

AN EXPERIMENTAL STUDY UTILIZING VARIED SCHEDULING  
AND OUT-OF-CLASS ASSIGNMENTS IN  
INTERMEDIATE COLLEGIATE  
TYPEWRITING

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## CHAPTER I

### INTRODUCTION

The status of the secretarial skills subjects in collegiate schools of business is being challenged by many educators. Some feel that certain skill subjects should not receive credit or that they should be phased out of the program. There seems to be a trend toward either reducing the credit for a skills course or reducing the number of hours of in-class instruction. Studies have shown that there is wide variation in time scheduling and variation in hours of credit offered.

Business educators who have reduced in-class instruction time for collegiate typewriting have often experimented with innovative teaching methods to compensate for less time in class. Various methods used include programmed instruction, taped instruction, and out-of-class assignments.

The problem of this study was to determine whether or not production typewriting skills could be taught effectively through reduced in-class hours with out-of-class assignments. The experiment may help to determine the effectiveness of in-class assignments with initial directions being given by the teacher but with the actual typing being performed without teacher supervision.

### Statement of the Problem

The problem of this study was to determine if, in intermediate college typewriting classes, students who meet class four days a week with in-class assignments have greater gain in production typewriting skills than do students who meet class two days a week with out-of-class assignments.

Differences in initial learning abilities of the groups were controlled through a randomized selection process. A statistical analysis of the pre-test scores of the two groups verified the effectiveness of the randomization process. Gains in production typewriting skills were measured by gains in scores achieved by the students on one testing instrument which was used both as a pre-test and as a post-test.

The independent variable consisted of a reduction of in-class hours with out-of-class assignments. The dependent variable consisted of gains in scores between the pre-test and the post-test.

### Null Hypothesis

The null hypothesis used in this study states that there will be no significant difference at the .05 level of confidence in the gain in production typewriting skills of intermediate college typewriting students who meet class four days a week and complete in-class assignments, as compared with those students who meet class two days a week and complete out-of-class assignments. Gains of production typewriting skills will be measured through the gains in scores between the pre-test and the post-test.

### Need for the Study

Students, administrators, and the public are concerned with the amount of time being spent in formalized education. Curriculum planners want their courses of study to include content and practice that will best meet the needs and goals of the students as well as the needs and goals of society. They are also interested in discovering the optimum class time required for the student to obtain knowledge and experience in individual courses.

Faculty resources and the budgeting of time for the faculty member for both teaching and research are also important considerations for curriculum planners. Business educators need to know the optimum time required for direct teaching and teacher-supervised practice in a typewriting course.

For many years college typewriting courses have been offered with more in-class hours required than credit hours given for the course. This practice has been based on the assumption that the work required in the course was done in the in-class hours set up for the course. In recent years, however, some decrease in the number of required in-class hours has occurred with more emphasis placed on out-of-class assignments.

If out-of-class assignments and less teacher-directed instruction could achieve the same end result as that achieved in teacher-directed, in-class instruction, there would be beneficial savings in time and energies for teachers.

This study attempts to discover if students can adequately perform in production typewriting, as measured by a selected standardized test, when students assume more personal responsibility for learning

utilizing out-of-class assignments. The results of this study may assist teachers and administrators in improving teaching methods and in reducing in-class hours for the intermediate college typewriting course. In addition, it may develop more initiative and personal responsibility on the part of the student concerning his share in the learning process.

There is a need for continuous in-class research to evaluate teaching methods and time scheduling of courses.

#### Scope and Limitations of the Study

The study was limited to a sample consisting of students enrolled in one section of the intermediate typewriting course, Office Management 2313, during the 1973 spring semester at Oklahoma State University. The experiment included two randomly assigned groups with twenty-five students in each group. Data were analyzed for the fifty students who completed both the pre-test and the post-test. Students in the experiment came from different departments and represented various majors.

The following limitations were noted:

- (1) Gains in production typewriting skills were measured for one semester only.
- (2) The amount of time students spent in the preparation of out-of-class assignments was not controlled. Students were asked to record the amount of time spent on out-of-class assignments, and this time was analyzed as observational data.
- (3) Students in the experimental group had less practice time on the special drills and exercises from the textbook than students in the control group. The influence of the difference in time spent on special drills and exercises was not determined.
- (4) No attempt was made to determine the influence of students' interest and motivation.

### Definition of Terms

In-class assignments: problems assigned in class, typed during the class period, and submitted to the instructor at the close of the class period. Assignments were made from typewriting problems in lessons of Division 2, "Intermediate Typewritten Communication," from the textbook, College Typewriting, (1965).

Intermediate Typewriting: defined by the Oklahoma State University Catalog, 1971-73, on page 334 as "continued skill development and application of skill to office problems. Not open for credit to students with two years of high school credit in typewriting."

Out-of-class assignments: problems assigned in class and typed in the university's typewriting laboratory or on the student's typewriter at home. Problems were submitted to the instructor at a designated period of instruction. These assignments were made from typewriting problems in lessons from Division 2, "Intermediate Typewritten Communication," from the textbook, College Typewriting, (1965).

Production Typewriting: refers to the typewriting of practical business problems, i.e., correspondence, tabulations, manuscripts, outlines, and rough drafts.

The following chapter contains a review of related literature and research. It includes a resume of: (1) variations in time scheduling for collegiate typewriting courses, (2) teacher-directed instruction as compared to other methods of instruction, and (3) approaches used to conduct out-of-class assignments in typewriting.

## CHAPTER II

### A REVIEW OF SELECTED RELATED RESEARCH AND LITERATURE

The purpose of the chapter is to summarize related research and literature with the following goals in mind: (1) to review findings concerning variations in course offerings, in credits allotted, in lengths of instructional periods, and in frequency of meetings for typewriting instruction; (2) to review findings concerning teaching methods utilized in the instruction of typewriting and the effect of these methods on achievement, on ability levels, and on attitudes of students; and (3) to review findings and thinking concerning the place of out-of-class assignments in typewriting instruction.

The studies analyzed in this chapter are all directly related to various time arrangements and approaches to instruction in typewriting. The studies are grouped according to similarities in approach, rather than according to levels of instruction. Some of the studies are cited more than once as they included information related to several classifications.

#### Variations in Time Scheduling

The studies analyzed in the first section include surveys on the number of courses offered and the number of credit hours allotted for

those courses in college typewriting. Some studies also reveal findings concerning research on the length and frequency of the instructional period.

#### Course Offerings and Credit Allotments

Recent surveys have been made concerning the number of typewriting courses being offered at the collegiate level and the variations in in-class hours and the number of credit hours granted for the courses.

Green (1961) surveyed member colleges and universities of the National Association for Business Teacher Education in an effort to ascertain the following: (1) What changes, if any, were taking place in the NABTE member schools concerning allocation of credit for the skills courses, (2) What were the variations in amount of credit given for these courses, and (3) What were the trends, if any, toward elimination of either courses or credit for courses. Responses from 197 institutions showed an exceedingly wide difference in credit allowance for various secretarial courses. Total credit offered in typewriting courses ranged from fifteen semester hours to zero hours. Most of the institutions indicated that they had not made changes in credit allowances during the past two years. Many institutions indicated that contemplated changes would be for decreases rather than increases in credit. The NABTE members surveyed advocated the upgrading of work in business education courses through shortening the time devoted to skills courses. They also suggested that there should be greater experimentation with new approaches to presentation of subject content.

Condon (1964) surveyed 36 state universities holding membership in the National Association for Business Teacher Education to obtain information about the status of business education. He found that typewriting was offered by all but one of the universities. All of the schools surveyed offered at least two semesters of typewriting with two credits for each course most commonly given. However, some schools that limited their course offerings to only two semesters of typewriting gave three credits per course. A third semester of typewriting, usually carrying two credits, was offered by 61 percent of the schools. In his discussion of the business education curriculum, Condon mentioned that some educators wanted to eliminate or curtail training in secretarial skills. To provide the time required for the general and business administration courses needed, Condon believes that skills must be taught to a higher proficiency in less time.

Rainey (1967) surveyed 67 colleges and universities in the states of California, Texas, Illinois, New York, and Florida which included typing in their curriculums. Typewriting II, production typewriting, was offered by 99 percent of the colleges surveyed. The mean semester hours credit for production typewriting was 2.4. The mean hours of classroom instruction for the same course was 4.2 per week.

McClung's (1971) survey of typewriting practices in ten Texas junior and senior colleges revealed that more than half of the colleges offered three typewriting courses and gave three hours of credit for each course. The typewriting classes usually met three days a week; but in beginning typewriting classes, 47 percent of the colleges had classes that met five days a week. Half of the colleges offered a



laboratory period that met two hours a week. Ninety-two percent of the business education respondents suggested that a two- or three-hour laboratory period should be included in a typewriting course.

Nelson's (1961) study at the University of Minnesota invited students to express their opinions concerning courses in college typewriting. Most of the students felt that typing should be given three hours a week for one credit. Some of the students said they were willing to spend as much as five hours a week in a typewriting class, but they expected to earn at least three credits for this amount of time. A follow-up survey form sent to the colleges in Minnesota sought to determine how much typing was offered and how much credit was awarded. Twenty-eight colleges returned the questionnaire, and only three of these indicated that typing was not included in their curriculum. There seemed to be no consistency as to credit given per hour of class work. The range was from no credit for one hour a week to four credits for four hours a week.

Those surveys showed a wide variation in courses offered in typewriting and a wide variation in credit hours and in-class hours. They indicated that, in most cases, more in-class hours are required than credit hours given for the course.

A doctoral study by Hansen (1965) studied the effect of varied scheduling on achievement in advanced college typewriting. Students from seven different colleges participated in the investigation. The teacher directed the class activities five periods a week in the control classes and three periods a week in the experimental classes. Hansen found that advanced college typewriting classes meeting five

periods a week do not achieve significantly better results than classes meeting three periods a week. He measured achievement through scores made on straight-copy writings, production typewriting tests, and a related information test. Hansen recommended that the number of hours of teacher-directed instruction each week in advanced college typewriting should be in agreement with the credit hours earned in the course. He also recommended that teachers should learn to use class time efficiently in the presentation of subject matter and that they should be discriminating in selecting and using speed, accuracy, and technique drills.

Another study conducted by Parsons (1969) agreed with Hansen (1965) that business teachers should plan instruction to use students' time most efficiently. She conducted a time analysis study of activities in typewriting classes at the secondary level during the second semester. Approximately 20 percent of the total observed time was devoted to timed writings and their related functions. Instructions, questions, and other non-typewriting activities consumed 20 percent of the total observed time. She felt that more time should have been spent in production-type activities in a second semester typewriting course.

#### Length and Frequency of Instructional Period

Not only is there wide variation in credit hours given and in in-class hours required for a typewriting class, but there is also evidence of wide variation in the length of period. Two research studies have shown that students meeting for a shorter class period can reach the same level of achievement as students who meet for a longer class period.

Radtke (1962) compared achievement in typewriting of high school students in a forty-two minute period with the achievement of students in a fifty-five minute period. Achievement was measured by five-minute timed writings. At the completion of one semester, the speed accomplishment was virtually the same, with the shorter class' students averaging approximately two more errors for the five-minute timings. At the end of two semesters of work, however, the achievement on speed and accuracy was identical.

Missling (1970) assessed a study conducted by Saraka (1964) which was related to time in class. Saraka experimented with the time element by reducing each typewriting period 10 to 12 minutes in length. The purpose of his study was to determine whether or not the instruction time could be reduced without significantly affecting the rate of speed and number of errors per minute. His findings showed that the experimental group, which met for the shorter period, was superior to the control group in speed but not in accuracy.

Several research studies have been concerned with differences in achievement by students who meet typewriting classes for double periods several times a week and achievement by students who meet typewriting classes for a single period each day.

Missling (1970) reported a study conducted by Rasor (1947) in which Rasor examined the typewriting achievement results of students in three variations of meetings per week. One group received instruction in a three-meetings-per-week, single-period plan for two years; another group was given instruction in a three-meetings-per-week, single-period plan for the first year and in a five-meetings-per-week, single-period plan

the second year. Two other groups were scheduled in a five-meetings-per-week, single-period plan for two years of instruction. Group mean differences were compared on a 15-minute straight-copy test and on a 30-minute rough-draft test. Missling reported that the findings showed that a five-meetings-per-week, single-period plan resulted in higher typewriting achievement on both tests as compared to a three-meetings-per-week, single-period plan, but she did not state the statistical significance of the findings.

Yuen's study (1959) hypothesized that a scheduling pattern different from the widely used single-period-per-day, five-days-per-week pattern might result in superior straight-copy speed and accuracy and in superior production typewriting skill. His findings indicated that typewriting achievement was not significantly higher for a group meeting three times a week in 80-minute periods as compared to a group meeting twice a week in 80-minute periods. The analysis also showed that not one of the experimental groups scheduled twice or three times a week in 40- or 80-minute periods exceeded the typewriting performance of the control group with a 60-minute, five-days-a-week schedule.

A more recent study by Missling (1970) compared achievement of straight-copy and production skills in first semester high school typewriting in the traditional plan and in three different flexible modular plans of class organization. Four high schools were selected to participate in the study. The experiment consisted of one control group and three experimental groups. The control group followed the traditional pattern, meeting classes five days a week for 55 minutes each day. Experimental group one met in small-group instruction for one 20-minute

module three days a week and for large-group instruction for one 20-minute module one day a week; open labs were used. Experimental group two met for two 20-minute modules for five days a week. Instruction included the use of open labs daily. Experimental group three met for two 20-minute modules three times a week. Instruction for group three included small-group, large-group, open labs, and the implementation of behavioral objectives and a performance curriculum. The three flexible modular schools (experimental) were compared individually with each other and were compared individually with the traditional (control) school. One-minute timings were used to measure straight-copy skill. Production skills were measured through production problem tests including letter, tabulation, and manuscript problems. Her findings were as follows: (1) Beginning typewriting classes in the secondary school that meet under the traditional plan of scheduling achieve a significantly higher rate of speed in both straight-copy timings and in production skills than classes taught under flexible modular plans. (2) There was no significant difference between the groups in accuracy in straight-copy timings or in accuracy in production timings. She concluded that students seem to perform most satisfactorily when beginning typewriting is somewhat structured, but they can also be taught effectively through independent instruction.

Walden (1971) does not agree with Missling's (1970) findings. The typewriting classes in her high school are scheduled for a shorter period each day for large-group instruction, with open laboratory time used for the completion of the assignment. She feels that achievement standards are maintained and that students have more time for independent study through this modular scheduling arrangement.

The studies by Rasor (1947), Yuen (1959), and Missling (1970) favored the traditional plan of teaching typewriting through meeting each day for a single period. A study by Duchan (1958) contradicted their findings.

Duchan (1958) studied the performance of 700 high school students enrolled in beginning typewriting. The students were grouped according to previous experience in typewriting and according to general ability. Group one consisted of students who had studied typewriting in junior high school and who had obtained generally poor results in all junior high school subjects. They were given a double period of typewriting each day. Group two included students who had studied typewriting in junior high school and who had obtained generally good results in all junior high school subjects. They were given a single period of typewriting each day. Group three had no previous typewriting instruction and was given a double period of typewriting each day. Uniform tests of speed and accuracy were prepared and administered as part of a regular testing schedule. Duchan's results showed the following: (1) The double period of typewriting produced significantly better speed results than the single period, and (2) The double period of typewriting produced significantly better accuracy results than the single period of typewriting. He further compared mean speed scores for group one at the end of eight weeks of instruction with mean speed scores for group two at the end of fourteen weeks. At that time they had received substantially the same number of hours of instruction. The analysis showed that the difference was significantly greater for the double-period group. He concluded that acquiring typewriting skill takes place more rapidly, in terms of speed, when the initial learning is concentrated.

## Variations in Instructional Methods

Studies reviewed in the following pages are, for the most part, comparisons between the traditional teacher-directed approach and the non-teacher-directed approach to teaching typewriting. Some researchers have used programmed instruction, taped instruction, and other media of instruction in their non-teacher-directed approach. The experimental studies have largely been concerned with the effects of these innovative approaches on achievement, but some studies have also been concerned about the effects on ability levels and attitudes.

### Traditional and Non-Teacher-Directed Methods

Effect on Achievement. Several studies compared a teacher-directed approach with a programmed or independent study approach to the teaching of typewriting. Most of the studies did not find significant differences in groups compared. Those studies that did find significant differences usually favored the teacher-directed approach for achievement in straight-copy skills and the programmed-independent study approach for achievement in production skills.

Warner (1969) sought to determine differences in terminal achievement of students in intermediate collegiate typewriting who were taught by one of three methods: (1) the traditional teacher directed classroom environment; (2) the tape recorded and teacher directed combination classroom environment; and (3) the programmed instruction and tape recorded, non-teacher directed classroom environment. The experiment was conducted with three samples of thirty-five students each. There was no significant difference in terminal achievement in typewriting

between the groups. He concluded that intermediate collegiate typewriting can be taught effectively through the use of programmed instructional materials and audio tape recordings.

Another study that compared a programmed approach with a teacher-directed approach in the teaching of typewriting was made by Varnon (1973). Ten intact classes in two high schools were used in the study. Five classes were in the programmed group and five classes were in the teacher-directed group. The programmed group used programmed units as their basic instructional source and proceeded at their own pace within designated unit time periods. The teacher-directed group received group instruction on the concepts of the units and worked on daily assignments made by the teacher. Achievement was measured through straight-copy timed writings and a production test administered at the end of the experiment. The results showed that there was no difference between the two groups in production form scores. On the production test, the programmed group made significant gains in speed, and the teacher-directed group made significant gains in accuracy. The gains in straight-copy accuracy were not significantly different. The gains in straight-copy speed were significantly different, with the difference being in favor of the teacher-directed group. Varnon concluded that permitting students to work at their own pace in completing self-instructional problem typewriting units does not inhibit their development of typewriting skills.

West (1971) studied the effects of programmed instruction versus traditional instruction on proficiency at office-typing tasks. Traditional instruction was given to 213 low-ability typing students in two



vocational high schools. Programmed instruction was given to 334 students of comparable general mental ability in the same schools two years later. Students taught by the traditional instruction method were given much explicit teacher and textbook guidance on placement of materials on the page. Students taught by programmed instruction were given explicit instruction via programmed homework on how to make placement decisions. Achievement was measured through a final test that included letters, a table, manuscripts, and a three-minute straight-copy timing. No differences in straight-copy skills were found between the two groups. Programmed students made significantly fewer errors in placement of materials on a page. West recommended that students be given early instruction in making placement decisions, followed with much practice without teacher assistance.

A study conducted by Kline (1971) revealed approximately the same results as those reached by West (1971). Kline compared the achievements of middle-school students in a self-directed typewriting program with the achievements of students in a teacher-directed program. The students in the teacher-directed class met with the instructor each day for a conventional 30-minute class. Large-group directive methods were employed. The self-directed students were urged to spend about 30 minutes daily in the typewriting carrels in which they had access to programmed materials or records and the accompanying textual materials; these students proceeded at their discretion. After the conclusion of the 43-day experiment, speed tests and error-control tests were administered to all students. All of the students were also video-taped for typewriting techniques. There were no differences in typewriting speed

or error-control between self-directed students and teacher-directed students. There were, however, significant differences in techniques; those students who had been teacher-directed had achieved superior techniques. She concluded that the independent study approach is a viable instructional procedure through which to obtain speed and error-control goals in typewriting in the middle school.

Valencia's (1968) study compared the relative effects of three laboratory arrangements, all associated with one type of large-group instructional arrangement, on typewriting achievement. Three groups were selected from ninth grade students enrolled in beginning typewriting. All of the groups attended four large-group sessions per week. Group I attended three laboratory sessions per week. Group II attended three laboratory sessions per week with an additional section optional, and Group III could attend any number of open laboratory sessions per week. Students worked independently in the laboratory session. Typewriting achievement was measured by a post-test. Valencia concluded that no one laboratory arrangement was significantly superior to the others in speed, production, and accuracy in beginning typewriting. This study showed that students can work independently to complete assignments.

Missling (1970) assessed an earlier study completed by Tyson in 1932. Tyson compared the achievement of students taught typewriting by a regular business education teacher with the achievement of students taught by a "modified correspondence" method. Students taught by the modified correspondence method were given a week's initial instruction on the parts and operation of the typewriter. During the following

36 weeks the assignment was placed on the chalkboard each day, and the students worked on their own. Tyson concluded that typewriting could be successfully learned by a modified correspondence method such as the one used in his study.

The following studies compared various teaching approaches using multi-media instructional methods with traditional instructional methods. These multi-media approaches also favored achievements in speed. There was little difference in accuracy rates in most of the studies using the multi-media approach.

Laurer's (1972) study evaluated the effectiveness of using prepared video tapes in the teaching of intermediate collegiate typewriting. The 60 students in the control group received all their instruction in the conventional teacher presentation, while the 60 students in the experimental group received all their instruction via prepared video tapes. Student performance was measured through pre- and post-testing in the following areas: straight-copy timed writings, manuscript typing, letter typing, and statistical tabulation typing. The experiment lasted for two quarters. The experimental group typed significantly more gross words in letter typing than the control group during the first quarter; they also achieved significantly higher scores in statistical tabulation total gross words during both quarters.

Frye (1972) studied the effects on typewriting achievement by students using behavioral objectives in an individualized multi-media instructional systems approach. The students were compared with a control group using the traditional teacher-directed approach. The students in the study were enrolled in intermediate typewriting in five public

junior colleges. Students in the multi-media instructional approach group used taped lessons; they were also required to meet the minimum objectives of each lesson as stated in the syllabus before beginning the next lesson. Even though the daily performance objectives were not always met by the students in the traditional group, a new lesson was presented on the next class date. Three timed progress tests were used to evaluate each student's skill level at three different times during the experiment. The individualized multi-media instructional systems approach produced significant differences in the terminal typewriting achievement of the students. Students using the multi-media approach were able to type faster on straight-copy materials, and they were able to type certain production activities with fewer typewriting and placement errors. Frye concluded that efficiency in student learning increases through prior knowledge of performance activities before an instructional unit is taught and through an attainment of minimum performance objectives before a student advances to a new lesson.

Schellstede (1964) studied the effectiveness of the tape-earphone method of instruction in beginning typewriting classes on the secondary level. Classes in one high school comprised the experimental group, while classes in two comparable high schools made up the control groups. The results showed that achievement in speed and accuracy in straight-copy timed writings was significantly greater for the experimental group.

Thoreson (1971) compared the performance of experimental classes taught with a large-group individualized multi-media approach with the performance of traditionally taught classes on straight-copy and production timings. The sample was selected from tenth grade beginning

typewriting students in 17 high schools. Three high schools used the large-group multi-media method, while the remaining 14 high schools used the traditional method. Straight-copy typewriting skill was tested by means of three-minute timings at the end of 80 and 160 class periods of instruction. The students were tested for production skill at the end of 160 class periods of instruction. Thoreson found that students in the multi-media classes attained significantly greater speeds in both straight-copy and production timings. The students taught by traditional methods made significantly fewer errors on straight-copy timings, while the students using the multi-media method made significantly fewer errors on production timings.

A finding of the study completed by Robon (1971) indicated that reduced teacher-instruction time will not impede student typing ability in a beginning typewriting course. The problem of her study was to determine differences in typing achievement between those students who learned to type using television monitors, selectric typewriters, an open-access laboratory, and a shorter time of instruction with those students who learned to type on manual typewriters and under the traditional classroom method. The televised group of students who met for two 50-minute periods a week achieved the same degree of speed, accuracy, and ability to type business letters as did the traditional students who met for five 50-minute periods a week. Apparently the time spent by the televised group in the open-access laboratory was not measured.

Effect on Ability Levels and Attitudes. Some of the studies previously cited, Warner (1969) and Varnon (1973) have also attempted to determine the effects, if any, of the non-teacher directed approach

on students of differing ability levels. Warner's (1969) study compared three methods: (1) the traditional teacher-directed, (2) the tape-recorded and teacher-directed combination, and (3) the programmed instruction and tape-recorded, non-teacher-directed. He concluded that these teaching methods do not favor any specific ability group; students achieve the same terminal typewriting achievement regardless of their initial ability levels.

Varmon's (1973) conclusion was very similar to Warner's. She concluded that the use of programmed materials as the basic instructional source was as effective as teacher-directed instruction in teaching problem typewriting to students of all scholastic achievement levels in the secondary school beginning typewriting course.

Greene' (1971) study revealed different conclusions. The main problem of his study was to determine the effectiveness of programmed typewriting instruction for students who differ in academic abilities. Students enrolled in college production typewriting were the subjects for his research. His study showed that college students with high academic ability achieve a significantly higher level of competency in production typewriting than students with low or average academic ability. He also found that students with low ability achieve approximately the same level of competency in production typewriting as students with average academic ability.

Missling's (1970) study compared a traditional group with three groups scheduled in varied laboratory plans. She found no significant difference between differing ability levels on speed in straight-copy timings. There was a difference in ability levels in accuracy on

straight-copy timings. She also found that there was a significant difference in speed by ability levels on the final production timing, but no difference in accuracy. Her study did not indicate which ability level was most favored by which particular class organization. She recommended that further research be conducted to determine the type of student who profits most from a flexible modular time arrangement. She feels there is evidence to indicate that the more intelligent person who is self-disciplined and needs very little direction and guidance benefits most from flexible modular scheduling.

Some of the researchers attempted to measure the attitudes of students toward a non-teacher-directed approach to teaching typewriting. Students in Laurer's (1972) experimental group gave high approval to the use of prepared video tapes as a medium of instruction. Kline (1971) reported there were no differences in attitudes toward typewriting between students in a self-directed typewriting program and students in a teacher-directed program.

#### Traditional and Specialized Instructional Methods

Studies conducted by Walch (1970) and Reha (1971) sought to determine if special drills or specialized instruction affected a student's terminal production typewriting achievement.

Walch (1970) found that intermediate typewriting students who had received specialized instruction and supplementary materials showed no significant difference in terminal achievement when compared with students who received traditional methods of instruction. She used a matched-group design which included 82 students enrolled in intermediate

production typewriting. Production typewriting problems structured for different ability groups, specialized instructions, and supplementary materials were given to the experimental group participants. Terminal production typewriting achievement was measured by a post-test consisting of a straight-copy timed writing, a correspondence problem, a tabulation problem, and a manuscript problem. She recommended that a programmed text should be evaluated for use in intermediate typewriting. The results of her study imply that students do not need as much teacher-directed instruction as they traditionally receive.

In Reha's (1971) study one group of students spent an average of 15 minutes of the daily typewriting period on basic drill and/or straight-copy timed writings. The rest of the 50-minute daily period was spent on production typewriting activities. The study involved tenth grade students in five schools. A pre-test, mid-test, and post-test consisting of straight-copy timed writings and production problems were used to measure speed and accuracy. The results showed no significant difference between the two groups in speed or accuracy. She concluded that specialized drills do not produce significant differences in achievement in production typewriting at the high school level.

Lloyd (1968) believes that typewriting instruction in the future will become more individualized and the teacher will become a supervisor. On page 9, he says:

Instruction will be individualized. Instead of working in cadence with other learners in a class, the typing trainee will work alone in a carrel as he progresses through a course of programmed instruction.

The carrel will contain not only an automated typewriter on which it is impossible to make an error, but also recording equipment, speed-setting pacers, and computer-assisted diagnostic instruments.



The teacher will be a supervisor of typewriting instruction, operating the equipment from the perspective of his analysis of the learner's needs, knowledge, and capacity.

Lloyd further suggests that the learner's schedule in the typewriting laboratory will be determined by his entry level of skill and by the pace of his progress.

Business departments are experimenting with individualized instructional programs. Hoyle (1971) starts an individualized learning program in beginning typewriting after the students achieve a speed of 30 words-a-minute without error on a one-minute writing. Students listen to a tape and then refer to a corresponding study outline which directs them to specific problems in the text. When the student feels he has mastered the work in the unit, he may request a test.

Learning Activity Packages are used in Nova High School. The package includes behavior goals, self-tests, teacher evaluation, assignments, provision for recycling, and a program of resource activities. The teacher seldom lectures to the class as a whole; he serves more as a resource person. Malavenda (1969) feels that this plan gives her more time to work with individual students, and the plan helps the student to seek a greater amount of self-direction in his own learning.

The students enrolled in Typewriting II in Delavan-Darien High School also learn typewriting skills under an individualized instructional plan. In a large-group instruction period new material is introduced and time is provided for questions. The students are scheduled for small-group instruction three days a week. One day is devoted to skill development, which is guided by the instructor. Students work on the assigned units during the other two periods. The students may also

work in an open laboratory to complete their assignments. After completing a unit, the student takes a performance test to determine whether or not he can proceed to the next level of learning. Thiele (1969) feels that individualized instruction through an open laboratory has made a difference in the performance of students.

#### Out-of-Class Assignments

Students can be taught to apply good techniques and good practice procedures outside of class and should be motivated to practice outside of the regular classroom period. Boyer (1969) feels that work outside the classroom is necessary to develop "thinking" typists. On page 236, he gives the following reasons for assigning homework:

To save class time. Outside preparation by students increases classroom typing time.

To practice new material. Most new material in typewriting is based on previous learnings. Some students need immediate and extra review of the newly presented material.

To provide a challenge for faster students. Properly selected materials can provide superior students with challenges that keep typewriting a fresh and stimulating course.

To help the slow student. Teachers generally pace their instructions for the class average; therefore, slower students do not always grasp the principles of typewriting. Selected homework with specific objectives provide opportunity for the slow student to "catch up."

To help the absentee. Absence requires backtracking unless proper practice takes place following the presentation of new material.

To provide self-analysis. The student has an opportunity to work alone on his own resources, helping him determine what he knows, and on what material he needs more assistance.

To develop an appreciation of the typewriter as a tool of literature. Most students are acquiring a personal-use skill. The habit of using the typewriter at home should be developed, and the student should be encouraged to take advantage of his typewriting ability by using the machine for the purpose it was intended.

In order to teach more typewriting in less time, Tate and Ross (1959) suggested that assigning applied homework might be a partial solution and suggested that production projects be done outside regularly scheduled classes.

When Balsley (1966) suggested that the five periods allotted for typewriting might be scheduled on three days, she also suggested that homework assignments could be made for the two days on which the class did not meet. This would provide for daily skill activity.

After analyzing the results of his study on the effect of varied scheduling on achievement in advanced college typewriting, Hansen (1965) made these recommendations concerning assignments: (1) Advanced college typewriting students should be given assignments to complete on days when class does not meet. (2) Advanced college typewriting students attending class three days a week should not be required to practice a specified number of hours a week or to attend specific laboratory periods. Students should be allowed to choose their own place and time for practice and for completing assignments.

Masterson and Clark (1969) feel that outside assignments are practical with modular scheduling. They surveyed the attitudes of students and teachers concerning modular scheduling. Students said that they liked modular scheduling because it gave them the opportunity to assume and accept responsibility. One reason that business teachers

gave for liking modular scheduling was that most students assumed more responsibility for outside assignments.

On page 259, Blackstone and Smith (1949) stated a very familiar dilemma for business educators.

Every experienced teacher of typewriting has faced the problem of what to do with the bright pupil, who usually finishes the assigned work ahead of the others, and with the dull pupil, who usually does not finish. The teacher generally attempts to gauge the amount of instruction by the abilities of the mythical average pupil, but even when this is done, the bright pupil always gets through before the rest of the class and the dull pupil is still working when the rest have finished.

They suggest a plan that is based on the idea of variable assignments fitted to the abilities of the students. Minimum essentials are determined for each unit of instruction with enrichment materials added for higher ability levels. Students are stimulated to work at their full capacity and to work outside of class.

Business educators seem to favor the use of out-of-class assignments in typewriting, but Rainey's (1967) survey revealed that 35 percent of the 67 colleges he surveyed made no out-of-class assignments for Typing II. Thirty-two percent of the colleges required the students to spend an average of 0-2 hours per week on assignments outside of class, while 31 percent required their students to spend an average of 2-6 hours per week on the assignments outside of the regular class period. Daily typewriting assignments were made in 70 percent of the colleges reporting, while 26 percent made weekly assignments in Typing II.

Hosler (1966) advocates the motivation of students to practice typewriting outside of the regular classroom situation. On page 22, he

states: "Surveys taken in many different regions of the country show that from 75 to 90 percent of the students taking typewriting have a machine available for their use outside of the classroom." He feels that out-of-class assignments should be given in typewriting because homework encourages students to get into the habit of using the typewriter.

Little experimental research has been reported in the area of the effects of out-of-class assignments upon achievement of typewriting skills. The study most directly related to the problem of the present experiment was conducted by Wubbel (1968). He sought to determine if required homework had any effect on first semester high school typewriting classes. Daily typewriting homework assignments were required in the experimental group. The results showed that the experimental group achieved significantly higher speeds on three- and five-minute timed writings than the control group. The difference in mean error rates was approximately the same for both groups. Homework assignments produced gains in speed but did not produce gains in accuracy.

Some teachers feel that all typewriting practice should be timed, which could imply that all practice should be completed in class. A study was completed by Rochford (1968) to determine if timed practice on production typewriting exercises was more effective in building production typewriting proficiency than untimed practice. Students in the study were enrolled in intermediate collegiate typewriting. In the experimental group only, all production typewriting practice was timed. Seven pairs were matched on several variables, two of the

variables were a production typewriting pre-test and a straight-copy pre-test. Achievement was determined through scores made on ten production measurements. The matched experimental group was superior to the matched control group on five of the ten production measurements, and the matched control group was superior to the matched experimental group on the remaining five. In none of the ten instances was either group's superiority statistically significant.

A study made by Duetel (1941) and assessed by Missling (1970) attempted to ascertain whether students of typewriting who were given regular assignments to prepare at home improved more in typewriting ability than students who had no unsupervised practice. The experimental group consisted of students who had typewriters at home on which they could practice. The control group did only the classroom work, while the experimental group did the classroom work plus twenty minutes of typing at home each day. The experimental group typed more net words per minute than the control group, but the difference was not statistically significant. Duetel did not recommend unsupervised home practice.

Student-owned typewriters will probably not be the same make as the typewriter the student uses in the typewriting laboratory. It is likely, therefore, that the student will practice on one make of typewriter at school and practice on a different make of typewriter at home. Hansen (1965) feels that the transfer from one kind of typewriter to another kind makes no difference and recommended that advanced college typewriting students should be encouraged to practice out of class on whatever typewriter is available.

Pohland's (1966) study was concerned with the transfer of basic typewriting skills when an electric typewriter and a manual typewriter were used interchangeably by students. He concluded that typewriting proficiency on timed writings can be transferred from the electric typewriter to the manual typewriter and from the manual to the electric typewriter without any significant difference in speed or accuracy.

#### Summary

The review of research and literature revealed a wide variation in typewriting course offerings on the college level, as well as a wide variation in credit allotments for those courses. The time pattern for collegiate courses ranged from three to five hours per week. Credits offered for the courses were usually fewer than the hours spent in the classroom. However, there seems to be a trend toward reducing the number of in-class hours for college typewriting.

The findings of two research studies suggest that the total time spent in an instructional period is not as important as the way in which the allotted time is used. Students meeting for a shorter class period achieved the same level of skill as students who met for a longer period.

Some studies compared achievement of students who met for single periods of instruction each day with those students who met for double periods of instruction several days a week. Findings from these studies favored the traditional plan of teaching typewriting through meeting each day for a single period.

Several experimental studies have been conducted to compare the traditional methods of instruction in typewriting with programmed and/or

independent study instructional methods. Most of the studies did not find significant differences in groups compared with these two approaches. Observed differences usually favored the teacher-directed approach for achievement in straight-copy skills and the programmed and/or independent study approach for achievement in production skills.

Multi-media instructional methods were also compared with traditional instructional methods. The results of these studies favored the multi-media methods for achievements in speed but found little difference in achievements in accuracy between students using these two approaches.

Contradictory results were found in the studies with regard to the effects of the non-teacher directed approaches on varying ability levels. Two studies concluded that these approaches did not favor any specific ability group, while two other researchers found that the approaches did produce differences in achievement by ability levels.

Special emphasis on basic drills and/or straight-copy timed writings did not produce significant differences in achievement in production typewriting. Another study also concluded that specialized instruction with supplementary materials did not produce a statistical difference in terminal achievement.

Teachers who have accepted the trend toward reduced time in instruction and drill in the classroom have experimented with out-of-class assignments. A synopsis of opinions reveals that business educators favor homework assignments. But very little research has been reported in the area of out-of-class assignments in typewriting. Therefore, it is difficult to draw any conclusions concerning the



effects of out-of-class assignments on achievement in production  
typewriting.

The following chapter includes a discussion of the procedures  
used to test the hypothesis of the present study.

## CHAPTER III

### EXPERIMENTAL DESIGN AND PROCEDURES

Chapter III is organized into two major divisions: (1) experimental design, and (2) experimental procedures. The experimental design section includes a justification of the statistical test that was used in the experiment. The experimental procedure section includes the following: description and selection of sample, description of teaching procedures, and description of testing procedures.

#### Experimental Design - Student's t-test

This experimental research design involves the comparison of an experimental and a control group in production typewriting. The students from section one of intermediate typewriting were randomly assigned to either the control or the experimental group. They were first measured by a pre-test, after which they were given different treatments. Both groups were then given a post-test which was identical to the pre-test. The principal problem was centered on the amount of change in production typewriting skills in the experimental group as compared with the change in production typewriting skills in the control group. Guilford (1965) recommended the Student's t-test as the statistical test to be used to find the difference between changes in groups. The changes were treated as the quantities to be compared.

Runyon and Haber (1967) also suggested that when comparing two sample means presumed to be from populations with equal variances, the Student's t-ratio, two-sample case, was the appropriate statistical test to use. Runyon and Haber listed on page 198 the assumptions underlying the use of the t-distribution as follows:

- (1) The sampling distribution of the difference between means is normally distributed.
- (2) Estimated standard error of difference between means (that is  $s \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{2}}$ ) is based on the unbiased estimate of the population variance.
- (3) Both samples are drawn from populations whose variances are equal. This assumption is referred to as homogeneity of variance.

The design of the experiment satisfies the assumptions underlying the use of the Student's t-test. A comparison of the means of pre-test scores for the control and experimental groups showed no significant difference between the two groups. The mean for the experimental group was 37.68, and the mean for the control group was 37.92. From the data a t-statistic was computed to be -.0627. A t-value with an absolute value of 2.014 or greater was needed to indicate a significant difference at the .05 level of confidence on the two-tailed test.

An additional comparison was made of pre-test scores on each of the three separate problems. The results of the t-tests indicated that there was no significant difference between the two groups on any of the three problems in the testing instrument. The randomization process of choosing the two groups through a table of random numbers resulted in homogeneity of variance.

This investigation was a simple control-group experiment in which the gain scores for the two groups were compared to determine if the

experimental treatment brought about a significant change. Guilford (1965) suggested that the simplest approach was to treat the changes as the quantities to be compared, whether or not they were means of changes or sets of individual changes.

Because the Student's  $t$ -test statistic is appropriate for use in measuring gains in scores between groups, this  $t$ -test was used to assess the degree of change between the pre-test and the post-test for the experimental and control groups.

The first procedure was to use the Student's  $t$ -test to test the gains in total scores. The  $t$ -test was then used to test the gains in total words typed, the gains in total points earned, and the gains in accuracy. The three individual problems were then tested, using these same factors in order to determine if gains were more significant in a particular type of typewriting problem.

### Experimental Procedures

#### Description and Selection of Sample

The sample consisted of those students registering for section one of Intermediate Typewriting, Office Management 2313, at Oklahoma State University during the spring semester of 1973. Fifty students completed the pre-test, the experimental treatment, and the post-test. Forty-eight of these students were females and two were males. A male student was in each of the two groups.

Detailed descriptions of the students in the sample were provided by individual information sheets. This summary may be seen in Appendix K, pages 122 and 123. The majority of the students in the

sample were enrolled in the College of Business; but students enrolled were also from the College of Arts and Sciences, the College of Education, and the College of Home Economics. A broad classification of levels of class standing, from freshmen to senior levels, existed. (See Appendix I, pages 117-118). The majority of the students were taking the course because it was a required subject, and they planned to use the skills learned in the course in their chosen occupations. Their backgrounds in typewriting, for the most part, consisted of a one-year course in high school.

The students were assigned to groups by using a table of random numbers. Students were assigned numbers according to their seating positions in the classroom. As a student's number appeared on the table of random numbers, his number was alternately placed in one of the two groups. Borg (1965) recommends this method of sampling because random methods are based on the assumption that differences between groups will "random out," that is, tend to cancel each other out.

### Description of Teaching Procedures

The description of teaching procedures summarizes the following: the time schedule of the groups in the experiment, the teaching materials used, the plan for assignments, the use of production measurements, and the rotation plan of the instructors.

Time Schedule for the Experiment. Students registering for section one of Intermediate Typewriting met as one class for the first three weeks of the semester. During the first two weeks the students were given a basic review of typewriting skills learned in the elementary

typewriting course. This time was used to help familiarize the students with their typewriters and to give them opportunities to type samples of problems covered in their previous courses. The pre-test was administered at the beginning of the third week of classes. The first production measurement was also given to the class at the end of the third week while the two groups were meeting together.

In order to eliminate any bias that might have resulted from the students' having knowledge of their being a part of an experimental study, the students were not told the details of the experiment. They were told that they would be chosen through a table of random numbers to participate in one of two groups. The reasons given to the students for the division of the class were as follows: (1) The section was overcrowded; (2) Mechanical failures caused some students not to have the use of a typewriter; and (3) More individual attention could be given to students through two smaller classes.

The time of day schedule was not changed for the two groups. Both groups continued to meet at 10:30 a.m. Borg (1963) admonishes the researcher to be careful of intervening variables such as time of day and changes of schedule. Section one of Intermediate Typewriting was scheduled to meet on Monday, Tuesday, Thursday, and Friday of each week. At the beginning of the fourth week of classes and throughout the experiment, the control group met at 10:30 a.m. on Monday, Tuesday, Wednesday, and Thursday.

The experimental group met at 10:30 a.m. on Wednesday and Friday of each week throughout the experiment. Classroom facilities were similar and equipment was identical for both groups. The groups were separated for the experiment for a period of twelve weeks.

Students were given the post-test during the final examination period or sixteenth week. Approximately one hour was needed for the administering of the post-test. One group took the post-test from 9:30 a.m. to 10:30 a.m. and the second group took the test from 10:30 a.m. to 11:30 a.m. Both groups took the post-test on the same day and in the regularly assigned classroom.

Teaching Materials. The course content for both groups was identical. (See Course Outline, Appendix C, pages 90-91). Students in the experimental and control groups were required to purchase a copy of the textbook for the course, College Typewriting (Lessenberry, Wanous, and Duncan, 1965). Learning materials were presented in the same sequence in both groups, and instructions given for the typing of the problems were the same for both groups. All of the students were also required to buy a Laboratory Materials Workbook and a prepared packet of supplies and materials needed for the course.

The classrooms used were equipped with IBM Selectric typewriters. Additional instructional equipment included a demonstration stand and typewriter, overhead projector and screen, chalkboard, bulletin board, and a loud-speaker system.

Overhead transparencies of model copies of the assigned problems were used extensively throughout the experiment to give feedback to both groups. Travers (1967) states on page 74: "It has been known for a long time that performance will not improve unless the individual knows whether what he does is right or wrong and what errors he makes." Travers also discusses the effect of delay on reinforcement. His summary statements in regard to this point are as follows:

The effect of delay in reinforcement is a complex one. Under some conditions, reinforcements may be delayed and still be effective. For this to happen, the learner must maintain an orienting activity toward the stimulus complex at the time the reinforcement is applied. (Travers, 1967, page 117).

For the control group, the transparencies were projected on the screen at the end of the class period, and students compared their completed assignments for that day with the perfect copy. The students marked their errors and then handed in their papers. In this way, the control group was given immediate feedback on errors in form before they completed other problems in the same unit.

The same transparencies were used with the experimental group. After completing problems in two or three lessons, the students in the experimental group compared their problems with the model copies. The experimental group marked their errors in form and then submitted their papers.

Assignments Plan. For the most part, the control group completed a lesson during each regularly scheduled period. The experimental group completed the same lessons as the control group but typed the problems in the university typewriting laboratory or at home.

A typical class outline for the control group consisted of a warm-up exercise, special drills or exercises from the textbook, and instruction concerning the problems to be typed in that lesson; the remaining part of the period was spent in typing the problems in that particular lesson. At the end of the class period, transparencies of perfect copies of the problems assigned were shown to the students. The students compared their work with the model copies, marked their



errors, and submitted their assignments. (See sample schedule of class outlines for control group in Appendix E, pages 95-98).

A typical class outline for the experimental group consisted of a warm-up exercise, a comparison of the students' assigned and completed problems with transparencies of perfect copies of the problems assigned, special drills or exercises from the textbook, and instruction concerning the next group of assigned problems to be completed out of class.

Since the experimental group spent less time in class, the instructors could not give the same amount of time in special drills and exercises to the experimental group as they gave to the control group. Students in the experimental group, however, were given a representative sampling of the same drills and exercises as those given to the control group. (See sample schedule of class outlines for experimental group in Appendix E, pages 99-100, and sample of out-of-class assignment sheets in Appendix F, pages 102-104).

Production Measurements. Students were tested on skills attained in each unit through a production measurement given at the completion of each unit. The same measurements were used for both the experimental and control groups. The production measurements used were selected from the textbook. For some of the measurements, changes were made from the specific instructions given in the textbook in order to prevent a student's preparing the material in advance.

The production measurements were conducted during specified class periods immediately following the completion of the unit. In most instances the experimental group took the measurement a day or two ahead

of the control group. Mean scores on the production measurements may be seen in Appendix J, page 120.

Rotation of Instructors. Two instructors were involved in the teaching of the two groups in this study. One teacher was the investigator, and the other teacher was a graduate teaching assistant. Borg (1963) warns researchers about types of errors that arise in experimental designs. On page 292, Borg states:

Failure to control differences in teaching ability can be a very important source of error in educational experiments. In comparing the effectiveness of two different methods of teaching a foreign language, for example, the difference in skill of teachers using the different methods may be the major factor in rate of learning. Unless such variables are controlled, "Type G" errors can combine to produce completely misleading results.

In an attempt to avoid this type of error in the experiment, the instructors rotated in their teaching assignments each week. The investigator taught the experimental group the first week while the second instructor taught the control group. The following weeks were then taught on an alternating schedule by the two instructors. The teaching assignments schedule may be seen in Appendix D, page 93.

Both instructors followed daily class outlines prepared by the researcher for each class period during the study. Any variation from the class outlines was noted and shared with the second instructor in order that compensation could be made and the treatments to both groups could be as equal as possible. A sample schedule of the daily class outlines is located in Appendix E, pages 95-100.

In addition to the regularly scheduled class periods, the two instructors also maintained a total of three office hours each day,

and students were encouraged to ask for individual help when needed. Students in the experimental group were especially encouraged to seek the counsel of the instructors when they had questions related to their out-of-class assignments. Only four students sought conferences with the instructors concerning their out-of-class assignments, and the total time in consultation with the students outside of class was twenty-two minutes.

Most of the questions raised by the students were discussed in class or immediately before or after the regular class period. A record was kept of the time spent in office conferences with the students in the experimental group in order to record excessive teacher consultation and time, but time spent was negligible. The same situation was evident in the control group as they did not seek instruction outside the regular class period.

#### Description of Testing Procedures

The intent of this research was to measure the gains in scores in production typewriting achievement by two groups who were given differing treatments with regard to time in class. Since typewriting is a motor skill and also requires the acquisition of some knowledge and reasoning ability for application to specific jobs, most authorities agree that a performance test is the most satisfactory method of measuring production typewriting skills. In a performance test the students demonstrate their abilities to do a task by actually doing it.

A performance test was used as the criterion measurement in this experiment. Such a test was administered as a pre-test at the beginning of the experiment to establish the students' initial typewriting

abilities, and the same test was given as a post-test during the final examination period to determine the students' terminal achievement.

The discussion which follows includes a description of the testing instrument used, pre-test and post-test procedures, and grading procedures.

Testing Instrument. The instrument was a typewriting production test which contained three types of problems: a correspondence problem, a tabulation problem, and a manuscript problem. (See Appendix A, pages 79 to 82). Helquist (1966) constructed and tested for reliability the instrument that was used. He used the test in an experiment with 164 students. The reliability of the test was computed by using the biserial coefficient of correlation by correlating the test results with the final grades earned in the course. The biserial correlation was .5948. Helquist had 163 degrees of freedom in his experiment, and any correlation above .21 is considered significant for that number.

Warner (1969) used the Helquist examination in his study. He tested the reliability of the instrument through administering it as a pre-test to two classes that were not a part of his experiment. Two weeks later the same test was administered as a post-test to the same two classes. Warner found the correlation coefficient to be .899. The Helquist examination once again proved to be a reliable instrument.

Pre-test Procedures. The pre-test was administered to both the control and experimental groups during the third week of classes in the same classroom and at the same time. The purpose of the pre-test was to discover the initial production typewriting skills of the

students. The time spent for reading the directions for the problems was included in the time allowed for the examination.

The pre-test was given in a regular class period and the students were allowed fifteen minutes for each problem. If they finished a problem in less than fifteen minutes, the students were told to proof-read their copy and to wait. They could not start on the next problem until time was called and the entire class started on the next problem.

The students were told that the examination would be used as a measuring device to determine their initial skills in production type-writing. Students were given the following specific directions concerning the typing of the test:

- (1) You should correct all errors.
- (2) The grade will be determined by speed and accuracy.
- (3) Follow the directions given for the problem. If directions are not specific enough, use your best judgment.
- (4) Do not use your textbook or talk to your neighbor during the examination.
- (5) You will have fifteen minutes to complete each problem. If you finish the problem before time is called, proofread your copy. Do not start on the next problem.
- (6) It is not to your advantage to start over on a problem unless you make a mistake which you cannot correct in the first few lines.

Post-test Procedures. All students in the experiment were given the post-test during the final examination period at the end of the semester. The purpose of the post-test was to measure each student's terminal achievement and gain from the pre-test in production type-writing. The hours scheduled for the final examination for section

one of Intermediate Typewriting were from 9:30 a.m. to 11:30 a.m. One group took the test during the first half of the scheduled period. When the first group walked out of the classroom, the second group walked into the same classroom and were given the post-test.

The directions given for the post-test were the same as those given for the pre-test. Both the control and experimental groups were told that the examination would contribute toward their final grade in the course. Students were encouraged to do their best on the examination.

Grading Procedures. The pre-test and the post-test were graded and scored by the investigator. This grading procedure was adopted to eliminate, as much as possible, any difference in grading and scoring between the pre-test and the post-test.

An evaluation was made of the pre-test in order to understand initial weaknesses of the students, but it was graded and scored at the end of the experiment. To insure that the grading and scoring of the two tests received equal treatment, it was decided that there should be a minimum time lapse between the grading and scoring of the pre-test and the grading and scoring of the post-test. The three problems on the examination were graded and scored separately. For example, problem one was graded for both the control and experimental groups on the pre-test and post-test before problem two was graded for either group.

Specific guidelines were set as to what would be acceptable form and placement. (See Appendix B, pages 84-88). The tests were graded in conformance with definite rules concerning the three problems as set

forth in the typewriting textbook, College Typewriting (Lessenberry, Wanous, and Duncan, 1965).

The following measures were recorded for the total test and for each of the three problems on the test: total strokes, total words, total points, total errors, and total scores.

Total strokes refers to an actual count of the number of strokes typed.

Total words typed was computed by dividing total strokes by five.

The total points value was arrived at by dividing each problem into 33 equal parts according to the word count. For example, problem one contained 424 words; therefore, approximately 13 words equaled one point. Problem two contained 95 words, so 3 words equaled one point; and problem three contained 489 words, so approximately 15 words equaled one point. Any fraction of one-half or more was rounded up to the next even number. Total points relate to the portion of the problem typed with no penalty for errors.

Total errors were determined by counting typographical errors and form and placement errors. One point was deducted for each error.

Total scores were found by subtracting the number of errors from the points earned. The total possible score for the three problems was ninety-nine.

Total strokes, total words, total points, total errors, and total scores are listed for each problem for each student on both the pre-test and the post-test in Appendix H, pages 108-109. The totals for all three problems for each student for both the pre-test and the post-test also appear in Appendix H, pages 110-115.

### Summary

Students registering for section one of Intermediate Typewriting, Office Management 2313, were randomly assigned to either the control or the experimental group. The control group met at 10:30 a.m. on Monday, Tuesday, Wednesday, and Thursday of each week. The experimental group met at 10:30 a.m. on Wednesday and Friday of each week.

Students in the control group typed production problems in class, while students in the experimental group typed the assigned problems out of class. Students in both groups used identical typewriters and similar classroom facilities for their sessions in class. Identical assignment of problems was made to both groups, and the same instructions and feedback for the typing of the problems were given to both groups.

The students were tested on typewriting skills attained in each unit through a production measurement given at the end of each unit. The measurements were identical for both groups.

Two instructors were involved in the teaching of the two groups, and they rotated between groups in their teaching assignments each week. The instructors followed daily class outlines prepared by the investigator.

The Helquist examination was used as a pre-test and as a post-test to measure the gain in production typewriting skills attained by the students in the two groups. The examination had previously been found to be reliable by two researchers.

The t-test was the statistical technique used to determine the degree of change between the pre-test and the post-test. The data



were tabulated and placed in tables for statistical comparisons.

Appropriate statistical tables were used to interpret the significance of the data, and these findings are reported in Chapter IV.

## CHAPTER IV

### FINDINGS

#### Introduction

At the end of the experiment the pre-test and post-test were graded and scored. The data were compiled so that statistical comparisons could be made between the two groups on the total test as well as on each of the three separate problems. This information and compilation of data appears in Appendix H, pages 108-115.

Total scores on the pre-test for both the experimental and the control groups were analyzed. An additional analysis was made of scores achieved on each of the three separate problems of the pre-test. The purpose of this investigation was to determine how evenly matched the groups were from the beginning of the experiment.

The primary emphasis in this experiment, as stated in the null hypothesis, was to determine the degree of change for the two groups between the pre-test and the post-test. The hypothesis assumed that any change that existed could be attributed to the methods used in the experiment.

First, an analysis was made of gains in total scores between the pre-test and post-test for the experimental and control groups. Total score was found by subtracting total errors made from total points earned. This finding proved to be significant at the .05 level of

confidence. An analysis was then made of gains in total words, gains in total points, and gains in accuracy. Total words typed represented the total strokes typed on the test divided by five. Total points earned represented the proportion of the entire test completed by the student. Accuracy was measured by counting the total number of errors—typographical, form, and/or placement—made on the test.

Gains in words, points, and scores were found by subtracting a student's numerical results in words, points, and scores on the pre-test from the numerical results achieved in these areas on the post-test. Gains in accuracy were found by subtracting the number of errors made on the post-test from the errors made on the pre-test. A gain in accuracy would evolve through a decrease in errors from the pre-test to the post-test, assuming that the student typed at the same rate.

A further detailed analysis studied the gains in words, gains in points, gains in accuracy, and gains in scores from the pre-test to the post-test on each of the three separate problems. The purpose of this investigation was to discover whether or not the experimental treatment produced more significant results in one type of problem as compared to another type of problem.

Production measurements were given to both groups at the completion of each unit of study. The mean score was computed for each group for each measurement. No further analysis was made of the data as no significant differences appeared between the two groups.

Students in the experimental group were asked to record the amount of time they spent on their out-of-class assignments. These times were recorded and mean scores found for each lesson. The average time spent on each out-of-class assignment was computed by adding the total mean

scores, and dividing by thirty-one, the number of lessons assigned as out-of-class homework. The students in the control group were allowed an average of thirty-five minutes in class for working on the same lessons. A further analysis was made of the average time the better students spent on out-of-class assignments, as well as on the average time the slower students spent on the assignments. A comparison was also made of the five students who gained the most and the five who gained the least in gain scores in order to check the amount of time spent by each group on out-of-class assignments.

The attitudes of the students toward the two teaching methods were expressed in a preference survey form at the conclusion of the experiment.

The findings of this experiment were classified in the following areas: (1) analysis of initial equality of the groups, (2) analysis of results produced through the experimental treatment, and (3) analysis of other data pertinent to the experiment.

#### Analysis of Initial Equality of the Groups

The effectiveness of the randomization process was clearly demonstrated in the pre-test scores for the two groups. The statistical t-test on the total scores for both groups is illustrated in Table I.

Since the results showed that the t-test for difference between means was well below the critical region for t, we can assume there was no significant difference in the two groups in initial learnings in the three areas of production typewriting skills that were measured by the pre-test.

TABLE I

t-TEST OF DIFFERENCE BETWEEN MEANS  
PRE-TEST TOTAL SCORES

Groups	Mean	Sum of Squares	<u>t</u> -test	Probability
Experimental	37.68	4103	-0.627	Non-significant
Control	37.92	4678		

.05 level of confidence with 45 degrees of freedom  $\underline{t} = 2.014$

Additional t-tests were run on the scores for each of the three separate problems on the pre-test. Table II shows these results. The purpose of this investigation was to determine if the students in one

TABLE II

t-TEST OF DIFFERENCE BETWEEN MEANS  
INDIVIDUAL PROBLEMS ON PRE-TEST

Groups	Problem 1 Letter with Table Mean	Problem 2 Tabulation Mean	Problem 3 Manuscript Mean
Experimental	8.56	13.92	15.08
Control	9.08	14.08	14.76

Probability	$\underline{t} = -.47$ Non-significant	$\underline{t} = -.08$ Non-significant	$\underline{t} = .19$ Non-significant
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.05 level of confidence with 45 degrees of freedom  $\underline{t} = 2.014$

of the groups achieved better on a particular problem used in the testing instrument.

The pre-test results revealed that there was no significant difference between the two groups on the entire test. Moreover, no one group was significantly better on a particular type of problem in the testing instrument.

The basic assumption in this research was that one population was identified and that two samples from that population were randomly selected for the study. The findings concerning the initial equality of the groups verified this assumption.

The next procedure was to discover whether or not there was a significant difference between the two groups in gains in scores from the pre-test to the post-test. The gains in scores will be analyzed in the following section.

#### Analysis of Results Produced Through the Experimental Treatment

Two methods of teaching typewriting were compared in this experiment. In the first method, the instructor taught the students during four class periods a week, and the students typed the assigned problems in class. In the second method, the instructor taught the students for two class periods a week, and the students typed the assigned problems out of class. It was assumed that differences in gains in scores from the pre-test to the post-test could be attributed to the effectiveness of the teaching methods.

The null hypothesis of this experiment stated that there would be no significant difference in gains in scores between the two groups as

measured by the pre-test and post-test. The t-test was used to analyze the gains in scores from the pre-test to the post-test on total words, total points, total errors, and total scores.

The experimental group achieved a much larger mean gain score than did the control group as measured by the pre-test/post-test. There was a significant difference between the two groups at the .05 level of confidence. The experimental treatment produced a significantly greater gain in production typewriting skills than did the control treatment. Students can achieve in production typewriting skills through fewer in-class hours with out-of-class assignments; and in this study, students who attended class two hours a week and typed assignments out of class achieved significantly greater gains in production typewriting skills than did students attending class four hours a week and typing assignments in class. Table III illustrates these findings.

TABLE III

t-TEST OF DIFFERENCE BETWEEN MEANS  
GAIN SCORES IN TOTAL SCORES

Groups	Mean	Sum of Squares	<u>t</u> -test	Probability
Experimental	23.36	2365.76	2.5561	.025*
Control	15.84	2827.36		

.025 level of confidence with 45 degrees of freedom  $\underline{t} = 2.319$   
\*The confidence level reached was equal to or greater than that required by the hypothesis.

Table IV illustrates the findings of the t-test with regard to gain scores in total words typed. An immediate observation denoted that the experimental group made significantly greater gains in speed which resulted in their typing more words than those typed by the control group. In the area of gain scores in total words typed, there was a significant difference between the two groups at the .05 level of confidence. The experimental treatment favors speed building in production typewriting.

TABLE IV  
t-TEST OF DIFFERENCE BETWEEN MEANS  
 GAIN SCORES IN TOTAL WORDS

Groups	Mean	Sum of Squares	<u>t</u> -test	Probability
Experimental	170.40	169,942	3.4603	.005*
Control	85.56	190,736		

.005 level of confidence with 45 degrees of freedom  $\underline{t} = 2.952$

\*The confidence level reached was equal to or greater than that required by the hypothesis.

The experimental group made significantly greater gains in the proportion of the problems typed as measured by the pre-test/post-test. The proportion of the problems typed depended on these factors: (1) the students' ability to read directions, to make decisions, and to proceed



with the assignment and (2) the students' ability to type with speed and accuracy. The experimental group may have developed these skills because they had less teacher direction in assignments and were forced to develop more initiative and personal responsibility. There was a significant difference in favor of the experimental group in gains in total points earned. Table V illustrates these findings.

TABLE V  
t-TEST OF DIFFERENCE BETWEEN MEANS  
 GAIN SCORES IN TOTAL POINTS

Groups	Mean	Sum of Squares	<u>t</u> -test	Probability
Experimental	16.80	2736	3.4781	.005*
Control	6.28	2753		

.005 level of confidence with 45 degrees of freedom  $t = 2.952$   
 \*The confidence level reached was equal to or greater than that required by the hypothesis.

The control group showed greater numerical gains in accuracy from the pre-test to the post-test, but the t-test showed no significant difference between the two groups with regard to gains in accuracy. Table VI illustrates these findings.

TABLE VI  
t-TEST OF DIFFERENCE BETWEEN MEANS  
 GAIN SCORES IN TOTAL ERRORS

Groups	Mean	Sum of Squares	<u>t</u> -test	Probability
Experimental	6.56	1328.16	-1.4809	.20
Control	9.56	1134.16		

.05 level of confidence with 45 degrees of freedom  $\underline{t} = 2.014$

The control group typed with fewer errors, but they also typed fewer words than the experimental group. A t-test for differences in mean rate of errors was computed for the two groups and the results are shown in Table VII.

TABLE VII  
t-TEST OF DIFFERENCE BETWEEN MEANS  
 RATE OF ERRORS

Groups	Pre-test Mean	Post-test Mean	Mean Difference	<u>t</u> -test	Probability
Experimental	.041441	.023724	.017717	-.0295	Non-significant
Control	.043216	.024381	.018835		

.05 level of confidence with 45 degrees of freedom  $\underline{t} = 2.014$

The error rate was found by dividing the number of words into the number of errors. The mean error rate on the post-test was subtracted from the mean error rate on the pre-test to obtain the decrease in error rate. The decrease in error rate is in direct proportion to the gain in accuracy. There was no significant difference between the two groups in their rate of errors. The t-test for differences in proportions showed a t-statistic of  $-.0295$ . This low ratio indicated that there was no significant difference between the two groups in gains in accuracy.

The analyses of gain scores from the pre-test to the post-test indicated a significant difference between the two groups in favor of the experimental group in all areas measured with the exception of accuracy. The experimental treatment produced significantly greater gains in speed as evidenced by the gains in words typed by the experimental group. Significantly greater gains in points earned by the experimental group were indicative of skills developed in perception, reasoning, and decision-making through the out-of-class assignment approach. The experimental group typed a greater proportion of the problems than the control group. The error rate for the two groups was essentially the same.

The next procedure was an attempt to determine whether or not a specific type of problem accounted for the gains in scores made by the experimental group. The pre-test and post-test consisted of the following types of problems: (1) a letter with a table; (2) a tabulation problem with columnar headings; and (3) a manuscript problem. Separate t-tests were computed on gains in words, gains in points, gains in accuracy, and gains in scores for each of the above listed problems.

In the first problem, letter with a table, there was no significant difference between the two groups at the .05 level of confidence for any of the areas measured as shown in Table VIII. The experimental

TABLE VIII

t-TEST OF DIFFERENCE BETWEEN MEANS IN GAIN SCORES  
PROBLEM 1: LETTER WITH TABLE

Groups	Scores	Words	Points	Errors	Rate of Errors
Experimental	6.32	70.32	5.40	.92	.012373
Control	5.48	45.88	3.60	1.88	.013316
<u>t</u> =	.6363	1.4756	1.4186	-1.1229	-.0296
Probability	n/s*	.20	.20	.40	n/s*

.05 level of confidence with 45 degrees of freedom t = 2.014

\*n/s = non-significant

group obtained greater gains in all areas analyzed with the exception of accuracy, but these gains were not significant. The nature of problem one is such that less decision making was required than for problem two, in which there was a significant difference in gain scores, points, and words. Furthermore, the content of the course involved more practice on letters and simple tabulations similar to problem one than complex tabulations similar to problem two. Since there was no significant

difference between the two groups on problem one, the results may indicate that the experimental treatment does not produce gains in skills requiring limited decision making or gains in skills practiced frequently throughout the course. One cannot determine whether the limited decision making or the frequent practice or a combination of the two factors contributed to the lack of a significant difference in the performance of the two groups on problem one.

The second problem in the pre-test/post-test was a tabulation problem. The experimental group showed significant gains over the control group (Table IX) in words, points, and scores on the tabulation problem at the .05 level of confidence. The t-test analysis illustrated

TABLE IX

t-TEST OF DIFFERENCE BETWEEN MEANS IN GAIN SCORES  
PROBLEM 2: TABULATION PROBLEM

Groups	Scores	Words	Points	Errors	Rate of Errors
Experimental	10.16	16.60	5.96	4.20	.076583
Control	5.08	.24	.04	5.04	.071160
<u>t</u> =	2.3519	2.3655	2.4575	-.5021	.0733
Probability	.025*	.025*	.025*	n/s**	n/s**

.025 level of confidence with 45 degrees of freedom t = 2.319

\*The confidence level reached was equal to or greater than that required by the hypothesis.

\*\*n/s = non-significant

that there was no significant difference between the two groups in numerical gain scores in errors or in rate of errors on the tabulation problem.

The typing of the tabulation with columnar headings problem required a knowledge of centering concepts and the ability to apply these concepts quickly and accurately. This problem involved more complex decision making than either problem one or problem three. Students in the control group had more teacher, peer support and less motivation to develop personal responsibility for these learning concepts. The significant difference between the two groups on the tabulation problem shows that the out-of-class assignment approach seems to aid in the understanding and application of more difficult concepts in production typewriting.

In the third problem of the pre-test/post-test, a manuscript problem, the experimental group achieved a significantly higher level in the areas of gain scores in total words typed and gain scores in total points earned. There was no significant difference between the two groups in gains in total scores and in gains in accuracy. This problem was similar to problem one in that it required limited decision-making ability and much of the problem was similar to straight-copy typing. The experimental group typed significantly more, which indicates the ability to read and apply directions quickly and/or actually type a problem of this nature (straight copy) faster or a combination of both. However, their number of errors affected the total score. The control group typed with fewer errors but also typed fewer words, so their error rate was essentially the same as that of the experimental group. Table X illustrates these findings.

TABLE X

t-TEST OF DIFFERENCE BETWEEN MEANS IN GAIN SCORES  
PROBLEM 3: MANUSCRIPT PROBLEM

Groups	Scores	Words	Points	Errors	Rate of Errors
Experimental	7.00	83.52	5.56	1.44	.008468
Control	5.28	39.56	2.64	2.64	.009996
<u>t</u> =	1.3572	2.6526	2.5845	-1.2400	-.0565
Probability	.20	.025*	.025*	.40	n/s**

.025 level of confidence with 45 degrees of freedom t = 2.319  
 \*The confidence level reached was equal to or greater than that required by the hypothesis.  
 \*\*n/s = non-significant

Gains in scores were statistically significant in the tabulation problem only; this difference favored the experimental treatment. There was no statistical difference in the gains in scores on the problem of a letter with a table and on the manuscript problem. Gains in words typed and in points earned were significantly in favor of the experimental group on problem two, the tabulation problem, and on problem three, the manuscript problem. There was no significant difference in gains in words typed and in points earned on problem one, letter with a table. There was no significant difference between the groups in numerical gains in accuracy nor in rate of errors on any of the three problems.

The analysis of the individual problems indicates that students receiving the experimental treatment apparently developed more skill in decision making and applying more difficult concepts than did the control group. Students who are expected to solve production problems without teacher supervision seem to acquire greater skill in the production of difficult problems than students who work under teacher supervision.

#### Analysis of Other Data

This section summarizes an analysis of data related to (1) the mean scores of the two groups on production measurements completed at the end of each unit of study; (2) the average time spent on out-of-class assignments by students in the experimental group, and (3) the students' attitudes toward the teaching methods.

Thirteen production measurements were given to both groups as they completed each unit of study. The experimental group had slightly higher mean scores on seven of the measurements, and the control group had slightly higher mean scores on six of the measurements. The mean score for all of the production measurements for the experimental group was 16.6333, while the mean score for all of the production measurements for the control group was 16.3857.

The control group tended to have higher mean scores during the first part of the semester, while the experimental group had higher mean scores toward the end of the semester. Since there was very little difference in the groups in scores on the production measurements, no further analysis was made of these data. The compilation of data for the production measurements may be seen in Appendix J, page 120.



Students in the experimental group were asked to record the amount of time spent on each out-of-class assignment. Since records were not complete for every student, it was impossible for the researcher to judge the accuracy of the records. However, from the reports that were completed (Appendix G, page 106), the findings indicated that the mean time spent on each out-of-class assignment was 29.804 minutes. This time can be compared to approximately 35 minutes allowed for the students in the control group to complete production assignments each day. Of course, not all students in the control group used the full 35 minutes each day for typing their assignments, but this period was the approximate class time allowed for completing the assignment. Apparently, students who typed their assignments out of class used a little less time than the 35 minutes allowed in class for assignments.

A further analysis was made of the time spent on out-of-class assignments by three of the better students and by three of the poorer students in the experimental group. The better and poorer students compared were selected on the basis of accumulative points in areas used for a final evaluation and for a final grade in the course. The final evaluation was based on points for the following areas: (1) production measurements, 60%, (2) straight-copy timed writings, 20%, and (3) daily problem assignments, 20%. The mean time spent on out-of-class assignments by the three better students was 29.8924 minutes for each lesson. The mean time spent on out-of-class assignments by the poorer students was 40.3628 minutes for each lesson.

The five students who gained the most on total scores on the entire test, as well as the five students who gained the least, were selected

for comparison of the mean time spent on out-of-class assignments. The mean time on out-of-class assignments by students making the highest gains was 22.31 minutes per lesson. The mean time on out-of-class assignments for the students who gained the least was 32.66 minutes. It is interesting to note that the students who gained the most spent less time than the class average on out-of-class assignments. Furthermore, this group spent less time on out-of-class assignments than did the group of students who gained the least. The available data seem to show no particular relationship between the amount of time spent on out-of-class assignments and gain in production typewriting skill.

Students in the experimental group typed their out-of-class assignments in the university typewriting laboratory or on typewriters at home. Students reported that only 15 percent of the total time spent on the assignments was in the university typewriting laboratory. Only three or four students consistently used the university typewriting laboratory for typing their out-of-class assignments. Most students had access to typewriters outside the university laboratory and preferred to use them.

Students in both groups completed a course preference survey form in which they were asked to indicate their preference concerning the two methods used in the experiment. Nineteen, or 76 percent, of the twenty-five students in the control group preferred the course arranged as it was for their group. In the experimental group, twenty, or 80 percent, of the twenty-five students preferred the out-of-class assignment approach. Both groups appeared to be satisfied with the method of instruction used for their class. (The preference survey form may be seen in Appendix I, page 125).

It is difficult to ascertain whether or not the groups would have answered the survey this way had they been exposed to both methods. However, it is quite likely that the experimental group had been exposed in other classes to the traditional method used in the control group. Therefore, the fact that the experimental group preferred their method of instruction seems to indicate that this method would be acceptable to students.

#### Summary

The null hypothesis stated that there would be no significant difference in gain of production typewriting skills of intermediate college typewriting students who met class four days a week with in-class assignments, as compared to students who met class two days a week with out-of-class assignments. The major finding of the study was that the null hypothesis was rejected. The experimental group demonstrated significantly greater gains in total scores as measured by the pre-test/post-test; therefore, the findings of this study indicate that less time in class with out-of-class assignments was the better teaching method.

An analysis of the three separate problems revealed that the experimental group achieved significantly greater gain scores on the tabulation with columnar headings problem. The experimental group showed gains in scores greater than those made by the control group on both the problem of a letter with a table and on the manuscript problem, but those gains were not significant at the .05 level of confidence.

Mean scores for production measurements following each unit of study were approximately the same for both groups in the experiment.

Students who typed their assignments out of class averaged less time on the assignments than the 35 minutes allowed in class. The majority of the students typed their out-of-class assignments on typewriters at home rather than on typewriters in the university laboratory.

The course preference survey indicated that the students in each group preferred the particular teaching method under which they had been taught.

The summary, conclusions, and recommendations are presented in the following chapter.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

#### Purpose of the Study

The purpose of this experimental research was to determine the difference in gain, if any, in production typewriting skills, between two groups of students enrolled in a course in Intermediate Typewriting. Students in the experimental group met class twice a week and typed the assigned problems out of class. Students in the control group met class four times a week and typed the assigned problems in the regularly scheduled class period.

Both groups were assigned identical problems, were given the same instructions for the completing of the problems, and were given the same feedback. Both groups were also given identical production measurements at the completion of each unit.

Gains in scores were measured through a production typewriting instrument that was administered as a pre-test at the beginning of the experiment and as a post-test at the end of the experiment.

#### Description of the Sample

The sample was comprised of students enrolled in one section of Intermediate Typewriting, Office Management 2313, during the 1973 spring semester at Oklahoma State University. The fifty students participating

in the experiment were randomly assigned to either the experimental group or the control group through use of a table of random numbers.

### Findings

The results of the study revealed that there was a significant difference between the two groups concerning gains in scores from the pre-test to the post-test. The experimental group had significantly higher gains in scores than did the control group.

The null hypothesis stated that there would be no significant difference at the .05 level of confidence in gain of production typewriting skills of Intermediate Typewriting students who meet class four days a week with in-class assignments, as compared to students who meet class two days a week with out-of-class assignments. Gain of production typewriting skill was measured through the gains in scores between the pre-test and the post-test. The null hypothesis was rejected. The findings of this study indicate that less time in class with out-of-class assignments was the better teaching method.

The results of the study further revealed that the difference between the two groups in gains in total words typed, significantly favored the experimental treatment. Total words were found by counting total strokes typed and dividing by five.

The experimental group earned more points than the control group earned. Points earned were determined by the proportion of the problem typed. The experimental treatment produced significantly greater gains in speed in the typing of production typewriting problems than did the control treatment.

The t-test revealed that the error rate was approximately the same for both groups. The error rate was determined by dividing the number of words typed into the number of errors made. The experimental treatment did not produce significantly greater gains in accuracy over the control treatment in the typing of production typewriting problems.

The three problems on the testing instrument were analyzed separately and the results were as follows: (1) There was no significant difference between the two groups in gains in scores on problem one, letter with a table; (2) There was a significant difference in favor of the experimental group in gains in scores on problem two, tabulation problem; and (3) There was no significant difference between the two groups in gains in scores on problem three, manuscript problem. On problems one and three, the experimental group obtained higher gains in scores than the control group obtained, but those gains were not statistically significant. The gain in scores by students who typed assigned problems out of class was most evident in the tabulation problem.

The average amount of time spent on typing assignments out of class, as reported by the students, was approximately equal to the time allowed for students to type the assignments in a regularly scheduled class.

### Conclusions

The following conclusions resulted from the findings of the experiment:

(1) Intermediate Typewriting can be taught as effectively with two hours a week in class and out-of-class assignments as with four hours a week in class and all assignments completed in class. This conclusion assumes that a teaching method similar to the one in this study is used whereby detailed instructions for the assignments are given in class and generous feedback concerning the accuracy of each assignment is given.

(2) The accuracy skills of students who type assignments out of class do not differ from the accuracy skills of students who type assignments in class on problem or production typewriting.

(3) The preparing of assignments without teacher supervision may possibly strengthen a student's ability to solve complex problems, as is suggested by the significant difference in gains in scores on the tabulation with columnar headings problem.

(4) Students can work independently in production typewriting courses and can assume more personal responsibility for learning by utilizing out-of-class assignments.

(5) A teacher need not be present to supervise the typing of production problems when adequate instructions and feedback are given to students.

#### Recommendations

The recommendations are:

(1) In schools where a three-hour intermediate typewriting course is scheduled to meet four hours a week, the class contact hours should be reduced to two hours a week. Out-of-class assignments should be made with complete instructions and generous feedback being given in class.



(2) Authors of college typewriting textbooks should consider structuring lesson materials so that alternate lessons can be given as out-of-class assignments.

(3) Research studies similar to this experiment should be conducted for other levels of courses in typewriting, that is, elementary college typewriting and advanced college typewriting, to determine how effective this method might be at those levels.

(4) The experimental treatment used in this study should be utilized in a similar study to measure the effect of the treatment on gains in straight-copy skills.

(5) Further research should be conducted to support the findings of this study concerning the effect of this experimental treatment on a student's ability to solve production problems of a complex nature.

(6) This experimental research should be replicated to see if like results would be obtained from other samples.

## A SELECTED BIBLIOGRAPHY

- Balsley, Irol W. "Some Suggestions for Achieving Office Practice Objectives in Advanced Typewriting." The Balance Sheet, Vol. 48, No. 4 (December, 1966), 148-151.
- Blackstone, E. G., and Sofrona L. Smith. Improvement of Instruction in Typewriting. New Jersey: Prentice-Hall, Inc., 1949.
- Borg, Walter R. Experimental Research in Education. New York: David McKay, Inc., 1963.
- Boyer, Glen L. "Make Homework Work in Typewriting." The Journal of Business Education, Vol. 44, No. 6 (March, 1969), 236-238.
- Condon, Arnold C. "The University Business Education Curriculum." National Business Education Quarterly, Vol. 32, No. 4 (May, 1964), 23-30.
- Downie, N.M. and R.W. Heath. Basic Statistical Methods. New York: Harper & Row Publishers, 1965.
- Duchan, Simon A. "Patterns of Skill Development in the Learning of Typewriting." Business Education Forum, Vol. 12, No. 5 (February, 1958), 26-27.
- Frye, Marianne Elizabeth. "A Comparative Analysis of the Effect of a Multimedia Instructional Systems Approach with a Traditional Teacher-Directed Group Approach in Collegiate Intermediate Typewriting." (unpublished Doctor's thesis, The University of North Dakota, 1972).
- Green, Helen Hinkson. "Policies in Determining Credit Allocation for Secretarial Science Courses at the Collegiate Level." National Business Education Quarterly, Vol. 30, No. 2 (December, 1961), 44-54.
- Greene, Randi. "The Effectiveness of Programmed Intermediate College Typewriting Instruction for Students who Differ in Academic Abilities." (unpublished Master's thesis, Brigham Young University, 1971).
- Guilford, J. P. Fundamental Statistics in Psychology and Education New York: McGraw-Hill Book Company, 1965.

- Hansen, Kenneth LeRoy. "The Effect of Varied Scheduling on Achievement in Advanced College Typewriting." (unpublished Doctor's thesis, Colorado State College, 1965).
- Helquist, Boyd. "Analysis of the Intermediate Typewriting Program at Brigham Young University." (unpublished Master's thesis, Brigham Young University, 1966).
- Hosler, Russell J. "Homework in Typewriting—Definitely Yes." Business Education Forum, Vol. 20, No. 5 (February, 1966), 22.
- Hoyle, Thelma Carson. "Work Units for Independent Study: Typewriting I." Business Education World, Vol. 51, No. 4 (March-April, 1971), 3-4.
- Kline, Geraldine Ann Broeren. "An Analysis of the Achievements and Attitudes of Middle-School Students in a Self-Directed Typewriting Program Compared with Students in a Teacher-Directed Program." (unpublished Doctor's thesis, University of Colorado, 1971).
- Lauer, William Charles. "Evaluating Effectiveness of Using Business Education Department Prepared Video Tapes in the Teaching of Intermediate Typewriting at Utah State University." (unpublished Doctor's thesis, Utah State University, 1972).
- Lessenberry, D. D., S. J. Wanous, and C. H. Duncan. College Typewriting, Complete Course. Cincinnati: South-Western Publishing Company, 1965.
- Lloyd, Alan C. "Typewriting Futures." Business Education World, Vol. 48, No. 6 (February, 1968), 9-10, 24-28.
- Malavenda, Leonora Q. "Typewriting in a Modular Scheduled Program." Business Education Forum, Vol. 24, No. 2 (November, 1969), 13.
- Masterson, Bert, and Wally Clark. "A Flexible Approach to Office Education Modular Scheduling." The Balance Sheet, Vol. 51, No. 2 (October, 1969), 68-70.
- McClung, Margaret A. "Survey of Typewriting Practices in Selected Texas Junior and Senior Colleges Compared with Practices Advocated by Typewriting Experts." (unpublished Master's thesis, East Texas State University, 1970). Business Education Forum, Vol. 26, No. 1 (October, 1971), 44.
- Missling, Lorraine Pearl. "A Comparison of the Traditional Plan to Three Selected Flexible Modular Plans in First-Semester High School Typewriting with Straight-Copy Achievement and Production Achievement as Criteria." (unpublished Doctor's thesis, The University of North Dakota, 1970).
- Nelson, Doris E. "College Students Take a Look at Typewriting." Business Education World, Vol. 43, No. 1 (September, 1962), 7-9.

Oklahoma State University College Catalog 1971-1973. Stillwater:  
Oklahoma State University, 1971.

- Parsons, Karon May. "A Time-Analysis Study of Beginning Typewriting Classes in Selected High Schools." (unpublished Master's thesis, Brigham Young University, 1969). Business Education Forum, Vol. 25, No. 1 (October, 1970), 43-44.
- Pohland, William. "A Comparison of Achievement of Beginning Typewriting Students Using Manual and Electric Typewriters with Emphasis on Straight Copy Material." (unpublished Master's thesis, Whitewater Wisconsin State University, 1966).
- Radtke, Ronald R. "A Comparison of Achievement in Typewriting of Students in a Forty-two Minute Period with Those in a Fifty-five Minute Period." (unpublished Master's thesis, University of Wisconsin, 1962). National Business Education Quarterly, Vol. 32, No. 1 (October, 1963), 44.
- Rainey, Bill G. "Variations in Collegiate Typewriting Courses." Business Education World, Vol. 47, No. 5 (January, 1967), 11-12, 27.
- Reha, Rose K. "A Comparison of Two Procedures of Developing Production Typewriting Skill." (unpublished Doctor's thesis, University of Minnesota, 1971).
- Robon, Nancy L. "The Effectiveness of Teaching Beginning Typewriting with Television Monitors, Selectric Typewriters, and an Open-Access Laboratory." (unpublished Master's thesis, University of Toledo, 1971). Business Education Forum, Vol. 26, No. 1 (October, 1971), 50.
- Rochford, Pamela. "A Study to Determine if Timed Production Practice is More Effective in Building Production Typewriting Proficiency than Untimed Practice." (unpublished Master's thesis, Northern Illinois University, 1968). National Business Education Quarterly, Vol. 38, No. 1 (October, 1969), 34-35.
- Runyon, Richard P., and Audrey Haber. Fundamentals of Behavioral Statistics. Massachusetts: Addison-Wesley Publishing Company, 1971.
- Schellstede, Agnes. "Teaching Typing with Tapes." Business Education World, Vol. 44, No. 8 (April, 1964), 13-15.
- Tate, Donald J., and Kenton E. Ross. "College Teachers Take a Look at Typewriting." Business Education Forum, Vol. 14, No. 2 (November, 1959), 19-20, 25.
- Thiele, Sandralee Desombre. "We Have a Performance Curriculum for Typewriting II." Business Education World, Vol. 49, No. 8 (April, 1969), 10-11, 26.

- Thoreson, Laverne Dennis. "An Experimental Study to Determine the Validity of Individualized Large-Group Multi-Media Instruction Compared with Traditional Instruction in First-Year Typewriting." (unpublished Doctor's thesis, The University of North Dakota, 1971).
- Travers, Robert M. W. Essentials of Learning: An Overview for Students of Education. New York: The MacMillan Company, 1967.
- Valencia, Atilana Alvino. "The Effects of Three Laboratory Arrangements Associated with one Type of Large Group Instructional Arrangement in the Learning of Typewriting." (unpublished Doctor's thesis, Stanford University, 1968).
- Varnon, Mary Sue. "A Comparison of Self-Paced, Programmed Instruction and Teacher-Directed, Non-Programmed Instruction in Problem Typewriting in the Beginning Secondary School Course." (unpublished Doctor's thesis, Georgia State University, 1973).
- Walden, Ann. "Typewriting in a Modular Schedule." Business Education Forum, Vol. 25, No. 8 (May, 1971), 24.
- Walsh, Bernice K. "An Experimental Study to Evaluate the Effects of Specialized Instruction in Groups Selected on the Basis of Initial Typewriting Ability in Intermediate Typewriting." Business Education Forum, Vol. 26, No. 1 (October, 1971), 55.
- Warner, Sherman ElVon. "An Experimental Study Utilizing Programmed Instructional Materials and Tape Recordings in the Teaching of Intermediate Collegiate Typewriting." (unpublished Doctor's thesis, Arizona State University, 1969).
- West, Leonard J. "Effects of Programmed vs. Conventional Instruction on Proficiency at Office-Typing Tasks." (Independent study, City University of New York, 1971). Business Education Forum, Vol. 27, No. 1 (October, 1972), 52-53.
- Wubbel, Carol A. "The Role of Homework in Typewriting Achievement." (unpublished Master's thesis, Northern Illinois University, 1968). National Business Education Quarterly, Vol. 38, No. 1 (Fall, 1969), 55.
- Yuen, Jack. "The Effects of Variable Scheduling on the Achievement of Typewriting Skill." (unpublished Doctor's thesis, Stanford University, 1959).

APPENDIX A

TESTING INSTRUMENT

## HELQUIST PRODUCTION MEASUREMENT EXAMINATION

## I. LETTER WITH TABLE.

Directions: Use the Semi-Block letter style with standard punctuation. This is a two-page letter. Be sure enumerations are in proper sequence.

Charles Bruning Company, Inc.  
75 Industrial Street  
San Francisco 24, California

Gentlemen: Now that we have broken the \$100 barrier with our Verifax Bantam Copier, even the smallest one-man office can afford and enjoy its benefits.

With the new low price of \$99.50, it is also possible in a large firm to equip everyone who needs one with a Bantam Copier--just as is done with typewriters and telephones.

Other Verifax Machines available are listed in the following table:

VERIFAX COPYING MACHINES  
Four Versatile Office Time-Savers

Model	Maximum Size Copy	Price
Bantam	8 1/2" x 11"	\$ 99.50
Signet	8 1/2" x 14"	148.00
Regent	8 1/2" x 11"	250.00
Viscount	10" x 16"	425.00

We are frequently asked why we think the Verifax Copying Method is the best you can buy. To answer this question completely, we compiled the following list of reasons:

1. The new letter-size Verifax Bantam Copier is about half the price of other "low-cost" copiers--just \$99.50. It pays for itself quickly.
4. The Verifax method copies all kinds of writing--typewriter, print, ink, pencil, crayon--even purple duplicator copies. It never misses a signature, notation, letterhead or rubber stamp.
5. Verifax copies can be made on card stock and printed office forms, as well as on letterhead-type paper--a big plus in record-keeping and systems work.

2. Verifax copies can be turned out at the rate of 5 in 1 minute for just 2 1/2 cents each.

3. Verifax copies have the look and feel of a good letterhead--are durable, easy to file, and as long-lasting as any typed record.

6. Verifax copies can be made on both sides of the above materials--a big convenience in copying two-sided originals and preparing lengthy reports and manuals.

7. Verifax copies are never immersed in any liquid--are ready for distribution, filing, mailing as soon as they are made.

We hope that this list of reasons will enable your staff to sell many more Verifax Copiers. Cordially yours, EASTMAN KODAK COMPANY,  
P. H. Reed, Sales Manager.

## II. TABULATION

Directions: Center the following problem vertically and horizontally on a full sheet of paper. Use six spaces between columns.

DO NOT WRITE ON THIS SHEET OF PAPER.

Heading: TABLE 3 CHANGES IN OCCUPATIONAL EMPLOYMENT, BY MEDIAN EDUCATIONAL ATTAINMENT 1953-1962

Subheading: (Numbers in thousands)

Column 1 heading: Median Educational Attainment  
Column 2 heading: 1953  
Column 3 heading: 1962  
Column 4 heading: Change, 1953-1962  
Column 5 heading: Per cent Change, 1953-1962

Less than 9 years	11,730	10,766	-964	-8.2
9 to 12 years	26,434	27,180	746	1.8
12 to 16 years	18,166	21,861	3,695	20.3
16 years and over	<u>5,448</u>	<u>8,040</u>	<u>2,592</u>	<u>47.6</u>
Total	61,778	67,846	6,068	9.8

Source: U. S. Department of Labor



## III. MANUSCRIPT

Directions: The following exercise is a rough draft of a contract, a legal document. Prepare the final draft to be bound at the top. Double space the copy.

Contract ] *Caps, spread, centered*  
3 #

] This contract made and concluded this <sup>(SP)</sup> 27th day of <sup>(SP)</sup> Sept., 1963, by and between the Martell Special Services Corporation, of 10701 Fort Wheeling Boulevard, Fort Wheeling, Kentucky, ~~Party of the first part~~, and Richard D. Allred, 3995 Dexter Parkway, Louisville, Ky., party of the second part. <sup>(SP)</sup>

] Article 1. services. The said party of the second part covenants and agrees to and with the <sup>said</sup> party of the first part, to furnish his <sup>and time</sup> services <sup>and time</sup> exclusively and regularly to the said party of the first part as promotion <sup>and time</sup> director and advertising consultant for the period of two years, or twenty-four <sup>(24)</sup> calendar months, beginning October 1, 1963, and ~~ending~~ <sup>(SP)</sup> Sept. 30, 1965; and the said party of the <sup>second</sup> ~~first~~ part covenants and agrees to faithfully perform <sup>and discharge</sup> all duties and execute all responsibilities <sup>attendant</sup> ~~incident~~ to such employment <sup>and appointment</sup>.

] Article 2. Wages. And the said party of the first part covenants and agrees to pay the said party of the second part <sup>(named herein)</sup> above, for <sup>described service</sup> the same <sup>the sum of</sup> twenty-five thousand four hundred dollars (\$25,400), <sup>in the following manner:</sup> ~~as follows:~~ <sup>(SP)</sup> the sum of two thousand four hundred dollars on Oct. 31, 1963, and the sum of one thousand dollars on the last day of each succeeding calendar month until this contract as herein stipulated shall have <sup>expired.</sup> ~~ended.~~

] Article 3. other considerations. And the said party of the first part does hereby covenant and agree that such (privileges and benefits) respecting retirement, health and life insurance, sick leave, annual <sup>VACATION</sup> leave, and other company benefits and considerations in existence <sup>on the date</sup> of this contract shall be extended in full to the said party of the second part without reservation or limitation for the full period of this contract as (identified heretofore), such benefits and privileges to be withdrawn only in the event of termination of employment or death of the party of the second part.

] In witness whereof, the parties of this contract have hereunto set their hands the day and year first (written above).

4#

---

 Richard D. Allred

---

 Bruce D. Stocks, president


---

 Witness to signature

4#

---

 ↗ signature (witness to)

APPENDIX B

FORM AND PLACEMENT GUIDELINES FOR

PRE-TEST/POST-TEST

## I. Letter with Table

May 9, 1973

(Date begins at center  
on line 12)

(3 blank lines)

Charles Bruning Company, Inc.  
75 Industrial Street  
San Francisco 24, California

(DS)

Gentlemen:

(DS)

Now that we have broken the \$100 barrier with our Verifax Bantam Copier, even the smallest one-man office can afford and enjoy its benefits.

With the new low price of \$99.50, it is also possible in a large firm to equip everyone who needs one with a Bantam Copier--just as is done with typewriters and telephones.

Other Verifax Machines available are listed in the following table:

(TS)

## VERIFAX COPYING MACHINES

(DS)

Four Versatile Office Time-Savers

(TS)

Model	Maximum Size Copy	Price
Bantam	8 $\frac{1}{2}$ " x 11"	\$ 99.50
Signet	8 $\frac{1}{2}$ " x 14"	148.00
Regent	8 $\frac{1}{2}$ " x 11"	250.00
Viscount	10" x 16"	425.00

(TS)

We are frequently asked why we think the Verifax Copying Method is the best you can buy. To answer this question completely, we compiled the following list of reasons:

1. The new letter-size Verifax Bantam Copier is about half the price of other "low-cost" copiers--just \$99.50. It pays for itself quickly.
2. Verifax copies can be turned out at the rate of 5 in 1 minute for just 2 $\frac{1}{2}$  cents each.

(1" margin at bottom and sides of page)

(1" top margin)

\*Charles Bruning Company, Inc.

2

May 9, 1973

(3 blank lines)

3. Verifax copies have the look and feel of a good letterhead—are durable, easy to file, and as long-lasting as any typed record.
4. The Verifax method copies all kinds of writing—typewriter, print, ink, pencil, crayon—even purple duplicator copies. It never misses a signature, notation, letterhead or rubber stamp.
5. Verifax copies can be made on card stock and printed office forms, as well as on letterhead-type paper—a big plus in record-keeping and systems work.
6. Verifax copies can be made on both sides of the above materials—a big convenience in copying two-sided originals and preparing lengthy reports and manuals.
7. Verifax copies are never immersed in any liquid—are ready for distribution, filing, mailing as soon as they are made.

We hope that this list of reasons will enable your staff to sell many more Verifax Copiers.

(DS)

Cordially yours,

(DS)

EASTMAN KODAK COMPANY

(3 blank lines)

P. H. Reed, Sales Manager

(DS)

PHR/kw

---

\*The following form was also acceptable for the second-page heading:

Charles Bruning Company, Inc.

Page 2

May 9, 1973

## II. Tabulation

Specific instructions were:

Center the problem vertically and horizontally, and leave six spaces between columns.\*

TABLE 3  
CHANGES IN OCCUPATIONAL EMPLOYMENT,  
BY MEDIAN EDUCATIONAL ATTAINMENT 1953-1962  
(DS)  
(Numbers in thousands)

Median Educational Attainment	(TS)		Change 1953-1962	Percent Change 1953-1962
	1953	1962		
Less than 9 years	11,730	10,766	-964	-8.2
9 to 12 years	26,434	27,180	746	1.8
12 to 16 years	18,166	21,861	3,695	20.3
16 years and over	<u>5,448</u>	<u>8,040</u>	<u>2,592</u>	<u>47.6</u>
Total	61,778	67,846	6,068	9.8

Source: U.S. Department of Labor

---

\*This instruction would intimate that six spaces would be left between the columns or between the columnar headings and the column, depending on which combination contained the longest line.

The following options were considered to be correct:

- (1) SS or DS the body of the table.
- (2) Columnar headings could have been placed on one, two, or three lines.

## III. Manuscript

(2" or 2½" top margin)

(1" side margins)

## C O N T R A C T

(TS)

THIS CONTRACT made and concluded this twenty-seventh day of September, 1963, by and between the Martell Special Services Corporation, of 10701 Fort Wheeling Boulevard, Fort Wheeling, Kentucky, party of the first part, and Richard D. Allred, 3995 Dexter Parkway, Louisville, Kentucky, party of the second part.

(TS)

Article 1. Services.

The said party of the second part covenants and agrees to and with the said party of the first part, to furnish his services and time exclusively and regularly to the said party of the first part as Promotion Director and advertising consultant for the period of two years, or twenty-four (24) calendar months, beginning October 1, 1963, and ending September 30, 1965; and the said party of the second part covenants and agrees to faithfully perform and discharge all duties and execute all responsibilities attendant to such employment and appointment.

(TS)

Article 2. Wages.

And the said party of the first part covenants and agrees to pay the said party of the second part herein named above, for the same described service the sum of twenty-five thousand four hundred dollars (\$25,400), in the following manner: The sum of two thousand four hundred dollars on October 31, 1963, and the sum of one thousand dollars on the last day of each succeeding calendar month until this contract as herein stipulated shall have expired.

(1" bottom margin)

(1½" top margin)

Article 3. Other Considerations.

And the said party of the first part does hereby covenant and agree that such benefits and privileges respecting retirement, health and life insurance, sick leave, annual vacation leave, and other company benefits and considerations in existence on the date of this contract shall be extended in full to the said party of the second part without reservation or limitation for the full period of this contract as heretofore identified, such benefits and privileges to be withdrawn only in the event of termination of employment or death of the party of the second part.

IN WITNESS WHEREOF, the parties of this Contract have hereunto set their hands the day and year first above written.

(3 blank lines)

Richard D. Allred \_\_\_\_\_

\_\_\_\_\_  
Bruce D. Stocks, President

(3 blank lines)

\_\_\_\_\_  
Witness to Signature

\_\_\_\_\_  
Witness to Signature

(Page numbers typed on fourth line from bottom of page)



APPENDIX C

COURSE OUTLINE

## COURSE OUTLINE FOR INTERMEDIATE TYPEWRITING

## Office Management 2313

January 15 - February 5

Control and Experimental groups scheduled together  
Lessons 76-86

February 6 - Pre-test for Control and Experimental groups

February 7 - Production Measurement Test (87) for Experimental and Control groups

February 8 - Lessons 88-89 for both groups - Divide into two sections  
Assign Lessons 90, 91, 92 for Experimental group

<u>Date</u>	<u>Experimental Group</u>	<u>Control Group</u>
February 14	Submit Assignments	February 12 Lesson 90
	Assign Lesson 93	13 Lesson 91
16	Prod. Msmt. 94	14 Lesson 92
	Assign Lessons 95-97	15 Lesson 93
21	Submit Assignments	19 Prod. Msmt. 94
	Assign Lessons 98-99	20 Lesson 95
23	Submit Assignments	21 Lesson 96
	Assign Lesson 100	22 Lesson 97
28	Prod. Msmt. 102	26 Lesson 98
	Assign Lesson 104	27 Lesson 99
March 2	Submit Assignment	28 Lesson 100
	Assign Lessons 105-107	March 1 Prod. Msmt. 102
7	Submit Assignments	5 Lesson 104
	Assign Lesson 108	6 Lesson 105
9	Submit Assignment	7 Lesson 106
	Prod. Msmt. 110	8 Lesson 107
14	Prod. Msmt. 111	12 Lesson 108
		13 Prod. Msmt. 110
16	Prod. Msmt. 112	14 Prod. Msmt. 111
	Assign Lessons 114-116	15 Prod. Msmt. 112
March 19-25	S P R I N G    B R E A K	
28	Submit Assignments	26 Lesson 114
	Assign Lessons 117-118	27 Lesson 115
30	Prod. Msmt. 120	28 Lesson 116
	Assign Lessons 123, 124, 125	29 Lesson 117

April	4	Submit Assignments	April	2	Lesson 118
	6	Prod. Msmt. 127 Assign Lessons 129-131		3	Prod. Msmt. 120
	11	Submit Assignments Assign Lesson 132		4	Lesson 123
	13	Submit Assignment Prod. Msmt. 134 Assign Lessons 136-138		5	Lessons 124-125
	18	Submit Assignments Assign Lesson 139		9	Prod. Msmt. 127
	20	Prod. Msmt. 141 Assign Lessons 143-145		10	Lesson 129
	25	Submit Assignments Assign Lesson 146		11	Lessons 130-131
	27	Prod. Msmt. 148		12	Lesson 132
				16	Prod. Msmt. 134
				17	Lessons 136-137
				18	Lesson 138
				19	Lesson 139
				23	Prod. Msmt. 141
				24	Lesson 143
				25	Lesson 144
				26	Lesson 145
May	2	Prod. Msmt. 149		30	Lesson 146
	4	Prod. Msmt. 150	May	1	Prod. Msmt. 148
				2	Prod. Msmt. 149
				3	Prod. Msmt. 150

Final Examination Period - Post-test for both groups - May 9, 9:30-11:30

APPENDIX D

TEACHING ASSIGNMENT SCHEDULE

## TEACHING ASSIGNMENT SCHEDULE

<u>Week</u>	<u>Experimental Group</u>	<u>Control Group</u>
1 & 2	Investigator and Graduate Assistant taught together in orientation and review period.	
3	Investigator and Graduate Assistant taught together—pre-test and production measurement given.	
4	Investigator	Graduate Assistant
5	Graduate Assistant	Investigator
6	Investigator	Graduate Assistant
7	Graduate Assistant	Investigator
8	Investigator	Graduate Assistant
9	SPRING BREAK	SPRING BREAK
10	Graduate Assistant	Investigator
11	Investigator	Graduate Assistant
12	Graduate Assistant	Investigator
13	Investigator	Graduate Assistant
14	Graduate Assistant	Investigator
15	Investigator	Graduate Assistant
16	FINAL EXAMINATION WEEK - Investigator and Graduate Assistant gave the post-test.	

APPENDIX E

SAMPLE CLASS OUTLINES

## SECTION 22: LESSONS 135-141

## Control Group

April 17 - Tuesday: Lessons 136-137

I. Warm-up Practice 136A and 137A.

II. ASSIGNMENT: Lesson 136 - Problems 1 & 2

Use modified block form. Find center for  $5\frac{1}{2}$ " stationery and type date line and complimentary close at center point.

Lesson 137 - Problems 1 & 2

Problem 1 - Use a  $1\frac{1}{2}$ " to 2" top margin. Arrange the material so that it is easy to read the parts of the program. Place the "address" on one line; the name of the speaker and title on the second line, and the name of the company on the third line.

Problem 2 - TS; unbound manuscript form; 10-space paragraph indention.

III. Check problems through use of transparencies. Have students mark their errors and submit problems to the instructor.

Section 22: Lessons 135-141

Control group continued

April 18 - Wednesday: Lesson 138

- I. Warm-Up Practice 138A.
- II. Practice three one-minute writings on the control level - 137C, page 238.
- III. ASSIGNMENT: Problems 1 & 2
  - Problem 1 - Follow directions in textbook. Addresses for envelopes for executive size stationery are typed  $2\frac{1}{4}$ " down from the top and  $3\frac{1}{2}$ " from the left side.
  - Problem 2 - Leave three blank lines after "Respectfully submitted." Notice that center will be three spaces to the right of the original centering point.
- IV. Check problems through the use of transparencies. Have students mark their errors and submit problems to the instructor.



Section 22: Lessons 135-141

Control group continued

April 19 - Thursday: Lesson 139

- I. Warm-up Practice 139A.
- II. Production Skill Building 139B - One 5-minute writing.
- III. ASSIGNMENT: Problems 1 & 2
  - Problem 1 - Follow placement table except allow for the fact that you will have three lines less in the length of the page. Leave 1" side margins. Use modified block form.
  - Problem 2 - Follow directions in textbook. Center "Articles."
- IV. Check problems through use of transparencies. Have students mark their errors and submit problems to the instructor.
- V. Announce Production Measurement test for Monday. Review the typing of letters and reports on special size and regular size stationery.

Section 22: Lessons 135-141

Control group continued

April 23 - Monday: Lesson 141-Production Measurement

- I. Preparatory Practice 141A.
- II. Five-minute Timed Writing - 141B.
- III. Production Measurement 141: Problems 4, 3, 1, and 2. DO THE PROBLEMS LISTED IN THE ORDER GIVEN.
- IV. Directions for Problems:

Problem 4: Unbound manuscript form; DS the body; SS insets; leave three blank lines between the body and the closing lines (space four times). Closing line on the right hand side should be typed flush with the right margin. Type a 3" signature line above the names in the closing lines. (Example placed on chalkboard).

Problem 3: DS all lines in heading and the body. Place the first closing line so that it will be typed flush with the right margin. Center the second closing line under the first. Leave three blank lines between "By order of..." and "Secretary" (for signature). Unbound manuscript form.

Problem 1: Use modified block form.

Problem 2: Lines in headings are to be double spaced unless the heading is too long for one line. Arrange the problem so that it is neat and can be easily read.

- V. Proofread production measurement problems and count gross words typed. Submit the problems to the instructor.

## SECTION 22: LESSONS 135-141

## Experimental Group

April 18 - Wednesday: Lessons 136-139

- I. Warm-up Practice 139A.
- II. Use transparencies to check assignments on Lessons 136-138. Have students mark their errors and submit problems to the instructor.
- III. Five-minute Timed Writing - 139B.
- IV. OUT-OF-CLASS ASSIGNMENT: Lesson 139: Problems 1 & 2
  - Problem 1 - Follow placement table except allow for the fact that you will have three lines less in the length of the page. Leave 1" side margins. Use modified block form.
  - Problem 2 - Follow directions in textbook. Center "Articles."
- V. Students begin typing the assignment in class and finish the problems outside of class.
- VI. Announce Production Measurement test for Friday. Review the typing of letters and reports on special size and regular size stationery.

## Section 22: Lessons 135-141

Experimental group continued

April 20 - Friday: Lesson 141 - Production Measurement

- I. Preparatory Practice 141A.
- II. Use transparencies to check assigned problems in Lesson 139. Have students mark their errors and submit problems to the instructor.
- III. Five-minute Timed Writing - 141B.
- IV. Production Measurement 141: Problems 4, 3, 1, and 2. DO THE PROBLEMS LISTED IN THE ORDER GIVEN.
  - Problem 4 - Unbound manuscript form; DS the body; SS insets; leave three blank lines between the body and the closing lines (space four times). Closing line on the right hand side should be typed flush with the right margin. Type a 3" signature line above the names in the closing lines. (Example placed on chalkboard).
  - Problem 3 - DS all lines in heading and the body; place the first closing line so that it will be typed flush with the right margin. Center the second closing line under the first. Leave three blank lines between "By order of..." and "Secretary" (for signature). Unbound manuscript form.
  - Problem 1 - Use modified block form.
  - Problem 2 - Lines in headings are to be double spaced unless the heading is too long for one line. Arrange the problem so that it is neat and can be easily read.
- V. Proofread production measurement problems and count gross words typed. Submit the problems to the instructor.

APPENDIX F

SAMPLE OUT-OF-CLASS ASSIGNMENT SHEETS

ASSIGNMENT SHEET

Date: February 28, 1973

Due Date: March 2, 1973

Assignments and Special Directions: Lesson 104

Lesson 104 - 104C Outline

Follow the directions as outlined in the text. The page number on the first page is typed at center on line 4 from the bottom of the page. Page number "2" is typed in the upper right corner, even with the right margin on line 4 from the top of the page.

Notice the special directions in green ink concerning the typing of an outline.

Record of Time Spent on Assignments

Lesson <u>104</u>	Problem <u>104C</u>	Problem ____	Problem ____	Total Time <u>25</u> Place typed: ____ Univ. Lab. ____ Home
Time Started	<u>4:30</u>			
Time Finished	<u>4:55</u>			

Lesson ____	Problem ____	Problem ____	Problem ____	Total Time ____ Place typed: ____ Univ. Lab. ____ Home
Time Started				
Time Finished				

Lesson ____	Problem ____	Problem ____	Problem ____	Total Time ____ Place typed: ____ Univ. Lab. ____ Home
Time Started				
Time Finished				

Lesson ____	Problem ____	Problem ____	Problem ____	Total Time ____ Place typed: ____ Univ. Lab. ____ Home
Time Started				
Time Finished				

Total time spent on problems: 25 Minutes

ASSIGNMENT SHEET

Date: March 2, 1973

Due Date: March 7, 1973

Assignments and Special Directions: Lessons 105-107

Problem 105-C Topbound Manuscript with Footnotes

This is one large problem for three lessons. Use plain white paper. Read the directions carefully on page 186 and read the problem through before you begin typing it.

Footnotes should be typed on the page on which the reference appears. The footnotes are listed at the end of the problem on page 188. Study the directions for "topbound" manuscripts on page 185 and see examples in Reference Guide ix.

Record of Time Spent on Assignments

Lesson <u>105-107</u>	Problem <u>105C</u>	Problem ____	Problem ____	Total Time <u>85</u> Place typed: ____ Univ. Lab. ____ Home
Time Started	<u>3:00</u>			
Time Finished	<u>4:25</u>			

Lesson ____	Problem ____	Problem ____	Problem ____	Total Time ____ Place typed: ____ Univ. Lab. ____ Home
Time Started				
Time Finished				

Lesson ____	Problem ____	Problem ____	Problem ____	Total Time ____ Place typed: ____ Univ. Lab. ____ Home
Time Started				
Time Finished				

Lesson ____	Problem ____	Problem ____	Problem ____	Total Time ____ Place typed: ____ Univ. Lab. ____ Home
Time Started				
Time Finished				

Total time spent on problems: 85 Minutes

ASSIGNMENT SHEET

Date: March 7, 1973

Due Date: March 9, 1973

Assignments and Special Directions: Lesson 108

Problem 1 - Bibliography

Follow the directions in the textbook. Type on plain white paper.

Problem 2 - Title Page (page 194)

Type your name where it says "Name of Student."

Type "Oklahoma State University" where it says "Name of School."

Record of Time Spent on Assignments

Lesson <u>108</u>	Problem <u>1</u>	Problem <u>2</u>	Problem <u>   </u>
Time Started	<u>7:00</u>	<u>7:20</u>	
Time Finished	<u>7:17</u>	<u>7:25</u>	

Total Time 22

Place typed:  
 \_\_\_ Univ. Lab.  
 \_\_\_ Home

Lesson <u>   </u>	Problem <u>   </u>	Problem <u>   </u>	Problem <u>   </u>
Time Started			
Time Finished			

Total Time    

Place typed:  
 \_\_\_ Univ. Lab.  
 \_\_\_ Home

Lesson <u>   </u>	Problem <u>   </u>	Problem <u>   </u>	Problem <u>   </u>
Time Started			
Time Finished			

Total Time    

Place typed:  
 \_\_\_ Univ. Lab.  
 \_\_\_ Home

Lesson <u>   </u>	Problem <u>   </u>	Problem <u>   </u>	Problem <u>   </u>
Time Started			
Time Finished			

Total Time    

Place typed:  
 \_\_\_ Univ. Lab.  
 \_\_\_ Home

Total time spent on problems: 22 Minutes



APPENDIX G

SCHEDULE OF TIME SPENT ON  
OUT-OF-CLASS ASSIGNMENTS

TABLE XI  
SCHEDULE OF TIME SPENT ON OUT-OF-CLASS ASSIGNMENTS

Lesson Number	No. of Problems Assigned	Average time in Minutes	No. of students using college laboratory*	No. of students using personal typewriters
90	3	47.12	5	20
91	3	44.48	4	21
92	3	39.96	1	24
95	1	8.48	3	22
96	2	31.24	2	23
97	3	21.40	3	22
98	2	22.13	5	18
99	3	32.17	4	19
100	3	37.24	7	18
104	1	25.40	5	20
105-107	3	84.44	5	20
108	2	22.28	5	20
114	2	26.91	4	18
115	3	44.18	5	17
116	2	30.87	5	18
117	2	29.48	4	19
118	2	34.31	4	19
123	3	44.61	6	17
124	2	31.31	7	16
125	1	21.70	5	18
129	3	31.91	2	20
130	3	28.55	3	19
131	3	31.14	3	19
136	2	18.15	3	17
137	2	31.30	3	17
138	2	25.10	3	17
143	3	30.96	5	17
144	2	23.68	5	17
145	2	23.41	4	18

\*Includes students who checked that they did part of the assignment in the university typewriting laboratory.

APPENDIX H

RAW PRE-TEST/POST-TEST DATA

TABLE XII

RAW DATA: TOTAL SCORES FOR CONTROL GROUP

Student Number	Total Words		Total Points		Total Errors		Total Scores	
	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test
01	348	340	35	34	15	9	20	25
02	540	871	52	85	29	14	23	71
03	777	912	83	92	48	26	35	66
04	789	812	84	86	33	24	51	62
05	593	589	63	53	24	7	39	46
06	790	809	82	85	31	18	51	67
07	701	913	78	87	23	22	55	65
08	736	714	76	79	25	19	51	60
09	558	634	64	65	23	11	41	54
10	575	736	69	63	18	6	51	57
11	374	519	44	64	15	19	29	45
12	614	689	57	74	32	29	25	45
13	570	638	57	57	31	16	26	41
14	590	634	63	58	41	20	22	38
15	879	989	90	98	36	26	54	72
16	632	686	66	71	22	17	44	54
17	609	668	63	62	20	9	43	53
18	560	584	56	54	29	24	27	30
19	636	844	61	88	26	20	35	68
20	443	564	37	53	26	19	11	34
21	868	1007	90	99	41	20	49	79
22	300	373	30	38	9	12	21	26
23	802	721	84	79	20	11	64	68
24	819	834	86	84	35	21	51	63
25	354	516	46	65	16	10	30	55

TABLE XIII

RAW DATA: TOTAL SCORES FOR EXPERIMENTAL GROUP

Student Number	Total Words		Total Points		Total Errors		Total Scores	
	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post test
01	565	785	67	84	40	27	27	57
02	474	558	50	66	18	21	32	45
03	781	916	83	92	24	23	59	69
04	752	1003	80	98	23	19	57	79
05	555	789	54	84	25	19	29	65
06	556	691	59	70	17	11	42	59
07	622	946	65	94	24	20	41	74
08	425	617	45	65	20	28	25	37
09	706	720	76	71	37	20	39	51
10	542	653	61	63	30	14	31	49
11	365	545	40	58	31	19	9	39
12	443	645	40	61	7	11	33	50
13	607	761	65	82	34	26	31	56
14	399	625	47	60	29	19	18	41
15	643	813	71	86	22	7	49	79
16	471	669	42	74	10	10	32	64
17	598	884	61	90	25	14	36	76
18	672	889	59	92	26	26	33	66
19	832	908	83	93	41	23	42	70
20	833	840	87	87	36	26	51	61
21	745	1008	81	99	27	11	54	88
22	475	717	48	78	14	9	34	69
23	539	748	53	81	23	27	30	54
24	781	870	85	89	19	19	66	70
25	580	621	60	65	18	7	42	58

TABLE XIV  
 RAW DATA FOR CONTROL GROUP  
 PROBLEM 1: LETTER

Student Number	Words		Points		Errors		Scores	
	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test
01	115	122	9	9	4	1	5	8
02	206	332	16	26	9	4	7	22
03	299	341	23	26	14	11	9	15
04	276	335	21	26	9	5	12	21
05	233	189	18	15	9	4	9	11
06	318	303	24	23	7	6	17	17
07	231	356	18	27	8	7	10	20
08	248	295	19	23	8	9	11	14
09	143	206	11	16	6	1	5	15
10	190	269	15	21	3	0	12	21
11	136	197	10	15	4	6	6	9
12	229	266	18	20	10	8	8	12
13	177	234	13	18	6	6	7	12
14	230	259	18	20	11	8	7	12
15	351	422	27	33	10	7	17	26
16	216	274	17	21	9	8	8	13
17	206	252	16	19	6	4	10	15
18	206	255	16	20	10	11	6	9
19	195	308	15	24	4	5	11	19
20	136	177	10	14	7	7	3	7
21	359	423	28	33	16	8	12	25
22	113	113	9	9	3	2	6	7
23	258	235	20	18	8	7	12	11
24	331	329	25	25	11	12	14	13
25	120	177	9	14	6	4	3	10

TABLE XV  
 RAW DATA FOR EXPERIMENTAL GROUP  
 PROBLEM 1: LETTER

Student Number	Words		Points		Errors		Scores	
	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test
01	187	272	14	21	8	9	6	12
02	135	151	10	12	3	4	7	8
03	230	340	18	26	7	13	11	13
04	182	419	14	32	5	8	9	24
05	204	272	16	21	10	8	6	13
06	200	177	15	14	7	5	8	9
07	261	366	20	28	10	7	10	21
08	132	233	10	18	8	12	2	6
09	241	238	19	18	9	6	10	12
10	229	255	18	20	13	6	5	14
11	161	236	12	18	8	6	4	12
12	128	251	10	19	4	2	6	17
13	206	291	16	22	8	10	8	12
14	128	251	10	19	5	11	5	8
15	265	294	20	23	9	3	11	20
16	140	251	11	19	4	4	7	15
17	126	323	10	25	5	7	5	18
18	276	397	21	31	12	10	9	21
19	331	389	25	30	13	8	12	22
20	290	308	22	23	10	9	12	14
21	322	424	25	33	12	5	13	28
22	197	251	15	19	8	5	7	14
23	216	287	17	22	8	9	9	13
24	396	300	31	23	9	7	22	16
25	225	190	17	15	7	5	10	10

TABLE XVI  
 RAW DATA FOR CONTROL GROUP  
 PROBLEM 2: TABULATION

Student Number	Words		Points		Errors		Scores	
	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test
01	36	35	12	12	4	4	8	8
02	44	80	15	27	16	4	-1	23
03	95	95	33	33	26	6	7	27
04	95	95	33	33	16	15	17	18
05	70	35	24	12	13	1	11	11
06	89	95	31	33	16	8	15	25
07	95	83	33	28	9	9	24	19
08	81	95	28	33	5	3	23	30
09	88	71	30	24	13	8	17	16
10	95	33	33	11	10	2	23	9
11	62	95	21	33	9	6	12	27
12	44	88	15	30	4	8	11	22
13	58	39	20	13	10	5	10	8
14	76	42	25	14	22	4	3	10
15	95	95	33	33	9	6	24	27
16	72	75	25	26	6	4	19	22
17	67	49	23	17	8	1	15	16
18	55	39	19	13	10	6	9	7
19	55	95	19	33	13	5	6	28
20	17	40	6	14	3	5	3	9
21	95	95	33	33	10	8	23	25
22	27	37	9	13	0	6	9	7
23	95	95	33	33	8	2	25	31
24	95	87	33	29	13	4	20	25
25	76	95	26	33	7	4	19	29



TABLE XVII  
 RAW DATA FOR EXPERIMENTAL GROUP  
 PROBLEM 2: TABULATION

Student Number	Words		Points		Errors		Scores	
	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test
01	95	95	33	33	22	7	11	26
02	49	91	17	32	6	8	11	24
03	95	95	33	33	9	3	24	30
04	95	95	33	33	11	5	22	28
05	48	95	16	33	6	6	10	27
06	66	72	23	25	6	2	17	23
07	73	95	25	33	11	4	14	29
08	52	87	18	26	7	11	11	15
09	88	66	30	23	21	9	9	14
10	76	51	26	18	9	3	17	15
11	51	64	17	22	13	8	4	14
12	27	52	9	18	1	4	8	14
13	75	95	26	33	13	8	13	25
14	68	51	23	18	19	6	4	12
15	88	95	30	33	8	1	22	32
16	27	91	9	32	2	0	7	32
17	64	95	22	33	13	3	9	30
18	39	95	13	33	5	9	8	24
19	81	95	27	33	10	6	17	27
20	95	95	33	33	17	7	16	26
21	95	95	33	33	11	4	22	29
22	51	95	17	33	4	1	13	32
23	50	95	17	33	3	11	14	22
24	95	95	33	33	4	5	29	28
25	65	73	22	25	6	1	16	24

TABLE XVIII  
 RAW DATA FOR CONTROL GROUP  
 PROBLEM 3: MANUSCRIPT

Student Number	Words		Points		Errors		Scores	
	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test
01	197	183	14	13	7	4	7	9
02	290	459	21	32	4	6	17	26
03	384	476	27	33	8	9	19	24
04	419	383	30	27	8	4	22	23
05	290	365	21	26	2	2	19	24
06	383	411	27	29	8	4	19	25
07	376	474	27	32	6	6	21	26
08	407	325	29	23	12	7	17	16
09	327	358	23	25	4	2	19	23
10	290	433	21	31	5	4	16	27
11	176	228	13	16	2	7	11	9
12	341	335	24	24	18	13	6	11
13	335	365	24	26	15	5	9	21
14	284	333	20	24	8	8	12	16
15	433	473	30	32	17	13	13	19
16	344	336	24	24	7	5	17	19
17	336	367	24	26	6	4	18	22
18	298	290	21	21	9	7	12	14
19	385	442	27	31	9	10	18	21
20	290	347	21	25	16	7	5	18
21	414	489	29	33	15	4	14	29
22	160	222	12	16	6	4	6	12
23	449	392	31	28	4	2	27	26
24	394	418	28	30	11	5	17	25
25	158	245	11	18	3	2	8	16

TABLE XIX  
 RAW DATA FOR EXPERIMENTAL GROUP  
 PROBLEM 3: MANUSCRIPT

Student Number	Words		Points		Errors		Scores	
	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test	Pre- test	Post- test
01	283	419	20	30	10	11	10	19
02	290	316	21	22	9	9	12	13
03	457	481	32	33	8	7	24	26
04	475	489	33	33	7	6	26	27
05	303	423	22	30	9	5	13	25
06	290	442	21	31	4	4	17	27
07	288	486	20	33	3	9	17	24
08	241	298	17	21	5	5	12	16
09	378	416	27	30	7	5	20	25
10	237	346	17	25	8	5	9	20
11	153	245	11	18	10	5	1	13
12	289	342	21	24	2	5	19	19
13	325	376	23	27	13	8	10	19
14	203	322	14	23	5	2	9	21
15	290	425	21	30	5	3	16	27
16	305	327	22	23	4	6	18	17
17	408	466	29	32	7	4	22	28
18	358	397	25	28	9	7	16	21
19	420	425	30	30	18	9	12	21
20	448	436	32	31	9	10	23	21
21	328	489	23	33	4	2	19	31
22	227	371	16	26	2	3	14	24
23	273	366	19	26	12	7	7	19
24	290	476	21	33	6	7	15	26
25	290	358	21	25	5	1	16	24

APPENDIX I

GENERAL CLASSIFICATION DATA

TABLE XX  
GENERAL CLASSIFICATION DATA FOR CONTROL GROUP

Student Number	Class	College	College G.P.A.	Composite ACT Score	English ACT Score
01	FR	BU	2.375	—	—
02	FR	BU	3.066	19	19
03	JR	BU	2.150	18	17
04	FR	AS	2.800	22	23
05	FR	BU	2.538	12	10
06	JR	BU	2.102	—	—
07	SO	BU	2.347	20	23
08	SO	BU	3.040	23	25
09	FR	AS	3.000	20	21
10	FR	BU	3.733	22	25
11	FR	BU	2.062	—	—
12	JR	AS	2.035	18	19
13	SO	BU	3.250	23	24
14	SO	BU	2.212	18	16
15	FR	BU	1.750	18	18
16	SO	BU	2.820	13	15
17	FR	AS	3.000	25	29
18	FR	BU	2.428	16	18
19	FR	AS	1.636	10	16
20	FR	AS	2.214	15	19
21	SO	BU	3.543	27	21
22	FR	BU	2.181	12	16
23	FR	BU	2.800	23	27
24	SO	AS	2.833	20	22
25	JR	BU	3.108	35	26

TABLE XXI  
GENERAL CLASSIFICATION DATA FOR EXPERIMENTAL GROUP

Student Number	Class	College	College G.P.A.	Composite ACT Score	English ACT Score
01	FR	BU	2.785	20	21
02	SO	HE	2.280	16	19
03	FR	BU	3.230	29	27
04	FR	BU	2.000	22	19
05	FR	BU	—	14	14
06	FR	BU	2.714	20	20
07	FR	BU	2.500	14	14
08	FR	AS	3.200	15	16
09	FR	BU	2.571	15	20
10	FR	BU	2.642	17	19
11	FR	BU	2.384	11	17
12	JR	HE	2.850	22	20
13	FR	BU	2.714	16	17
14	GR	HE	2.260	17	16
15	FR	BU	4.000	29	27
16	SO	HE	2.710	21	23
17	FR	BU	1.930	24	24
18	FR	AS	2.214	11	8
19	SR	HE	2.900	23	24
20	SO	ED	1.420	16	15
21	FR	BU	3.625	—	—
22	JR	BU	3.489	23	26
23	FR	AS	2.250	13	12
24	SP	BU	4.000	—	—
25	FR	BU	—	19	17

APPENDIX J

PRODUCTION MEASUREMENTS DATA

TABLE XXII  
MEAN SCORES FOR PRODUCTION MEASUREMENTS

Measurement Number	Control Group Mean Score	Experimental Group Mean Score
87	21.54	21.20
94	19.60	17.60
102	21.20	20.29
110	21.24	21.32
111	16.04	15.48
112	19.87	20.87
120	5.72	5.48
127	11.84	14.17
134	7.36	8.27
141	16.28	17.96
148	16.83	16.68
149	20.21	21.04
150	15.28	15.87



APPENDIX K

STUDENT INFORMATION CARD

CONTROL GROUP - INFORMATION CARD

Name \_\_\_\_\_  
(Last) (First) (Middle)

Living Arrangements at College: Dormitory \_\_\_\_\_ Sorority \_\_\_\_\_ Apartment \_\_\_\_\_  
Parent's Home \_\_\_\_\_ Other \_\_\_\_\_

Telephone: \_\_\_\_\_ Marital Status: \_\_\_\_\_

Major: \_\_\_\_\_ Minor: \_\_\_\_\_

Year in School: Senior \_\_\_\_\_ Junior 4 Sophomore 7 Freshman 14

High School GPA: \_\_\_\_\_ Freshman English GPA: \_\_\_\_\_ College GPA: 2.601

Grade in Last Course in Typewriting: \_\_\_\_\_

\*\*\*\*\*

Offmg. 2313 is:

My typewriting skill is:

- 15 Required
- 7 An elective
- 2 Suggested by an adviser

- 1 Above average
- 16 Average
- 8 Below Average

Plan for use of typewriting:

Personal use of typewriting skill:

- 20 Use directly in an occupation
- 3 Use indirectly in an occupation
- 1 For personal use

- 0 Used all the time
- 20 Used some of the time
- 4 Seldom used

Availability of typewriter for outside assignments:

Interest in typewriting:

- 9 I have one of my own
- 11 I can use a friend's typewriter
- 5 I will have to use a typewriter in the lab

- 9 Highly interested
- 14 Interested
- 1 Moderately interested

Background in Typewriting:

High School Curriculum:

- 3 One semester in College
- 17 One year in High School
- 4 Two years in High School

- 3 Stenographic option
- 4 Clerical option
- \_\_\_\_\_ Other (Please state what it was on line below)

List other courses taken in high school or college where you have used typewriting. For example, Office Practice, Transcription, C.O.E., etc.

\_\_\_\_\_  
\_\_\_\_\_



APPENDIX L

PREFERENCE SURVEY

## CONTROL GROUP

## PREFERENCE SURVEY OF COURSE IN INTERMEDIATE TYPEWRITING

I. Hours in class:

- 4 Prefer 2 hours in class and problems in lessons completed as outside assignments on my own time.
- 0 Prefer 2 hours in class and 2 hours of scheduled time in university laboratory for doing problems assigned.
- 19 Prefer the arrangement as it was: 4 hours in class with just a few assignments completed outside of class.

II. Access to a typewriter for outside assignments:

- 2 Extremely difficult to have the use of a typewriter.
- 4 Difficult to have the use of a typewriter.
- 8 Easy access to a friend's typewriter.
- 9 Had my own typewriter.
- 1 Used the typewriters in the university laboratory.

## EXPERIMENTAL GROUP

## PREFERENCE SURVEY OF COURSE IN INTERMEDIATE TYPEWRITING

I. Hours in class:

- 4 Prefer 4 hours in class, rather than 2 hours.
- 1 Prefer 2 hours in class and 2 hours of scheduled time in university laboratory for doing assignments.
- 20 Prefer the arrangement as it was: 2 hours in class and assignments completed on own time outside of class.

II. Access to a typewriter for outside assignments:

- 1 Extremely difficult to have the use of a typewriter.
- 3 Difficult to have the use of a typewriter.
- 5 Easy access to a friend's typewriter.
- 14 Had my own typewriter.
- 2 Used the typewriter in the university laboratory.

APPENDIX M

STATISTICAL DATA

Statistical DataStudent's t-test:

$$\underline{t} = \frac{\bar{X}_1 - \bar{X}_2}{S \sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}$$

$$\text{where } S \sqrt{\frac{1}{N_1} + \frac{1}{N_2}} = \sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}$$

$$\text{and } S^2 = \frac{\sum x_1^2 + \sum x_2^2}{N_1 + N_2 - 2}$$

Statistical Data

t-test between proportions:

$$t = \frac{p_1 - p_2}{S_{D_p}}$$

$$\text{then } S_{D_p} = \sqrt{\frac{pq}{N_1} + \frac{pq}{N_2}}$$

p - difference in proportion

q = 1 - p



VITA

Kathryn Fern White

Candidate for the Degree of

Doctor of Education

Thesis: AN EXPERIMENTAL STUDY UTILIZING VARIED SCHEDULING AND  
OUT-OF-CLASS ASSIGNMENTS IN INTERMEDIATE COLLEGIATE  
TYPEWRITING

Major Field: Business Education

Biographical:

Personal Data: Born December 5, 1924, at Ft. Cobb, Oklahoma,  
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Education: Attended elementary school at County Line, Oklahoma,  
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from Comanche High School in May, 1942. Received the  
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Education, in January, 1949, and May, 1968, respectively.  
Received the Master of Religious Education degree from  
Southwestern Baptist Theological Seminary in May, 1952.  
Completed requirements for the Doctor of Education degree  
in July, 1974.

Professional Experience: Employed as secretary-bookkeeper, 1942-  
1945, as high school instructor, 1949-1950, as youth  
counselor, Memorial Hospital School of Nursing and First  
Baptist Church, Houston, 1952-1959, as instructor and  
department head of Secretarial Science, Hong Kong Baptist  
College, 1960-1971, as part-time instructor, Oklahoma State  
University, 1972-1973, and assistant professor at Lamar  
University, 1973-1974.

Professional Organizations: Member of Delta Pi Epsilon, National  
Business Education Association, Mountain-Plains Business  
Education Association, Texas Business Education Teacher  
Council, and Beta Gamma Sigma.