 5454 5443 2223 2100
Number/Symbol	14.1% 25.1% 52.0% 16.1% 30.0% 15.0% 82.4% 15.2% 24.1% 92.4% 31.7% 14.2%
Balanced Hand	75 50 39 20 85 83 49 72 06 62 47 95 38 57 94 03 59 18 82 58 29 74 29 17
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 33

Location Drill	ewe 323 eye 363 rip 480 rye 463 rut 475 row 492 tow 593 try 546 tot 595
Cont. & Double	9000 1112 7767 6654 2111 1234 8900 0098 5544 9000 7665 7787 5676 8789
Number/Symbol	2415-06142 2931-42020 5314-15151 2520-26151 9161-30251 2516-13151
Balanced Hand	4048 5036 6375 8493 2816 1820 3039 4046 8384 7393 1748 9274 8583 7294
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 34

Location Drill	pipe 0803 prop 0490 pert 0345 purr 0744 putt 0755 poor 0994 peep 0330
Cont. & Double	098 433 211 665 345 098 333 009 567 988 900 767 900 788 211 000 787 878
Number/Symbol	(4.150) (1,612) (6,142) (6,153) (2,024) (6,251) (2,961) (1,351) (3,141)
Balanced Hand	171 205 204 301 383 364 572 193 164 174 362 392 292 171 930 163 395 462
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 35

Location Drill	tot 595 too 599 toy 596 tip 580 top 590 tow 592 two 529 tie 583 tee 533
Cont. & Double	00 11 00 22 56 33 44 78 54 00 89 55 90 22 00 88 00 00 89 76 55 00 55 87
Number/Symbol	15.02% 15.19% 03.15% 14.03% 27.91% 14.02% 20.62% 13.15% 14.02% 13.62%
Balanced Hand	71 40 49 46 46 62 63 92 10 75 63 74 36 59 64 16 40 58 29 71 36 50 30 62
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 36

Location Drill	porter 094534 quitter 1785534 quieter 1783534 terror 534494 totter 595534
Cont. & Double	0001 7877 9998 2234 4454 9987 0098 1234 9000 3222 1000 0098 7654 8900
Number/Symbol	$20,262 $10,241 $13,151 $21,735 $20,253 $20,051 $18,261 $20,352 $13,131
Balanced Hand	7203 8504 1820 5049 2717 3716 4817 5036 5740 2658 9401 4619 5038 7461
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 37

Location Drill	tee 533 yet 635 you 697 yip 580 ire 843 opt 905 wry 246 try 546 pie 083
Cont. & Double	0011 0010 7654 0098 0009 5544 2221 7787 6767 0098 2212 7878 7654 0009
Symbol/Number	14.0% 15.2% 52.0% 16.1% 21.1% 15.0% 14.2% 59.1% 24.1% 14.2% 56.3% 19.4%
Balanced Hand	1620 6495 9364 1830 2946 6385 1750 2757 7492 5819 6382 9194 4947 8183
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 38

Location Drill	pit 085 pro 049 pot 095 pup 070 pet 035 pry 046 pop 090 pep 030 put 075
Cont. & Double	432 009 900 567 233 100 665 656 888 445 554 100 333 767 009 987 000 443
Symbol/Number	131,841 161,913 205,042 141,382 950,242 302,024 160,251 915,153 500,750
Balanced Hand	830 182 271 463 502 162 264 164 291 462 184 195 363 272 020 174 563 272
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 39

Location Drill	pit 085 pro 049 pot 095 pup 070 pet 035 pry 046 pop 090 pep 030 put 075
Cont. & Double	432 009 900 567 233 100 665 656 888 445 554 100 333 767 009 987 000 443
Symbol/Number	131,841 161,913 205,042 141,382 950,242 302,024 160,251 915,153 500,750
Balanced Hand	830 182 271 463 502 162 264 164 291 462 184 195 363 272 020 174 573 272
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

NUMBER DRILL NO. 40

Location Drill	error 34494 route 49753 roper 49034 upper 70034 utter 75534 otter 95534
Cont. & Double	0011 6566 1001 5676 1112 0011 0012 1001 7778 5543 8900 2100 9988 0012
Symbol/Number	1539-18-203 4718-61-242 0419-05-916 0381-74-131 3028-16-131 6241-71-617
Balanced Hand	5926 6385 1830 3647 5746 8294 8172 3049 8382 5048 1827 3839 5916 6483
	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14

DRILL NO. 1

Alphabet	A grizzly bear jogged through the pine woods after a quick-moving fox.
Direct reaches	Fred tried to decide just how much of the old junk might be destroyed.
Figure/symbol	A & D's memo #894-673-2 (dated May 20) requests a 15½ or 15% discount.
Fluency	A good criticism has a positive goal for it is meant to help someone.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

from College Typewriting, Intensive Course, Ninth Edition

DRILL NO. 2

Alphabet	After a week's probe, the lazy jury acquitted 27 men of evading taxes.
Figure/symbol	About 17 2/3 percent of the 16,450 men have read George Orwell's 1984.
Long words	He is likely to influence the next generation of intellectual leaders.
Fluency	A grin can cut a big load in half; a frown just heaps the load higher.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

from College Typewriting, Intensive Course, Ninth Edition

DRILL NO. 3

Alphabet	Al Gray became exhilarated as we kept justifying his five quiz scores.
Figure/symbol	At the meeting, 289,356 stockholders (70%) voted "No" on proposal #14.
One hand	As Johnny Carver asserted, Fred was regarded as carefree and careless.
Fluency	A right approach to work that must be done cuts the size of most jobs.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

from College Typewriting, Intensive Course, Ninth Edition

DRILL NO. 4

Alphabet	All of his money exhausted, lazy Jacques is now verging on bankruptcy.
Figure/symbol	*Billed as "385 sets @ 76¢ a set," the listing caused a $194.02 error.
1st row	Can Mr. Van Bux, the banker, visualize our volume six months from now?
Fluency	Anybody can be wrong. Can being wrong not be a beneficial experience?

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

from College Typewriting, Intensive Course, Ninth Edition

DRILL NO. 5

Alphabet	Aquatic experts have judged my worn samples to be fossilized plankton.
Figure/symbol	Bond #7365024 will not be called until 1978, and it pays 5¼% interest.
Hyphen	Our vice-president is on a far-reaching trip to get all-round players.
Fluency	A busy man may work until five--then work through a downtown auto jam.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

from College Typewriting, Intensive Course, Ninth Edition

DRILL NO. 6

Alphabet	Bob Frags quickly explained why we don't have zero weather in Jamaica.
Figure/symbol	By buying the stock at 124¼ and selling it at 86½, Lance lost $395.70.
Vowels	Despite his diet, he ate various pieces of chocolate candy and sweets.
Fluency	Be sure to vote; it is with our vote that we ensure and insure rights.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 7

Alphabet	Brazilian Judge Frank Wavo is quietly confirming the risk of smallpox.
Figure/symbol	Call 875-0529 on May 9 to purchase volume #4 at a discount of 33 1/3%.
Direct reaches	Freddy needed his cooperation in order to start the logs rolling away.
Fluency	During August, he had some other work that had taken up time at night.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 8

Alphabet	Daniel Joyer's macabre mask, "Banquo's Ghost," won five or six prizes.
Figure/symbol	Compute: 640 pairs @ 38½¢ and 975 sets @ 12½¢; allow a 14¼% discount.
Shift keys	D. H. Ochs, P. G. Hasko, and R. I. Quinn live in Salt Lake City, Utah.
Fluency	Habits--the more we use them, the more difficult it is to change them.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 9

Alphabet	Dank fog hid unlit objects; expressway driving became quite hazardous.
Figure/symbol	Corley & Wellman sent us check #723 (dated November 19) for $4,967.50.
1st row	Can Victor Zorn cleverly recover much extra evidence and deceive them?
Fluency	He is a man who profits from the work of firms that make our machines.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 10

Alphabet	Eliza quit both her jobs, packed six bags, and moved far away to Nome.
Figure/symbol	Cody & Dee's Checks #381 ($176.89) and #407 ($154.72) are outstanding.
a, e	These ears of corn are easier to eat than were the ears I ate earlier.
Fluency	It can be an amazing experience to find that work can be a lot of fun.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 11

Alphabet	Elizabeth Jacks should mix five quarts of gray paint for Hugh Budwell.
Figure/symbol	Didn't invoice #87456-901 allow us a 3 1/5% discount--or was it 3 2/5%?
Adjacent reaches	There were three points on Kili's eastern slope free of rough weather.
Fluency	It is difficult for me to guide somebody further than I myself can go.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 12

Alphabet	Examine Herb's work; judge for quality; recognize needed improvements.
Figure/symbol	Felt & Blane's address is 7290 East 356th Street (Telephone 452-8134).
One Hand	Drew was requested to decrease the minimum number of pollution tests.
Fluency	Many elements must be combined to produce work in which we take pride.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 13

Alphabet	The exact propinquity of the moving red object was quickly recognized.
Figure/symbol	Exactly 25 7/16 of the solids (384 pounds) must be added at 10:29 a.m.
Long words	Management development must challenge the manager to question success.
Fluency	Lucky is the man with workable plans for what he wants his life to be.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 14

Alphabet	Equip the tug Zyma B for work and expect her to be judged serviceable.
Figure/symbol	Employee #4870 at B-P-W & Company worked from 1:30 to 5:27 for $36.89.
Double letters	All his possessions have been transferred to your home in Tallahassee.
Fluency	Let us always play the game fairly, the way it was meant to be played.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 15

Alphabet	Bud's dog isn't lazy; he quickly makes five extra jumps to win prizes.
Figure/symbol	For $274.31 (plus tax), Mr. Stone can take UAL Flight 580 at 6:19 a.m.
Shift keys	Bob and Jim Smith visited the Hillsdale County fair in July or August.
Fluency	Now is the time to find out how I can contribute to the world of work.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 16

Alphabet	Explain quietly how Dickens vilified Ebenezer Scrooge or Jacob Marley.
Figure/symbol	He said, "Ship 14 #872 lamps, listed at $39.50 less 6% cash discount."
a, u	Thousands of us order sauerkraut to inaugurate an auspicious New Year.
Fluency	Judy is the auditor for the firm of Lee & Work in the downtown office.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 17

Alphabet	The exquisite, azure blue water of some Japanese lakes gets very cold.
Figure/symbol	He wrote, "Sell 875 @ 63¼¢ ea., 180 @ 29½¢, and the remainder @ 49½¢."
Adjacent keys	We were assured Polk Power Saws were proper saws to cut sides 32 x 45.
Fluency	Our neighbor and his visitor may take a dirigible to the ancient city.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 18

Alphabet	The exultant jockey had won five bronze placques and seven gold medals.
Figure/symbol	How can B/O & H, Inc., meet accounts of $27,463 and $58,900 by June 1?
Double letters	Ann can now notify all her classes that the 22 books will arrive soon.
Fluency	Our problem is that there is a right and a wrong way with any problem.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 19

Alphabet	Ezra Weber likes the piquancy of orange juice mixed with clover honey.
Figure/symbol	In 1925, A & E Company's net sales were $283,490; in 1974, $6,708,351.
Left hand	Fears decreased as westward breezes gave six vessels access to a reef.
Fluency	Some "friends" find it more natural to be critical than to be helpful.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 20

Alphabet	The five dozen quarts of blackberry and grape juice mixture were mine.
Figure/symbol	In 1957, our profits were $37,461.05; this year, they are $189,227.13.
Shift keys	I moved from Elm Street, Orange, Texas, to Pine Avenue, Red Oak, Iowa.
Fluency	The future is not with a job; it is with the worker who does that job.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 21

Alphabet	Elizabeth requested that Marge and Jack pay to fix our vacuum sweeper.
Figure/symbol	In 1974, John Rolfe paid $2,438.65 for a boat and $150.92 for a motor.
Home row	Ask Gladys if she has a half tank of gas; she has less than she knows.
Fluency	The men may visit the walls of the ancient city if they can find them.
	/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 22

Alphabet	Five zebras will quietly make appearances in this dark, exotic jungle.
Figure/symbol	Invoice #267-095, dated May 23, read: "140 ctns. (Grade 8) @ 12¢ ea."
c, d	Dick deduced the cold wind could induce Cedric to decal the goods COD.
Fluency	A woman is entitled to equal pay when she does the same work as a man.
	/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 23

Alphabet	Frank eloquently extemporized on his subject, "Letting a Vision Grow."
Figure/symbol	Invoice #46-891 lists credit terms of 2½/15, n/30. We can save $7.49.
Adjacent keys	Three tired wrens stopped on their return trip to the old poplar tree.
Fluency	It is fine to be a "good sport" if one doesn't lose his individuality.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 24

Alphabet	Fred Zwik gave an excellent speech by quoting many famous journalists.
Figure/symbol	Its weight is 36#; height, 2'8"; length, 27'9"; code number, 14-5809*.
Left hand	Fred Carteret traced garden addresses for several crates of red beets.
Fluency	Take what I own that is valuable, but do not deprive me of my dignity.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 25

Alphabet	Happily, Monique believed George's zany joke was excruciatingly funny.
Figure/symbol	Ken's stock, bought at 135½, sold for 248¼ in the 1969-70 bull market.
Shift keys	Karen, Lee, Jo Anne, and Bill attend North Madison Junior High School.
Fluency	The worker who takes pride in his work seldom has to do any job twice.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 26

Alphabet	His five calm blue oxen, wearing antique yokes, won the judges' prize.
Figure/symbol	King & Wynn collected $6,582, plus 4½% interest, less $137.90 in fees.
Home row	Daylight was fading; Hal adjusted the waning little spark of gaslight.
Fluency	They can spend eight days with the formal chairman of the civic corps.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 27

Alphabet	His proclivity to work explains his fine grade on a major botany quiz.
Figure/symbol	L/P, Inc., 7521½ Hone Road, grossed 2¼% more ($2,348.60) than in 1974.
d, e	Eddie decided to deed the feedlot to Fred; he indeed needed the money.
Fluency	Time is such a costly element, we ought to use it as wisely as we can.
	/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 28

Alphabet	Howard Long paid the tax on five quarts of gray paint for Jack Bozman.
Figure/symbol	Lee & Cowl's 14¼% discount applies to your $27,630 and $58,909 orders.
Adjacent keys	We were excited and frightened; we looked like three dreaded warriors.
Fluency	Individuality, one form of sensitivity, makes me proud that "I am me."
	/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 29

Alphabet	I know that an extreme Quebec blizzard may be jeopardizing four lives.
Figure/symbol	Lee & Lee lost 36% on the sale of the 875 books they sold for $12,493.
One hand	Face the facts; you can win an award only if you exceed Jim's average.
Fluency	The wise man finds time for socializing; he finds time for quiet, too.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 30

Alphabet	In a truly amazing way, John's books quickly verified his tax reports.
Figure/symbol	*List does not include Day & Company's policy #87-6320-WE-1954 (paid).
1st row	Has Maxine Mazon or Bab Vanz, members of this club, climbed Mt. Blanc?
Fluency	To captialize on the right to vote is the sign of a mature individual.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 31

Alphabet	In her zany book, Madge Cowper says it is quite fair to tax juveniles.
Figure/symbol	Mark Invoice 118299 "350 sets @ 67¢ a set, less 2 4/5% cash discount."
d, e	Jed decided to heed me; he destroyed the weeds, then seeded the field.
Fluency	Some men and women plan their future; some just wait for it to happen.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 32

Alphabet	Jack and Beth Powell may take a quiz next week if the board gives one.
Figure/symbol	Memo #7091 said: Buy 25½ dozen @ 46¢ and 38¼ dozen @ 27¢ immediately.
Double letters	Bill Hatten and Gregg Mann discussed a funny fellow from Apple Valley.
Fluency	Is he a speaker who tries to make up in length what he lacks in depth?

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 33

Alphabet	Jack ordered a few very large zinnias and some quaint phlox from Bert.
Figure/symbol	Model #7006, marked $528.11, is selling for $435.99--a loss of $92.12.
Long words	The audio-visual environment offers unique opportunities for research.
Fluency	Until a problem confronts us, why must we worry about how to solve it?

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 34

Alphabet	Our quiz grades improved quickly, but we failed the June examinations.
Figure/symbol	My May 7 memo read, "386 rulers @ 49¢; 5 1/3% if paid within 20 days."
Shift keys	Mary, Jack, and Sarah Jane visited St. Paul, Minnesota, last November.
Fluency	We can always do more good by being good than we can in any other way.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 35

Alphabet — Clark now realizes that his brusque expletives frightened my dog Jinx.

Figure/symbol — My May 14 receipt (#5302) was stamped, "Note that Rule 76-98 applies."

Home row — Jason thanked the Highland laddies and lassies for dancing the flings.

Fluency — I shall be the captain of my own future; nobody else can do it for me.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 36

Alphabet — Joel quickly extinguished the blazing fire in the powerful locomotive.

Figure/symbol — My new figures show a 1,235,780 increase, or 469¼% more than expected.

e, i — Desiring to lose weight, I used my weird diet until the eightieth day.

Fluency — Change can be beneficial, but no elemental law says that it always is.

/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 37

Alphabet	James Forrest's proxy quickly voted to recognize the required by-laws.
Figure/symbol	"My rate of return," he said, "can be 32½% ($1,385 + $4,260) by 1979."
Direct reaches	Dee longed to troll for muskellunge, so Polly swerved to deeper water.
Fluency	We can't find time to do a job right--but we find time to do it twice.
	/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 38

Alphabet	The jarring impact of the earthquake paralyzed six old Bavarian towns.
Figure/symbol	O'Dell paid $729.38 (less 10%) for model $4560 at Birtwell & Smothers.
Double letters	Kelly will succeed in getting the committee's letters to their office.
Fluency	Man's culture lies in his ability to prize that which is good in life.
	/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 39

Alphabet	Jeff York amazed us by stating his quixotic view of the labor problem.
Figure/symbol	On May 26, 1974, George paid Sedge-Brown $513.02, just $4.98 too much.
Shift keys	Mr. Smith's itinerary included Tulsa, Dallas, Fort Worth, and Houston.
Fluency	We ought not to tell her to go to the store for just a box of oatmeal.
	/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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DRILL NO. 40

Alphabet	Jim Flack was required to pay the tax on the zinc souvenirs he bought.
Figure/symbol	On November 3, 1974, Richard paid $50.68 (plus tax) for 125# of nails.
1st row	Mr. Newman discovered zinc, bauxite, and miscellaneous minerals there.
Fluency	Let me, if I criticize, be more critical of myself than of my friends.
	/ 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 /

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ONE-MINUTE NUMBER-COPY PRETEST TIMED WRITING

1401 4402 3003 6704 1905 6406 0007 5108 1709 9610 5611 0012

6913 3214 6415 1216 8817 7718 6219 8720 3321 0022 0023 5824

3925 1326 8727 1728 8929 2930 1131 0032 2833 7834 9935 2836

0037 1938 9839 0040 8941 5642 7843 1144 6645 0046 1747 1648

1949 0050 0051 1452 6353 2054 3155 2256 5157 1658 7559 5760

ONE-MINUTE NUMBER-COPY FIVE-WEEK TIMED WRITING

1901 0002 3303 1404 3005 4006 3107 2208 1609 1610 5711 5712

0013 1914 9815 0016 8917 5618 7819 1120 6621 0022 1723 1624

2925 1026 8727 1728 8929 2930 1131 0032 2833 7834 9935 2836

9637 3238 2639 1240 8841 7742 6243 8744 3645 0046 0047 5848

0049 5650 6551 1752 9153 0054 3455 1956 6757 0658 0259 1460

ONE-MINUTE NUMBER-COPY TEN-WEEK TIMED WRITING

1001 4202 3603 6704 1905 3406 4007 9108 1009 6610 5611 0012

5813 0014 3615 0016 8717 6218 7719 8820 1221 2622 0023 9624

2825 9926 7827 2828 2629 1130 2931 8932 1733 8134 1335 2936

2437 1738 9839 0040 8941 5942 7843 1144 6445 0046 1247 1648

7349 5750 5651 1552 0053 7154 4755 5356 1457 0058 0059 1960

FIVE-MINUTE STRAIGHT-COPY PRETEST TIMED WRITING

The words that we use are effective whenever they enable others to understand precisely what it is we mean. There are certain rules of grammar, of course, that justify the decision to use a particular word; and we should adhere to such rules. However, an essential point to keep in mind in choosing that word is that it must help convey clearly and accurately to others the meaning of our written or spoken message.

Choosing with care the words we use provides us with the power to express ourselves more effectively and gives other clearer insight as to our meaning. We must try to be aware of the importance of using the right word, the specific one that conveys what we really want to say. This practice not only helps us express ourselves; it also adds richly to our ability to think keenly, with precision and with clarity.

If we want to talk and to write more effectively, we must acquire an adequate supply of words. A large vocabulary is a definite advantage for a businessman. It allows him to use one word rather than several to express his ideas. It helps him add zest and meaning to his speech and his writing. The personal satisfaction derived more than repays him for the labor involved in acquiring a useful stock of words.

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FIVE-MINUTE STRAIGHT-COPY FIVE-WEEK TIMED WRITING

Business letters are an effective form of communication, but they are an expensive form as well. One management consultant has calculated the cost of a typical letter to run as high as fifteen dollars. Others use a lesser sum, but it cannot be denied that letters cost money. Much of their cost is attributable to the wages of people engaged in letter writing. It seems reasonable to assume, then, that the less time it takes to get out a letter, the less expensive it will be.

When an executive writes a letter, a portion of his salary becomes part of its cost. The same principle applies to the work of a typist or to anybody else who contributes to the letter. Of course, costs for all other charges, such as paper, postage, light, heat, rent, and depreciation on machinery, must also be counted. Although none of these costs taken singly seems to be of major importance, together they add up to a significant figure as the cost for one letter.

Typically, an office function will at some time be stated as a dollar figure, as an expense item. Most businessmen assume that an office function is an investment that will in time pay for itself. If, upon analysis, a function is found to be so expensive that it is not returning an amount that is at least equal to its cost, that function will be ended and some other, more profitable activity substituted. A firm makes profit from efficient procedures as well as from its sales.

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FIVE-MINUTE STRAIGHT-COPY TEN-WEEK TIMED WRITING

Many letters appear to click right away; many do not. Do you know why this is true? A letter can be short, clear, concrete, and correct; but it can lack the sparkle a good writer likes to get into a communication. What is missing? Chances are good that the omitted quality is an evasive factor called the "personal touch." The letters that click have it; but those that do not are cold, impersonal, and unimaginative.

Good letters contain a skillful mix of fact and feeling. They can scarcely be otherwise; for they are written by people, to people, and about people and ideas that involve people. The tone quality a letter possesses has an important bearing on the way it will be received. It should be positive, friendly, and helpful. The ideal letter is one in which a writer puts part of himself in the envelope before he seals it.

Many effective correspondents realize the importance of a basic sales principles. They have good ideas on how to use such principles to help them frame letters that win support. Initially, they try to gain the reader's attention; then they discuss the subject in a way that is apt to appeal to the reader and make him want to be involved. In the closing, they suggestion action to be taken and urge the reader to take it.

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APPENDIX B

NUMBER DRILL SUMMARY SHEET

SUMMARY OF NUMBER DRILL LINES
(Summary of Second through Fourth Drill Lines Numbered ___ to ____)

Digit	No. in Contiguous & Double No. Lines	No. in Symbol/ Number Lines	No. in Balanced-Hand Lines	Total Strokes	% of Total	Grill's %
0						15.4%
1						14.7%
2						11.3%
3						9.4%
4						9.0%
5						9.5%
6						8.5%
7						7.4%
8						7.3%
9						7.5%
Totals						
Total Digraphs:						
Noncontiguous:						65.8%
Contiguous:						19.4%
Double:						14.8%
Total Digits & Symbols:						
Total Numbers:						

Average Number of Spaces Per Number:
Double Digraphs:

Number	% of Total	Grill's %
00		44.0%
11		11.5%
22		7.8%
33		6.2%
44		5.3%

Number	% of Total	Grill's %
55		5.8%
66		5.0%
77		4.6%
88		4.9%
99		4.9%

APPENDIX C

TABLES V - XLII

TABLE V

CONTROL GROUP SPEED AND ACCURACY SCORES

Student Number	Straight Copy						Number Copy					
	Pretest		Five-Week		Ten-Week		Pretest		Five-Week		Ten-Week	
	Speed	Errors	Speed	Errors	Speed	Errors	Speed	Errors	Speed	Errors	Speed	Errors
01	66	6	68	8	61	4	22	0	15	4	17	3
02	41	36	38	12	41	17	20	1	23	2	23	3
03	51	11	54	15	53	8	20	1	21	3	21	1
04	87	14	92	14	98	28	40	1	49	4	46	9
05	53	11	54	16	56	7	20	2	24	4	24	8
06	35	17	38	8	40	11	19	1	23	0	23	1
07	58	5	64	5	60	4	22	2	24	2	24	1
08	53	23	56	13	58	24	24	6	26	5	27	11
09	53	6	57	7	57	17	23	0	26	1	23	2
10	65	5	65	5	61	5	40	4	47	1	50	2
11	75	4	76	2	74	6	36	2	42	3	45	4
12	47	13	51	21	54	15	21	2	25	1	25	0
13	46	10	54	10	49	11	20	2	23	0	25	3
14	60	10	62	17	62	4	24	1	19	2	26	7
15	60	8	60	21	63	12	22	0	26	3	26	4
16	68	19	74	37	68	10	25	10	36	9	35	6
17	60	8	65	8	69	10	27	2	35	4	36	6
18	61	9	62	4	69	15	39	0	39	2	43	6
19	62	14	65	8	64	6	21	4	28	9	27	8
20	56	3	61	7	62	5	19	1	27	5	28	0
21	66	5	69	5	70	10	31	2	47	8	46	3
22	60	13	67	16	62	13	19	2	27	1	28	0
23	47	11	55	27	56	24	23	4	30	2	31	2
24	63	15	65	14	59	9	22	2	27	6	28	3
25	65	6	67	14	64	8	20	7	28	6	29	2
26	48	14	48	11	52	15	22	5	27	3	27	3
27	47	19	40	11	43	15	15	0	22	0	24	0
28	49	7	54	10	52	16	24	3	36	3	35	3

TABLE VI

EXPERIMENTAL GROUP SPEED AND ACCURACY SCORES

	Straight Copy						Number Copy					
Student Number	Pretest		Five-Week		Ten-Week		Pretest		Five-Week		Ten-Week	
	Speed	Errors	Speed	Errors	Speed	Errors	Speed	Errors	Speed	Errors	Speed	Errors
29	38	7	46	13	51	16	18	2	24	3	30	4
30	54	8	51	7	55	5	20	4	38	3	40	7
31	66	2	68	3	69	2	35	1	47	0	47	6
32	69	2	72	7	79	7	36	4	49	2	58	2
33	55	11	57	11	51	0	28	2	35	2	35	5
34	42	9	40	11	47	11	20	0	27	10	32	6
35	39	4	45	6	49	5	15	1	24	1	30	1
36	51	12	53	4	57	8	15	8	23	2	28	0
37	44	16	49	16	48	5	19	0	32	0	32	3
38	46	16	49	7	48	18	23	4	36	6	37	1
39	50	20	48	8	42	8	17	5	26	3	30	11
40	52	4	57	9	54	9	19	1	23	9	25	6
41	33	8	37	7	39	9	21	1	24	0	30	2
42	53	10	63	15	58	6	23	4	44	3	50	8
43	47	13	69	10	69	5	18	0	29	6	34	5
44	48	8	51	6	52	8	20	0	22	2	25	7
45	45	14	44	4	47	12	23	3	28	1	31	1
46	57	8	57	21	60	11	29	5	45	8	47	9
47	49	8	46	8	49	9	17	2	22	1	22	0
48	38	4	42	4	47	9	19	3	29	6	29	5
49	44	12	51	14	53	11	22	1	27	1	32	6
50	57	31	62	47	53	20	27	10	32	8	40	7
51	68	13	70	9	68	14	29	2	47	4	49	6
52	53	13	49	9	52	17	25	2	35	9	33	11
53	50	21	55	13	59	8	21	7	36	2	36	5

TABLE VII

MEANS OF STRAIGHT-COPY AND NUMBER-COPY SPEED AND ACCURACY SCORES IN CONTROL AND EXPERIMENTAL GROUPS

	Pretest Means	Five-Week Means	Ten-Week Means
Speed Scores (in GWPM)			
Control Group Straight-Copy Speed	57.21	60.04	59.89
Experimental Group Straight-Copy Speed	49.92	53.24	54.24
Control Group Number-Copy Speed	24.29	29.36	30.07
Experimental Group Number-Copy Speed	22.36	32.16	35.28
Accuracy Scores (in Percentages)			
Control Group Straight-Copy Accuracy	4.38%	4.26%	4.08%
Experimental Group Straight-Copy Accuracy	4.48%	4.04%	3.57%
Control Group Number-Copy Accuracy	10.24%	11.56%	12.18%
Experimental Group Number-Copy Accuracy	13.36%	11.96%	14.27%

TABLE VIII

MEANS OF LOW-TYPEWRITING-SKILL STUDENTS' STRAIGHT-COPY AND NUMBER-COPY SPEED AND ACCURACY SCORES IN CONTROL AND EXPERIMENTAL GROUPS

	Pretest Means	Five-Week Means	Ten-Week Means
Speed Scores (in GWPM)			
Control Group Straight-Copy Speed	45.00	47.25	48.38
Experimental Group Straight-Copy Speed	42.75	47.42	49.92
Control Group Number-Copy Speed	20.50	26.13	26.63
Experimental Group Number-Copy Speed	19.58	27.00	30.33
Accuracy Scores (in Percentages)			
Control Group Straight-Copy Accuracy	7.32%	5.75%	6.44%
Experimental Group Straight-Copy Accuracy	4.58%	3.76%	4.04%
Control Group Number-Copy Accuracy	10.30%	4.85%	6.94%
Experimental Group Number-Copy Accuracy	7.09%	11.06%	11.34%

TABLE IX

MEANS OF HIGH-TYPEWRITING-SKILL STUDENTS' STRAIGHT-COPY AND NUMBER-COPY SPEED AND ACCURACY SCORES IN CONTROL AND EXPERIMENTAL GROUPS

	Pretest Means	Five-Week Means	Ten-Week Means
Speed Scores (in GWPM)			
Control Group Straight-Copy Speed	62.10	65.15	64.50
Experimental Group Straight-Copy Speed	56.54	58.62	58.23
Control Group Number-Copy Speed	25.80	30.65	31.45
Experimental Group Number-Copy Speed	24.92	36.92	39.85
Accuracy Scores (in Percentages)			
Control Group Straight-Copy Accuracy	3.21%	3.67%	3.14%
Experimental Group Straight-Copy Accuracy	4.38%	4.29%	3.13%
Control Group Number-Copy Accuracy	10.21%	14.24%	14.28%
Experimental Group Number-Copy Accuracy	19.92%	12.80%	17.49%

TABLE X

MEANS OF LOW- AND HIGH-TYPEWRITING-SKILL STUDENTS' STRAIGHT-COPY AND NUMBER-COPY SPEED AND ERROR SCORES IN THE EXPERIMENTAL GROUP

	Pretest Means	Five-Week Means	Ten-Week Means
Speed Scores (in GWPM)			
Low-Typewriting-Ability Students' Straight-Copy Speed	42.75	47.42	49.92
High-Typewriting-Ability Students' Straight-Copy Speed	56.54	58.62	58.23
Low-Typewriting-Ability Students' Number-Copy Speed	19.58	27.00	30.33
High-Typewriting-Ability Students' Number-Copy Speed	24.92	36.92	39.85
Error Scores (in Percentages)			
Low-Typewriting-Ability Students' Straight-Copy Error	4.58%	3.76%	4.04%
High-Typewriting-Ability Students' Straight-Copy Error	4.38%	4.29%	3.13%
Low-Typewriting-Ability Students' Number-Copy Error	7.09%	11.06%	11.34%
High-Typewriting-Ability Students' Number-Copy Error	19.92%	12.80%	17.49%

TABLE XI

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS OF HYPOTHESIS 1: SPEED SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER FIVE WEEKS

Student Number	Five-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	68	66	1	0	2	0
02	38	41	5	0	5	0
03	54	51	0	0	5	0
04	92	87	5	20	6	0
05	54	53	0	0	2	0
06	38	35	2	0	2	0
07	64	58	0	0	6	0
08	56	53	1	0	6	0
09	57	53	3	0	4	0
10	65	65	4	0	4	0
11	76	75	2	4	8	0
12	51	47	2	0	6	0
13	54	46	0	0	4	0
14	62	60	0	0	2	0
15	60	60	1	3	2	0
16	74	68	1	0	4	0
17	65	60	4	14	2	0
18	62	61	1	0	2	0
19	65	62	1	2	2	0
20	61	56	1	12	2	0
21	69	66	1	0	4	0
22	67	60	0	0	1	0
23	55	47	3	0	4	0
24	65	63	3	0	4	0
25	67	65	5	0	6	0
26	48	48	3	0	4	0
27	40	47	0	0	5	0
28	54	49	0	5	4	0
29	46	38	0	0	4	1
30	51	54	10	0	2	1
31	68	66	3	0	4	1
32	72	69	3	0	1	1
33	57	55	5	10	2	1
34	40	42	4	0	3	1
35	45	39	3	0	5	1
36	53	51	0	0	4	1
37	49	44	0	4	4	1
38	49	46	0	0	3	1
39	48	50	4	0	2	1
40	57	52	3	0	2	1

TABLE XI (Continued)

Student Number	Five-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
41	37	33	5	0	4	1
42	63	53	1	0	6	1
43	69	47	8	0	3	1
44	51	48	0	0	2	1
45	44	45	0	0	4	1
46	57	57	1	0	6	1
47	46	49	0	0	3	1
48	42	38	0	5	4	1
49	51	44	4	0	6	1
50	62	57	1	0	2	1
51	70	68	4	0	2	1
52	49	53	0	0	1	1
53	55	50	1	0	2	1

TABLE XII

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS OF HYPOTHESIS 2: ERROR SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER FIVE WEEKS

Student Number	Five-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	2.4%	1.8%	1	0	2	0
02	6.3	17.6	5	0	5	0
03	5.6	4.3	0	0	5	0
04	3.0	3.2	5	20	6	0
05	5.9	4.2	0	0	2	0
06	4.2	9.7	2	0	2	0
07	1.6	1.7	0	0	6	0
08	4.6	8.7	1	0	6	0
09	2.5	2.3	3	0	4	0
10	1.5	1.5	4	0	4	0
11	0.5	1.1	2	4	8	0
12	8.2	5.5	2	0	6	0
13	3.7	4.3	0	0	4	0
14	5.5	3.3	0	0	2	0
15	7.0	2.7	1	3	2	0
16	10.0	5.6	1	0	4	0
17	2.5	2.7	4	14	2	0
18	1.3	3.0	1	0	2	0
19	2.5	4.5	1	2	2	0
20	2.3	1.1	1	12	2	0
21	1.4	1.5	1	0	4	0
22	4.8	4.3	0	0	1	0
23	9.8	4.7	3	0	4	0
24	4.3	4.8	3	0	4	0
25	4.2	1.8	5	0	6	0
26	4.6	5.8	3	0	4	0
27	5.5	8.1	0	0	5	0
28	3.7	2.9	0	5	4	0
29	5.7	3.7	0	0	4	1
30	2.7	3.0	10	0	2	1
31	.9	0.6	3	0	4	1
32	1.9	0.6	3	0	1	1
33	3.9	4.0	5	10	2	1
34	5.5	4.3	4	0	3	1
35	2.7	2.1	3	0	5	1
36	1.5	4.7	0	0	4	1
37	6.5%	7.3%	0	4	4	1
38	2.9	7.0	0	0	3	1
39	3.3	8.0	4	0	2	1
40	3.2	1.5	3	0	2	1

TABLE XII (Continued)

Student Number	Five-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
41	3.8	4.8	5	0	4	1
42	4.8	3.8	1	0	6	1
43	2.9	5.5	8	0	3	1
44	2.4	3.3	0	0	2	1
45	1.8	6.2	0	0	4	1
46	7.4	2.8	1	0	6	1
47	3.5	3.3	0	0	3	1
48	1.9	2.1	0	5	4	1
49	5.5	5.5	4	0	6	1
50	15.2	10.9	1	0	2	1
51	2.6	3.8	4	0	2	1
52	3.7	4.9	0	0	1	1
53	4.7	8.4	1	0	2	1

TABLE XIII

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS OF HYPOTHESIS 3: SPEED SCORES ON NUMBER-COPY TIMED WRITINGS AFTER FIVE WEEKS

Student Number	Five-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	15	22	1	2	0	0
02	23	20	5	0	5	0
03	21	20	0	0	5	0
04	49	40	5	20	6	0
05	24	20	0	0	2	0
06	23	19	2	0	2	0
07	24	22	0	0	6	0
08	26	24	1	0	6	0
09	26	23	3	0	4	0
10	47	40	4	0	4	0
11	42	36	2	4	8	0
12	25	21	2	0	6	0
13	23	20	0	0	4	0
14	19	24	0	0	2	0
15	26	22	1	3	2	0
16	36	25	1	0	4	0
17	35	27	4	14	2	0
18	39	39	1	0	2	0
19	28	21	1	2	2	0
20	27	19	1	12	2	0
21	47	31	1	0	4	0
22	27	19	0	0	1	0
23	30	23	3	0	4	0
24	27	22	3	0	4	0
25	28	20	5	0	6	0
26	27	22	3	0	4	0
27	22	15	0	0	5	0
28	36	24	0	5	4	0
29	24	18	0	0	4	1
30	38	20	10	0	2	1
31	47	35	3	0	4	1
32	49	36	3	0	1	1
33	35	28	5	10	2	1
34	27	20	4	0	3	1
35	24	15	3	0	5	1
36	23	15	0	0	4	1
37	32	19	0	4	4	1
38	36	23	0	0	3	1
39	26	17	4	0	2	1
40	23	19	3	0	2	1

TABLE XIII (Continued)

Student Number	Five-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
41	24	21	5	0	4	1
42	44	23	1	0	6	1
43	29	18	8	0	3	1
44	22	20	0	0	2	1
45	28	23	0	0	4	1
46	45	29	1	0	6	1
47	22	17	0	0	3	1
48	29	19	0	5	4	1
49	27	22	4	0	6	1
50	32	27	1	0	2	1
51	47	29	4	0	2	1
52	35	25	0	0	1	1
53	36	21	1	0	2	1

TABLE XIV

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 4: ERROR SCORES ON NUMBER-COPY TIMED WRITINGS AFTER FIVE WEEKS

Student Number	Five-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	26.7%	0.0%	1	2	0	0
02	8.7	5.0	5	0	5	0
03	14.3	5.0	0	0	5	0
04	8.2	2.5	5	20	6	0
05	16.7	10.0	0	0	2	0
06	0.0	5.3	2	0	2	0
07	8.3	9.1	0	0	6	0
08	19.2	25.0	1	0	6	0
09	3.8	0.0	3	0	4	0
10	2.1	10.0	4	0	4	0
11	7.1	5.6	2	4	8	0
12	4.0	9.5	2	0	6	0
13	0.0	10.0	0	0	4	0
14	10.5	4.2	0	0	2	0
15	11.5	0.0	1	3	2	0
16	25.0	40.0	1	0	4	0
17	11.4	7.4	4	14	2	0
18	5.1	0.0	1	0	2	0
19	32.1	19.0	1	2	2	0
20	18.5	5.3	1	12	2	0
21	17.0	6.5	1	0	4	0
22	3.7	10.5	0	0	1	0
23	6.7	17.4	3	0	4	0
24	22.2	9.1	3	0	4	0
25	21.4	35.0	5	0	6	0
26	11.1	22.7	3	0	4	0
27	0.0	0.0	0	0	5	0
28	8.3	12.5	0	5	4	0
29	12.5	11.1	0	0	4	1
30	7.9	20.0	10	0	2	1
31	0.0	2.9	3	0	4	1
32	4.1	11.1	3	0	1	1
33	5.7	7.1	5	10	2	1
34	37.0	0.0	4	0	3	1
35	4.2	6.7	3	0	5	1
36	8.7%	53.3%	0	0	4	1
37	0.0	0.0	0	4	4	1
38	16.7	17.4	0	0	3	1
39	11.5	29.4	4	0	2	1
40	39.1	5.3	3	0	2	1

TABLE XIV (Continued)

Student Number	Five-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
41	0.0	4.8	5	0	4	1
42	6.8	17.4	1	0	6	1
43	20.7	0.0	8	0	3	1
44	9.1	0.0	0	0	2	1
45	3.6	13.0	0	0	4	1
46	17.8	17.2	1	0	6	1
47	4.5	11.8	0	0	3	1
48	20.7	15.8	0	5	4	1
49	3.7	4.5	4	0	6	1
50	25.0	37.0	1	0	2	1
51	8.5	6.9	4	0	2	1
52	25.7	8.0	0	0	1	1
53	5.6	33.3	1	0	2	1

TABLE XV

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 5: SPEED SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER TEN WEEKS

Student Number	Ten-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	61	66	1	2	0	0
02	41	41	5	0	5	0
03	53	51	0	0	5	0
04	98	87	5	20	6	0
05	56	53	0	0	2	0
06	40	35	2	0	2	0
07	60	58	0	0	6	0
08	58	53	1	0	6	0
09	57	53	3	0	4	0
10	61	65	4	0	4	0
11	74	75	2	4	8	0
12	54	47	2	0	6	0
13	49	46	0	0	4	0
14	62	60	0	0	2	0
15	63	60	1	3	2	0
16	68	68	1	0	4	0
17	69	60	4	14	2	0
18	69	61	1	0	2	0
19	64	62	1	2	2	0
20	62	56	1	12	2	0
21	70	66	1	0	4	0
22	62	60	0	0	1	0
23	56	47	3	0	4	0
24	59	63	3	0	4	0
25	64	65	5	0	6	0
26	52	48	3	0	4	0
27	43	47	0	0	5	0
28	52	49	0	5	4	0
29	51	38	0	0	4	1
30	55	54	10	0	2	1
31	69	66	3	0	4	1
32	79	69	3	0	1	1
33	51	55	5	10	2	1
34	47	42	4	0	3	1
35	49	39	3	0	5	1
36	57	51	0	0	4	1
37	48	44	0	4	4	1
38	48	46	0	0	3	1
39	42	50	4	0	2	1
40	54	52	3	0	2	1

TABLE XV (Continued)

Student Number	Ten-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
41	39	33	5	0	4	1
42	58	53	1	0	6	1
43	69	47	8	0	3	1
44	52	48	0	0	2	1
45	47	45	0	0	4	1
46	60	57	1	0	6	1
47	49	49	0	0	3	1
48	47	38	0	5	4	1
49	53	44	4	0	6	1
50	53	57	1	0	2	1
51	68	68	4	0	2	1
52	52	53	0	0	1	1
53	59	50	1	0	2	1

TABLE XVI

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 6: ERROR SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER TEN WEEKS

Student Number	Ten-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	1.3%	1.8%	1	2	0	0
02	8.3	17.6	5	0	5	0
03	3.0	4.3	0	0	5	0
04	5.7	3.2	5	20	6	0
05	2.5	4.2	0	0	2	0
06	5.5	9.7	2	0	2	0
07	1.3	1.7	0	0	6	0
08	8.3	8.7	1	0	6	0
09	6.0	2.3	3	0	4	0
10	1.6	1.5	4	0	4	0
11	1.6	1.1	2	4	8	0
12	5.6	5.5	2	0	6	0
13	4.5	4.3	0	0	4	0
14	1.3	3.3	0	0	2	0
15	3.8	2.7	1	3	2	0
16	2.9	5.6	1	0	4	0
17	2.9	2.7	4	14	2	0
18	4.3	3.0	1	0	2	0
19	1.9	4.5	1	2	2	0
20	1.6	1.1	1	12	2	0
21	2.9	1.5	1	0	4	0
22	4.2	4.3	0	0	1	0
23	8.6	4.7	3	0	4	0
24	3.1	4.8	3	0	4	0
25	2.5	1.8	5	0	6	0
26	5.8	5.8	3	0	4	0
27	7.0	8.1	0	0	5	0
28	6.2	2.9	0	5	4	0
29	6.3	3.7	0	0	4	1
30	1.8	3.0	10	0	2	1
31	0.6	0.6	3	0	4	1
32	1.8	0.6	3	0	1	1
33	0.0	4.0	5	10	2	1
34	4.7	4.3	4	0	3	1
35	2.0	2.1	3	0	5	1
36	2.8	4.7	0	0	4	1
37	2.1	7.3	0	4	4	1
38	7.5	7.0	0	0	3	1
39	3.8	8.0	4	0	2	1
40	3.3	1.5	3	0	2	1

TABLE XVI (Continued)

Student Number	Ten-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
41	4.6%	4.8%	5	0	4	1
42	2.1	3.8	1	0	6	1
43	1.4	5.5	8	0	3	1
44	3.1	3.3	0	0	2	1
45	5.1	6.2	0	0	4	1
46	3.7	2.8	1	0	6	1
47	3.7	3.3	0	0	3	1
48	3.8	2.1	0	5	4	1
49	4.2	5.5	4	0	6	1
50	7.5	10.9	1	0	2	1
51	4.1	3.8	4	0	2	1
52	6.5	4.9	0	0	1	1
53	2.7	8.4	1	0	2	1

TABLE XVII

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS OF HYPOTHESIS 7: SPEED SCORES ON NUMBER-COPY TIMED WRITINGS AFTER TEN WEEKS

Student Number	Ten-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	17	22	1	2	0	0
02	23	20	5	0	5	0
03	21	20	0	0	5	0
04	46	40	5	20	6	0
05	24	20	0	0	2	0
06	23	19	2	0	2	0
07	24	22	0	0	6	0
08	27	24	1	0	6	0
09	23	23	3	0	4	0
10	50	40	4	0	4	0
11	45	36	2	4	8	0
12	25	21	2	0	6	0
13	25	20	0	0	4	0
14	26	24	0	0	2	0
15	26	22	1	3	2	0
16	35	25	1	0	4	0
17	36	27	4	14	2	0
18	43	39	1	0	2	0
19	27	21	1	2	2	0
20	28	19	1	12	2	0
21	46	31	1	0	4	0
22	28	19	0	0	1	0
23	31	23	3	0	4	0
24	28	22	3	0	4	0
25	29	20	5	0	6	0
26	27	22	3	0	4	0
27	24	15	0	0	5	0
28	35	24	0	5	4	0
29	30	18	0	0	4	1
30	40	20	10	0	2	1
31	47	35	3	0	4	1
32	58	36	3	0	1	1
33	35	28	5	10	2	1
34	32	20	4	0	3	1
35	30	15	3	0	5	1
36	28	15	0	0	4	1
37	32	19	0	4	4	1
38	37	23	0	0	3	1
39	30	17	4	0	2	1
40	25	19	3	0	2	1

TABLE XVII (Continued)

Student Number	Ten-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
41	30	21	5	0	4	1
42	50	23	1	0	6	1
43	34	18	8	0	3	1
44	25	20	0	0	2	1
45	31	23	0	0	4	1
46	47	29	1	0	6	1
47	22	17	0	0	3	1
48	29	19	0	5	4	1
49	32	22	4	0	6	1
50	40	27	1	0	2	1
51	49	29	4	0	2	1
52	33	25	0	0	1	1
53	36	21	1	0	2	1

TABLE XVIII

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 8: ERROR SCORES ON NUMBER-COPY TIMED WRITINGS AFTER TEN WEEKS

Student Number	Ten-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	17.6%	0.0%	1	2	0	0
02	13.0	5.0	5	0	5	0
03	4.8	5.0	0	0	5	0
04	19.6	2.5	5	20	6	0
05	33.3	10.0	0	0	2	0
06	4.3	5.3	2	0	2	0
07	4.2	9.1	0	0	6	0
08	40.7	25.0	1	0	6	0
09	8.7	0.0	3	0	4	0
10	4.0	10.0	4	0	4	0
11	8.9	5.6	2	4	8	0
12	0.0	9.5	2	0	6	0
13	12.0	10.0	0	0	4	0
14	26.9	4.2	0	0	2	0
15	15.4	0.0	1	3	2	0
16	17.1	40.0	1	0	4	0
17	16.7	7.4	4	14	2	0
18	14.0	0.0	1	0	2	0
19	29.6	19.0	1	2	2	0
20	0.0	5.3	1	12	2	0
21	6.5	6.5	1	0	4	0
22	0.0	10.5	0	0	1	0
23	6.5	17.4	3	0	4	0
24	10.7	9.1	3	0	4	0
25	6.9	35.0	5	0	6	0
26	11.1	22.7	3	0	4	0
27	0.0	0.0	0	0	5	0
28	8.6	12.5	0	5	4	0
29	13.3	11.1	0	0	4	1
30	17.5	20.0	10	0	2	1
31	12.8	2.9	3	0	4	1
32	3.4	11.1	3	0	1	1
33	14.3	7.1	5	10	2	1
34	18.8	0.0	4	0	3	1
35	3.3	6.7	3	0	5	1
36	0.0	53.3	0	0	4	1
37	9.4	0.0	0	4	4	1
38	2.7	17.4	0	0	3	1
39	36.7	29.4	4	0	2	1
40	24.0	5.3	3	0	2	1

TABLE XVIII (Continued)

Student Number	Ten-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
41	6.7%	4.8%	5	0	4	1
42	16.0	17.4	1	0	6	1
43	14.7	0.0	8	0	3	1
44	28.0	0.0	0	0	2	1
45	3.2	13.0	0	0	4	1
46	19.1	17.2	1	0	6	1
47	0.0	11.8	0	0	3	1
48	17.2	15.8	0	5	4	1
49	18.8	4.5	4	0	6	1
50	17.5	37.0	1	0	2	1
51	12.2	6.9	4	0	2	1
52	33.3	8.0	0	0	1	1
53	13.9	33.3	1	0	2	1

TABLE XIX

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 9: SPEED SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER FIVE WEEKS OF LOW-TYPEWRITING-SKILL STUDENTS

Student Number	Five-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
02	38	41	5	0	5	0
06	38	35	2	0	2	0
12	51	47	2	0	6	0
13	54	46	0	0	4	0
23	55	47	3	0	4	0
26	48	48	3	0	4	0
27	40	47	0	0	5	0
28	54	49	0	5	4	0
29	46	38	0	0	4	1
34	40	42	4	0	3	1
35	45	39	3	0	5	1
37	49	44	0	4	4	1
38	49	46	0	0	3	1
41	37	33	5	0	4	1
43	69	47	8	0	3	1
44	51	48	0	0	2	1
45	44	45	0	0	4	1
47	46	49	0	0	3	1
48	42	38	0	5	4	1
49	51	44	4	0	6	1

TABLE XX

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 10: ERROR SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER FIVE WEEKS OF LOW-TYPEWRITING-SKILL STUDENTS

Student Number	Five-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
02	6.3%	17.6%	5	0	5	0
06	4.2	9.7	2	0	2	0
12	8.2	5.5	2	0	6	0
13	3.7	4.3	0	0	4	0
23	9.8	4.7	3	0	4	0
26	4.6	5.8	3	0	4	0
27	5.5	8.1	0	0	5	0
28	3.7	2.9	0	5	4	0
29	5.7	3.7	0	0	4	1
34	5.5	4.3	4	0	3	1
35	2.7	2.1	3	0	5	1
37	6.5	7.3	0	4	4	1
38	2.9	7.0	0	0	3	1
41	3.8	4.8	5	0	4	1
43	2.9	5.5	8	0	3	1
44	2.4	3.3	0	0	2	1
45	1.8	6.2	0	0	4	1
47	3.5	3.3	0	0	3	1
48	1.9	2.1	0	5	4	1
49	5.5	5.5	4	0	6	1

TABLE XXI

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 11: SPEED SCORES ON NUMBER-COPY TIMED WRITINGS AFTER FIVE WEEKS OF LOW-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
02	23	20	5	0	5	0
06	23	19	2	0	2	0
12	25	21	2	0	6	0
13	23	20	0	0	4	0
23	30	23	3	0	4	0
26	27	22	3	0	4	0
27	22	15	0	0	5	0
28	36	24	0	5	4	0
29	24	18	0	0	4	1
34	27	20	4	0	3	1
35	24	15	3	0	5	1
37	32	19	0	4	4	1
38	36	23	0	0	3	1
41	24	21	5	0	4	1
43	29	18	8	0	3	1
44	22	20	0	0	2	1
45	28	23	0	0	4	1
47	22	17	0	0	3	1
48	29	19	0	5	4	1
49	27	22	4	0	6	1

TABLE XXII

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 12: ERROR SCORES ON NUMBER-COPY TIMED WRITINGS AFTER FIVE WEEKS OF LOW-TYPEWRITING-SKILL STUDENTS

Student Number	Five-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
02	8.7%	5.0%	5	0	5	0
06	0.0	5.3	2	0	2	0
12	4.0	9.5	2	0	6	0
13	0.0	10.0	0	0	4	0
23	6.7	17.4	3	0	4	0
26	11.1	22.7	3	0	4	0
27	0.0	0.0	0	0	5	0
28	8.3	12.5	0	5	4	0
29	12.5	11.1	0	0	4	1
34	37.0	0.0	4	0	3	1
35	4.2	6.7	3	0	5	1
37	0.0	0.0	0	4	4	1
38	16.7	17.4	0	0	3	1
41	0.0	4.8	5	0	4	1
43	20.7	0.0	8	0	3	1
44	9.1	0.0	0	0	2	1
45	3.6	13.0	0	0	4	1
47	4.5	11.8	0	0	3	1
48	20.7	15.8	0	5	4	1
49	3.7	4.5	4	0	6	1

TABLE XXIII

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 13: SPEED SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER TEN WEEKS OF LOW-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
02	41	41	5	0	5	0
06	40	35	2	0	2	0
12	54	47	2	0	6	0
13	49	46	0	0	4	0
23	56	47	3	0	4	0
26	52	48	3	0	4	0
27	43	47	0	0	5	0
28	52	49	0	5	4	0
29	51	38	0	0	4	1
34	47	42	4	0	3	1
35	49	39	3	0	5	1
37	48	44	0	4	4	1
38	48	46	0	0	3	1
41	39	33	5	0	4	1
43	69	47	8	0	3	1
44	52	48	0	0	2	1
45	47	45	0	0	4	1
47	49	49	0	0	3	1
48	47	38	0	5	4	1
49	53	44	4	0	6	1

TABLE XXIV

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 14: ERROR SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER TEN WEEKS OF LOW-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
02	8.3%	17.6%	5	0	5	0
06	5.5	9.7	2	0	2	0
12	5.6	5.5	2	0	6	0
13	4.5	4.3	0	0	4	0
23	8.6	4.7	3	0	4	0
26	5.8	5.8	3	0	4	0
27	7.0	8.1	0	0	5	0
28	6.2	2.9	0	5	4	0
29	6.3	3.7	0	0	4	1
34	4.7	4.3	4	0	3	1
35	2.0	2.1	3	0	5	1
37	2.1	7.3	0	4	4	1
38	7.5	7.0	0	0	3	1
41	4.6	4.8	5	0	4	1
43	1.4	5.5	8	0	3	1
44	3.1	3.3	0	0	2	1
45	5.1	6.2	0	0	4	1
47	3.7	3.3	0	0	3	1
48	3.8	2.1	0	5	4	1
49	4.2	5.5	4	0	6	1

TABLE XXV

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 15: SPEED SCORES ON NUMBER-COPY TIMED WRITINGS AFTER TEN WEEKS OF LOW-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
02	23	20	5	0	5	0
06	23	19	2	0	2	0
12	25	21	2	0	6	0
13	25	20	0	0	4	0
23	31	23	3	0	4	0
26	27	22	3	0	4	0
27	24	15	0	0	5	0
28	35	24	0	5	4	0
29	30	18	0	0	4	1
34	32	20	4	0	3	1
35	30	15	3	0	5	1
37	32	19	0	4	4	1
38	37	23	0	0	3	1
41	30	21	5	0	4	1
43	34	18	8	0	3	1
44	25	20	0	0	2	1
45	31	23	0	0	4	1
47	22	17	0	0	3	1
48	29	19	0	5	4	1
49	32	22	4	0	6	1

TABLE XXVI

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 16: ERROR SCORES ON NUMBER-COPY TIMED WRITINGS AFTER TEN WEEKS OF LOW-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
02	13.0%	5.0%	5	0	5	0
06	4.3	5.3	2	0	2	0
12	0.0	9.5	2	0	6	0
13	12.0	10.0	0	0	4	0
23	6.5	17.4	3	0	4	0
26	11.1	22.7	3	0	4	0
27	0.0	0.0	0	0	5	0
28	8.6	12.5	0	5	4	0
29	13.3	11.1	0	0	4	1
34	18.8	0.0	4	0	3	1
35	3.3	6.7	3	0	5	1
37	9.4	0.0	0	4	4	1
38	2.7	17.4	0	0	3	1
41	6.7	4.8	5	0	4	1
43	14.7	0.0	8	0	3	1
44	28.0	0.0	0	0	2	1
45	3.2	13.0	0	0	4	1
47	0.0	11.8	0	0	3	1
48	17.2	15.8	0	5	4	1
49	18.8	4.5	4	0	6	1

TABLE XXVII

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 17: SPEED SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER FIVE WEEKS OF HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Five-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	68	66	1	0	2	0
03	54	51	0	0	5	0
04	92	87	5	20	6	0
05	54	53	0	0	2	0
07	64	58	0	0	6	0
08	56	53	1	0	6	0
09	57	53	3	0	4	0
10	65	65	4	0	4	0
11	76	75	2	4	8	0
14	62	60	0	0	2	0
15	60	60	1	3	2	0
16	74	68	1	0	4	0
17	65	60	4	14	2	0
18	62	61	1	0	2	0
19	65	62	1	2	2	0
20	61	56	1	12	2	0
21	69	66	1	0	4	0
22	67	60	0	0	1	0
24	65	63	3	0	4	0
25	67	65	5	0	6	0
30	51	54	10	0	2	1
31	68	66	3	0	4	1
32	72	69	3	0	1	1
33	57	55	5	10	2	1
36	53	51	0	0	4	1
39	48	50	4	0	2	1
40	57	52	3	0	2	1
42	63	53	1	0	6	1
46	57	57	1	0	6	1
50	62	57	1	0	2	1
51	70	68	4	0	2	1
52	49	53	0	0	1	1
53	55	50	1	0	2	1

TABLE XXVIII

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 18: ERROR SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER FIVE WEEKS OF HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Five-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	2.4%	1.8%	1	0	2	0
03	5.6	4.3	0	0	5	0
04	3.0	3.2	5	20	6	0
05	5.9	4.2	0	0	2	0
07	1.6	1.7	0	0	6	0
08	4.6	8.7	1	0	6	0
09	2.5	2.3	3	0	4	0
10	1.5	1.5	4	0	4	0
11	0.5	1.1	2	4	8	0
14	5.5	3.3	0	0	2	0
15	7.0	2.7	1	3	2	0
16	10.0	5.6	1	0	4	0
17	2.5	2.7	4	14	2	0
18	1.3	3.0	1	0	2	0
19	2.5	4.5	1	2	2	0
20	2.3	1.1	1	12	2	0
21	1.4	1.5	1	0	4	0
22	4.8	4.3	0	0	1	0
24	4.3	4.8	3	0	4	0
25	4.2	1.8	5	0	6	0
30	2.7	3.0	10	0	2	1
31	0.9	0.6	3	0	4	1
32	1.9	0.6	3	0	1	1
33	3.9	4.0	5	10	2	1
36	1.5	4.7	0	0	4	1
39	3.3	8.0	4	0	2	1
40	3.3	1.5	3	0	2	1
42	4.8	3.8	1	0	6	1
46	7.4	2.8	1	0	6	1
50	15.2	10.9	1	0	2	1
51	2.6	3.8	4	0	2	1
52	3.7	4.9	0	0	1	1
53	4.7	8.4	1	0	2	1

TABLE XXIX

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 19: SPEED SCORES ON NUMBER-COPY TIMED WRITINGS AFTER FIVE WEEKS OF HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Five-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	15	22	1	0	2	0
03	21	20	0	0	5	0
04	49	40	5	20	6	0
05	24	20	0	0	2	0
07	24	22	0	0	6	0
08	26	24	1	0	6	0
09	26	23	3	0	4	0
10	47	40	4	0	4	0
11	42	36	2	4	8	0
14	19	24	0	0	2	0
15	26	22	1	3	2	0
16	36	25	1	0	4	0
17	35	27	4	14	2	0
18	39	39	1	0	2	0
19	28	21	1	2	2	0
20	27	19	1	12	2	0
21	47	31	1	0	4	0
22	27	19	0	0	1	0
24	27	22	3	0	4	0
25	28	20	5	0	6	0
30	38	20	10	0	2	1
31	47	35	3	0	4	1
32	49	36	3	0	1	1
33	35	28	5	10	2	1
36	23	15	0	0	4	1
39	26	17	4	0	2	1
40	23	19	3	0	2	1
42	44	23	1	0	6	1
46	45	29	1	0	6	1
50	32	27	1	0	2	1
51	47	29	4	0	2	1
52	35	25	0	0	1	1
53	36	21	1	0	2	1

TABLE XXX

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 20: ERROR SCORES ON NUMBER-COPY TIMED WRITINGS AFTER FIVE WEEKS OF HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Five-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	26.7%	0.0%	1	0	2	0
03	14.3	5.0	0	0	5	0
04	8.2	2.5	5	20	6	0
05	16.7	10.0	0	0	2	0
07	8.3	9.1	0	0	6	0
08	19.2	25.0	1	0	6	0
09	3.8	0.0	3	0	4	0
10	2.1	10.0	4	0	4	0
11	7.1	5.6	2	4	8	0
14	10.5	4.2	0	0	2	0
15	11.5	0.0	1	3	2	0
16	25.0	40.0	1	0	4	0
17	11.4	7.4	4	14	2	0
18	5.1	0.0	1	0	2	0
19	32.1	19.0	1	2	2	0
20	18.5	5.3	1	12	2	0
21	17.0	6.5	1	0	4	0
22	3.7	10.5	0	0	1	0
24	22.2	9.1	3	0	4	0
25	21.4	35.0	5	0	6	0
30	7.9	20.0	10	0	2	1
31	0.0	2.9	3	0	4	1
32	4.1	11.1	3	0	1	1
33	5.7	7.1	5	10	2	1
36	8.7	53.3	0	0	4	1
39	11.5	29.4	4	0	2	1
40	39.1	5.3	3	0	2	1
42	6.8	17.4	1	0	6	1
46	17.8	17.2	1	0	6	1
50	25.0	37.0	1	0	2	1
51	8.5	6.9	4	0	2	1
52	25.7	8.0	0	0	1	1
53	5.6	33.3	1	0	2	1

TABLE XXXI

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 21: SPEED SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER TEN WEEKS OF HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	61	66	1	0	2	0
03	53	51	0	0	5	0
04	98	87	5	20	6	0
05	56	53	0	0	2	0
07	60	58	0	0	6	0
08	58	53	1	0	6	0
09	57	53	3	0	4	0
10	61	65	4	0	4	0
11	74	75	2	4	8	0
14	62	60	0	0	2	0
15	63	60	1	3	2	0
16	68	68	1	0	4	0
17	69	60	4	14	2	0
18	69	61	1	0	2	0
19	64	62	1	2	2	0
20	62	56	1	12	2	0
21	70	66	1	0	4	0
22	62	60	0	0	1	0
24	59	63	3	0	4	0
25	64	65	5	0	6	0
30	55	54	10	0	2	1
31	69	66	3	0	4	1
32	79	69	3	0	1	1
33	51	55	5	10	2	1
36	57	51	0	0	4	1
39	42	50	4	0	2	1
40	54	52	3	0	2	1
42	58	53	1	0	6	1
46	60	57	1	0	6	1
50	53	57	1	0	2	1
51	68	68	4	0	2	1
52	52	53	0	0	1	1
53	59	50	1	0	2	1

TABLE XXXII

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 22: ERROR SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER TEN WEEKS OF HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	1.3%	1.8%	1	0	2	0
03	3.0	4.3	0	0	5	0
04	5.7	3.2	5	20	6	0
05	2.5	4.2	0	0	2	0
07	1.3	1.7	0	0	6	0
08	8.3	8.7	1	0	6	0
09	6.0	2.3	3	0	4	0
10	1.6	1.5	4	0	4	0
11	1.6	1.1	2	4	8	0
14	1.3	3.3	0	0	2	0
15	3.8	2.7	1	3	2	0
16	2.9	5.6	1	0	4	0
17	2.9	2.7	4	14	2	0
18	4.3	3.0	1	0	2	0
19	1.9	4.5	1	2	2	0
20	1.6	1.1	1	12	2	0
21	2.9	1.5	1	0	4	0
22	4.2	4.3	0	0	1	0
24	3.1	4.8	3	0	4	0
25	2.5	1.8	5	0	6	0
30	1.8	3.0	10	0	2	1
31	0.6	0.6	3	0	4	1
32	1.8	0.6	3	0	1	1
33	0.0	4.0	5	10	2	1
36	2.8	4.7	0	0	4	1
39	3.8	8.0	4	0	2	1
40	3.3	1.5	3	0	2	1
42	2.1	3.8	1	0	6	1
46	3.7	2.8	1	0	6	1
50	7.5	10.9	1	0	2	1
51	4.1	3.8	4	0	2	1
52	6.5	4.9	0	0	1	1
53	2.7	8.4	1	0	2	1

TABLE XXXIII

DATA ORGANZIED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 23: SPEED SCORES ON NUMBER-COPY TIMED WRITINGS AFTER TEN WEEKS OF HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	17	22	1	0	2	0
03	21	20	0	0	5	0
04	46	40	5	20	6	0
05	24	20	0	0	2	0
07	24	22	0	0	6	0
08	27	24	1	0	6	0
09	23	23	3	0	4	0
10	50	40	4	0	4	0
11	45	36	2	4	8	0
14	26	24	0	0	2	0
15	26	22	1	3	2	0
16	35	25	1	0	4	0
17	36	27	4	14	2	0
18	43	39	1	0	2	0
19	27	21	1	2	2	0
20	28	19	1	12	2	0
21	46	31	1	0	4	0
22	28	19	0	0	1	0
24	28	22	3	0	4	0
25	29	20	5	0	6	0
30	40	20	10	0	2	1
31	47	35	3	0	4	1
32	58	36	3	0	1	1
33	35	28	5	10	2	1
36	28	15	0	0	4	1
39	30	17	4	0	2	1
40	25	19	3	0	2	1
42	50	23	1	0	6	1
46	47	29	1	0	6	1
50	40	27	1	0	2	1
51	49	29	4	0	2	1
52	33	25	0	0	1	1
53	36	21	1	0	2	1

TABLE XXXIV

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 24: ERROR SCORES ON NUMBER-COPY TIMED WRITINGS AFTER TEN WEEKS OF HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
01	17.6%	0.0%	1	0	2	0
03	4.8	5.0	0	0	5	0
04	19.6	2.5	5	20	6	0
05	33.3	10.0	0	0	2	0
07	4.2	9.1	0	0	6	0
08	40.7	25.0	1	0	6	0
09	8.7	0.0	3	0	4	0
10	4.0	10.0	4	0	4	0
11	8.9	5.6	2	4	8	0
14	26.9	4.2	0	0	2	0
15	15.4	0.0	1	3	2	0
16	17.1	40.0	1	0	4	0
17	16.7	7.4	4	14	2	0
18	14.0	0.0	1	0	2	0
19	29.6	19.0	1	2	2	0
20	0.0	5.3	1	12	2	0
21	6.5	6.5	1	0	4	0
22	0.0	10.5	0	0	1	0
24	10.7	9.1	3	0	4	0
25	6.9	35.0	5	0	6	0
30	17.5	20.0	10	0	2	1
31	12.8	2.9	3	0	4	1
32	3.4	11.1	3	0	1	1
33	14.3	7.1	5	10	2	1
36	0.0	53.3	0	0	4	1
39	36.7	29.4	4	0	2	1
40	24.0	5.3	3	0	2	1
42	16.0	17.4	1	0	6	1
46	19.1	17.2	1	0	6	1
50	17.5	37.0	1	0	2	1
51	12.2	6.9	4	0	2	1
52	33.3	8.0	0	0	1	1
53	13.9	33.3	1	0	2	1

TABLE XXXV

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 25: SPEED SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER FIVE WEEKS FOR EXPERIMENTAL GROUP STUDENTS CLASSIFIED AS LOW- AND HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Five-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
29	46	38	0	0	4	1
34	40	42	4	0	3	1
35	45	39	3	0	5	1
37	49	44	0	4	4	1
38	49	46	0	0	3	1
41	37	33	5	0	4	1
43	69	47	8	0	3	1
44	51	48	0	0	2	1
45	44	45	0	0	4	1
47	46	49	0	0	3	1
48	42	38	0	5	4	1
49	51	44	4	0	6	1
30	51	54	10	0	2	1
31	68	66	3	0	4	1
32	72	69	3	0	1	1
33	57	55	5	10	2	1
36	53	51	0	0	4	1
39	48	50	4	0	2	1
40	57	52	3	0	2	1
42	63	53	1	0	6	1
46	57	57	1	0	6	1
50	62	57	1	0	2	1
51	70	68	4	0	2	1
52	49	53	0	0	1	1
53	55	50	1	0	2	1

TABLE XXXVI

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 26: ERROR SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER FIVE WEEKS FOR EXPERIMENTAL GROUP STUDENTS CLASSIFIED AS LOW- AND HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Five-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
29	5.7%	3.7%	0	0	4	1
34	5.5	4.3	4	0	3	1
35	2.7	2.1	3	0	5	1
37	6.5	7.3	0	4	4	1
38	2.9	7.0	0	0	3	1
41	3.8	4.8	5	0	4	1
43	2.9	5.5	8	0	3	1
44	2.4	3.3	0	0	2	1
45	1.8	6.2	0	0	4	1
47	3.5	3.3	0	0	3	1
48	1.9	2.1	0	5	4	1
49	5.5	5.5	4	0	6	1
30	2.7	3.0	10	0	2	1
31	0.9	0.6	3	0	4	1
32	1.9	0.6	3	0	1	1
33	3.9	4.0	5	10	2	1
36	1.5	4.7	0	0	4	1
39	3.3	8.0	4	0	2	1
40	3.2	1.5	3	0	2	1
42	4.8	3.8	1	0	6	1
46	7.4	2.8	1	0	6	1
50	15.2	10.9	1	0	2	1
51	2.6	3.8	4	0	2	1
52	3.7	4.9	0	0	1	1
53	4.7	8.4	1	0	2	1

TABLE XXXVII

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 27: SPEED SCORES ON NUMBER-COPY TIMED WRITINGS AFTER FIVE WEEKS FOR EXPERIMENTAL GROUP STUDENTS CLASSIFIED AS LOW- AND HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Five-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
29	24	18	0	0	4	1
34	27	20	4	0	3	1
35	24	15	3	0	5	1
37	32	19	0	4	4	1
38	36	23	0	0	3	1
41	24	21	5	0	4	1
43	29	18	8	0	3	1
44	22	20	0	0	2	1
45	28	23	0	0	4	1
47	22	17	0	0	3	1
48	29	19	0	5	4	1
49	27	22	4	0	6	1
30	38	20	10	0	2	1
31	47	35	3	0	4	1
32	49	36	3	0	1	1
33	35	28	5	10	2	1
36	23	15	0	0	4	1
39	26	17	4	0	2	1
40	23	19	3	0	2	1
42	44	23	1	0	6	1
46	45	29	1	0	6	1
50	32	27	1	0	2	1
51	47	29	4	0	2	1
52	35	25	0	0	1	1
53	36	21	1	0	2	1

TABLE XXXVIII

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 28: ERROR SCORES ON NUMBER-COPY TIMED WRITINGS AFTER FIVE WEEKS FOR EXPERIMENTAL GROUP STUDENTS CLASSIFIED AS LOW- AND HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Five-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
29	12.5%	11.1%	0	0	4	1
34	37.0	0.0	4	0	3	1
35	4.2	6.7	3	0	5	1
37	0.0	0.0	0	4	4	1
38	16.7	17.4	0	0	3	1
41	0.0	4.8	5	0	4	1
43	20.7	0.0	8	0	3	1
44	9.1	0.0	0	0	2	1
45	3.6	13.0	0	0	4	1
47	4.5	11.8	0	0	3	1
48	20.7	15.8	0	5	4	1
49	3.7	4.5	4	0	6	1
30	7.9	20.0	10	0	2	1
31	0.0	2.9	3	0	4	1
32	4.1	11.1	3	0	1	1
33	5.7	7.1	5	10	2	1
36	8.7	53.3	0	0	4	1
39	11.5	29.4	4	0	2	1
40	39.1	5.3	3	0	2	1
42	6.8	17.4	1	0	6	1
46	17.8	17.2	1	0	6	1
50	25.0	37.0	1	0	2	1
51	8.5	6.9	4	0	2	1
52	25.7	8.0	0	0	1	1
53	5.6	33.3	1	0	2	1

TABLE XXXIX

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 29: SPEED SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER TEN WEEKS FOR EXPERIMENTAL GROUP STUDENTS CLASSIFIED AS LOW- AND HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
29	51	38	0	0	4	1
34	47	42	4	0	3	1
35	49	39	3	0	5	1
37	48	44	0	4	4	1
38	48	46	0	0	3	1
41	39	33	5	0	4	1
43	69	47	8	0	3	1
44	52	48	0	0	2	1
45	47	45	0	0	4	1
47	49	49	0	0	3	1
48	47	38	0	5	4	1
49	53	44	4	0	6	1
30	55	54	10	0	2	1
31	69	66	3	0	4	1
32	79	69	3	0	1	1
33	51	55	5	10	2	1
36	57	51	0	0	4	1
39	42	50	4	0	2	1
40	54	52	3	0	2	1
42	58	53	1	0	6	1
46	60	57	1	0	6	1
50	53	57	1	0	2	1
51	68	68	4	0	2	1
52	52	53	0	0	1	1
53	59	50	1	0	2	1

TABLE XL

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 30: ERROR SCORES ON STRAIGHT-COPY TIMED WRITINGS AFTER TEN WEEKS FOR EXPERIMENTAL GROUP STUDENTS CLASSIFIED AS LOW- AND HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
29	6.3%	3.7%	0	0	4	1
34	4.7	4.3	4	0	3	1
35	2.0	2.1	3	0	5	1
37	2.1	7.3	0	4	4	1
38	7.5	7.0	0	0	3	1
41	4.6	4.8	5	0	4	1
43	1.4	5.5	8	0	3	1
44	3.1	3.3	0	0	2	1
45	5.1	6.2	0	0	4	1
47	3.7	3.3	0	0	3	1
48	3.8	2.1	0	5	4	1
49	4.2	5.5	4	0	6	1
30	1.8	3.0	10	0	2	1
31	0.6	0.6	3	0	4	1
32	1.8	0.6	3	0	1	1
33	0.0	4.0	5	10	2	1
36	2.8	4.7	0	0	4	1
39	3.8	8.0	4	0	2	1
40	3.3	1.5	3	0	2	1
42	2.1	3.8	1	0	6	1
46	3.7	2.8	1	0	6	1
50	7.5	10.9	1	0	2	1
51	4.1	3.8	4	0	2	1
52	6.5	4.9	0	0	1	1
53	2.7	8.4	1	0	2	1

TABLE XLI

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 31: SPEED SCORES ON NUMBER-COPY TIMED WRITINGS AFTER TEN WEEKS FOR EXPERIMENTAL GROUP STUDENTS CLASSIFIED AS LOW- AND HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Speed Score	Pretest Speed Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
29	30	18	0	0	4	1
34	32	20	4	0	3	1
35	30	15	3	0	5	1
37	32	19	0	4	4	1
38	37	23	0	0	3	1
41	30	21	5	0	4	1
43	34	18	8	0	3	1
44	25	20	0	0	2	1
45	31	23	0	0	4	1
47	22	17	0	0	3	1
48	29	19	0	5	4	1
49	32	22	4	0	6	1
30	40	20	10	0	2	1
31	47	35	3	0	4	1
32	58	36	3	0	1	1
33	35	28	5	10	2	1
36	28	15	0	0	4	1
39	30	17	4	0	2	1
40	25	19	3	0	2	1
42	50	23	1	0	6	1
46	47	29	1	0	6	1
50	40	27	1	0	2	1
51	49	29	4	0	2	1
52	33	25	0	0	1	1
53	36	21	1	0	2	1

TABLE XLII

DATA ORGANIZED FOR MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 32: ERROR SCORES ON NUMBER-COPY TIMED WRITINGS AFTER TEN WEEKS FOR EXPERIMENTAL GROUP STUDENTS CLASSIFIED AS LOW- AND HIGH-TYPEWRITING-SKILL STUDENTS

Student Number	Ten-Week Error Score	Pretest Error Score	Hours of Personal Typing Per Week	Hours of Job-Related Typing Per Week	Semester in College	Group: 1 = Exper. 0 = Control
	Y	X_1	X_2	X_3	X_4	X_5
29	13.3%	11.1%	0	0	4	1
34	18.8	0.0	4	0	3	1
35	3.3	6.7	3	0	5	1
37	9.4	0.0	0	4	4	1
38	2.7	17.4	0	0	3	1
41	6.7	4.8	5	0	4	1
43	14.7	0.0	8	0	3	1
44	28.0	0.0	0	0	2	1
45	3.2	13.0	0	0	4	1
47	0.0	11.8	0	0	3	1
48	17.2	15.8	0	5	4	1
49	18.8	4.5	4	0	6	1
30	17.5	20.0	10	0	2	1
31	12.8	2.9	3	0	4	1
32	3.4	11.1	3	0	1	1
33	14.3	7.1	5	10	2	1
36	0.0	53.3	0	0	4	1
39	36.7	29.4	4	0	2	1
40	24.0	5.3	3	0	2	1
42	16.0	17.4	1	0	6	1
46	19.1	17.2	1	0	6	1
50	17.5	37.0	1	0	2	1
51	12.2	6.9	4	0	2	1
52	33.3	8.0	0	0	1	1
53	13.9	33.3	1	0	2	1

VITA 2

Joan Kay Pierson

Candidate for the Degree of

Doctor of Education

Thesis: A COMPARISON OF THE EFFECTS OF ALPHABETIC DRILLS ON STRAIGHT-COPY AND NUMBER-COPY SPEED AND ACCURACY OF COLLEGE INTERMEDIATE TYPEWRITING STUDENTS

Major Field: Business Education

Biographical:

Personal Data: Born June 20, 1938, at Wichita, Kansas, the daughter of Inez and Carl Park; mother of two daughters: Lynn Karen and Leslie Ann.

Education: Graduated from Ottawa High School, Ottawa, Kansas, in May, 1955; received the Bachelor of Science in Business degree from Emporia State University in May, 1959; received the Master of Science degree from Emporia State University, Emporia, Kansas, in August, 1976; completed the requirements for the Doctor of Education degree at Oklahoma State University in December, 1981.

Professional Experience: Nine years professional secretarial experience in positions ranging from secretary to administrative assistant from 1959 to 1968; instructor and coordinator of a vocational office education program at Garden City Community College, Garden City, Kansas, from 1976 to 1980; graduate teaching assistant at Oklahoma State University during the 1980-81 academic year; visiting assistant professor in the Department of Administrative Services and Business Education at Oklahoma State University during the 1981-82 academic year.

Professional Membership: National Business Education Association; Oklahoma Business Education Association; Pi Omega Pi; Delta Pi Epsilon; Phi Delta Kappa; Data Processing Management Association; Society for Data Educators.