THE EFFECTS OF A TAPE-LABORATORY INSTRUCTIONAL APPROACH UPON ACHIEVEMENT IN BEGINNING COLLEGIATE SHORTHAND CLASSES

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This is to certify that the

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ABSTRACT

THE EFFECTS OF A TAPE-LABORATORY INSTRUCTIONAL APPROACH UPON ACHIEVEMENT IN BEGINNING COLLEGIATE SHORTHAND CLASSES

by Brendan G. Coleman

The purposes of this study were (1) to determine the effect of the utilization of a tape-laboratory approach to teaching shorthand on the performance of a selected group of beginning shorthand students at Michigan State University, (2) to determine, if possible, predictors of success in beginning shorthand at Michigan State University by examining correlations between student scores on subtests of the Entrance Test Battery and their terminal grades in beginning shorthand, and (3) to examine additional factors which might have influenced the results of the study, such as the age, number of college credits carried per participant as compared with terminal grades achieved in beginning shorthand, number of absences accrued by each member, and study habits of participants.

The study was divided into two phases. (1) A comparison was made of the terminal performance of two sections of beginning shorthand students; one section of which was taught utilizing a tape-laboratory approach (experimental section) and the other section (control section) was taught in a traditional manner. (2) An attempt was made to identify

possible predictors of potential success in beginning shorthand at Michigan State University and to identify additional factors that may have influenced the outcome of the study.

Procedures

Data concerning the performance of the two sections were analyzed to determine the following:

1. Comparability as to achievement as evidenced by terminal grades.
2. Relationships between student performance on the University Entrance Test Battery and terminal performance in beginning shorthand.
3. Relationships between other factors which were considered as possible influences on the outcome of the study and student performance in beginning shorthand.

Major Findings

1. The students in the control group performed significantly better than did the students in the experimental group.
2. The correlations between student scores on the Michigan State University Entrance Test Battery and subsequent performance in beginning shorthand were not statistically significant.

3. The results of comparisons of Entrance Test Battery scores and final grades on a composite basis (both sections) showed the following significant differences: (a) "A" students from "D" students as to total score on College Qualification Test; (b) "B" students from "C" students as to total score on College Qualification Test; (c) "A" students from "B" students as to scores on the English and Informational subtests of the Entrance Test Battery; (d) "A" students from "C" students as to scores on the English and Informational subtests of the Entrance Test Battery; (e) "B" students from "D" students as to scores on the English subtest of the Entrance Test Battery.
4. Other factors such as age, college credits carried, study habits, and distance-traveled to class factors did not appear to have influenced the outcome of the study.

Recommendations

The following recommendations were made:

1. That further research be carried on in beginning shorthand to determine the most efficient methods of use for tape or recorded types of presentations.
2. That beginning shorthand students be allowed to use the tape-laboratory facilities for study during all levels of instruction.

3. That teacher--and commercially--prepared taped material be developed utilizing short intensive spurts of new material.
4. That additional research be conducted: (a) to explore the possibilities of predicting success in beginning shorthand by utilizing a combination-of-factors approach, including attitudinal scales, (b) to examine the possible effects that spaced rather than massed practice and meeting periods might have upon performance in beginning shorthand, and (c) to determine the possible implications of presenting beginning shorthand through the use of coordinated programmed materials and taped dictation materials.
5. That a perpetual-inventory record of student scores on the Entrance Test Battery and their terminal grades in beginning shorthand be kept for purposes of correlation analysis.

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By

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CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

For some time, a difference of opinion has existed concerning the use of mechanical teaching aids for instructional purposes in all phases of shorthand. Although some difference of opinion exists, it has not appeared to be a question of whether mechanical aids could be used; but rather, whether the results obtained through their use were sufficiently effective to warrant their incorporation in the teaching process.

Early conceptions of what constituted usable mechanical aids and devices for the teaching of shorthand were limited in scope to visual media such as blackboards and flash cards. This limitation was identified by Baldwin[1] when he pointed out in 1952 that audio-visual devices had not gained much of a foothold in teaching shorthand. He also stated that, although combination recorders and electric record players were used, it seemed reasonable to say that they had not yet (1952) contributed much to shorthand instructional development.

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[1]Woodrow W. Baldwin, "History of Shorthand Instruction in Schools of the United States," (unpublished Doctor's dissertation, University of California, Los Angeles, 1952), pp. 387-388.

Purposes of the Study

The purposes of this study were as follows: (1) to determine, under controlled experimental conditions, the effect of the utilization of a tape-laboratory approach to teaching shorthand on the performance of a selected group of beginning shorthand students at Michigan State University, (2) to determine, if possible, predictors of potential success in beginning shorthand at Michigan State University by statistically analyzing the correlations between student scores on subtests of the Michigan State University Entrance Test Battery and subsequent performance in beginning shorthand as reflected in the form of terminal grades, and (3) to examine additional factors which might have influenced the results of the study such as, the age of the participants, the major field of study of the participants, average number of college credits carried per participant in each section as compared with terminal grades achieved in beginning shorthand, number of absences accrued by each member of each section, and study habits of members of each section.

An examination of the literature revealed that a definite effort was being expended to investigate the effects of the use of taped and other types of recorded dictation materials upon student performance.

Hypotheses

The following hypotheses were considered both appropriate and valid for use in estimating the probable outcomes of the experiment.

1. That the use of a tape-laboratory approach as a part of the instructional process for the experimental section would not result in significantly better performance by that section when judged by the departmental performance standards listed in Chapter III.
2. That there would not be a correlation between achievement in beginning shorthand and student performance on certain subtests comprising the Entrance Test Battery of the University, within the control and experimental section and between the two sections.
3. That additional factors such as the differential in ages of the members of the two sections, the differential in number of college credits carried per student in each section, the differential in the number of absences accrued by each member of each section, and differences in study habits of the members of each section would not affect student performance in beginning shorthand.

Importance of the Study

An important contributor to the quest for new and better methods of instruction in shorthand has been the accelerated rate of increase in school enrollments in the past two decades. Evidence of the size of these enrollments was given by the Reference, Estimates, and Projections

Section of the Educational Statistics Branch, Office of Education, in May 1962, in its estimation that 23,630 students would graduate from high school in 1961-1970. The implications of such data for business education were further clarified by additional statistics which revealed that three out of every ten students presently enrolled in the elementary grades would not attain high school graduation and that of the remaining seven- three would not go on to college. It was also estimated that of the remaining four students, only two would eventually graduate from college.[2]

On the basis of the statistical data just presented, it was possible to estimate that approximately six of every ten students, who were enrolled in elementary schools during the years from 1961 to 1970, would terminate their education before or at graduation from high school. Because this latter group comprised about 60 per cent of all those students who attended and would attend schools throughout the country during the era mentioned, it was obvious that, if they were to be gainfully employed contributors to their own society, some effort needed to be made to provide them with some form or forms of vocational education to adequately prepare them for an ever-changing world of work.

Although the history of business education included countless efforts to serve job-bound youth, the burden of

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[2] Education For A Changing World of Work, Department of Health, Education and Welfare, Office of Education, Bulletin-OE-80021, 1963.

increased enrollments on both the secondary and collegiate level makes it imperative that an all-out effort be launched to restyle the curriculum offerings in the shorthand skill area to meet the urgent needs of youth. Therefore, the examination of and experimentation with innovative types of instructional techniques was deemed to be a worthy and vital contribution to the on-going study and evaluation of current and past methods of instruction.

For that reason, although this study was primarily concerned with collegiate shorthand instructional methods, involving the use of a tape laboratory approach, this study did have definite implications for the modification of instruction at lower levels of preparation. It also had implications for the continued improvement of instructional techniques in shorthand that were used to prepare prospective business teachers.

Incorporation of an analysis of the possible predictive value for shorthand success of the Michigan State University Entrance Test Battery further increased the importance of the study. An initial examination of the Test Battery and its accompanying descriptive literature is included in Chapter II.

Since each student who was enrolled in LIO 201, Beginning Shorthand, had already taken the Entrance Test Battery when he entered the University, it was decided that an examination should be made of the possible correlations

which might have existed between achievement in beginning shorthand, as was reflected by terminal grade, and scores attained on the Entrance Test Battery. This was considered vital to the success of the study for the following reasons: (1) Past attempts to isolate reliable predictors of success in beginning shorthand had not been successful, (2) No previous attempt had been made at Michigan State University to identify possible predictors of success in beginning shorthand, and (3) It was important to analyze the relationship which might exist between success in beginning shorthand, as taught during this experiment, and aptitudes for college-level study as measured by the University Entrance Test Battery. This latter item was considered an integral portion of the study since no prior information was available concerning how students learn shorthand best or what types of measured aptitudes are indicative of potential in the shorthand learning area. This type of information, in turn, was deemed to be invaluable for identifying the possible underlying causes of student performance as related to the teaching technique utilized.

All studies of an experimental nature must necessarily take into account the possible influence of conditions and factors which might vary between the groups or sections being analyzed. Therefore, an examination was made of the possible variables in this study, and an attempt was made to identify these variables and to construct controls for them, in so far as was possible.

Definitions of Terms Used

The following definitions were included in the study in an effort to help the reader avoid confusion that might result from varied interpretations of terminology used.

Tape laboratory.--For purposes of this paper, the term "tape laboratory" meant a commercially built and installed unit consisting of a console with four channels in operation and forty listening stations for students. Each student listening station was comprised of a headset which allowed the student to hear whichever channel the instructor had selected for use with this particular student, or series of students, or the group at large. Each headset also had a small button, which when pressed, activated a light on the console which indicated to the instructor that the student wished to speak to her. In addition, each headset had an attached microphone-type speaking device which allowed the student and instructor to talk privately.

Members.--The term "members" was used in this study to denote those participants who were members of both the experimental and control sections sho had no prior short-hand experience.

CDC 3600.--The term "CDC 3600" was used in this study to identify Michigan State University's Control Data Corporation 3600 computer which was used to compute the statistical portions of this study.

Entrance test battery.--For purposes of this paper, the term "entrance test battery" was construed to mean the entrance examination taken by all entering freshmen at Michigan State University. This test consisted of a series of sub-tests which were designed to measure the academic aptitude of students in the areas of English, reading, verbal, information, and numerical proficiency. A detailed decription of the total test is included in Chapter III.

Instructor.--The term "instructor" was utilized to describe the person teaching beginning shorthand to the members of the study. It was not intended to be interpreted as a designation of professorial rank.

Sections.--The term "section" was used in this paper to describe the experimental and control groups involved in the study.

Participants.--The terms "participants" and "members" were used interchangeably in this paper and should be so read.

Beginning shorthand.--The term "beginning shorthand" meant a course designed to teach the first thirty lessons of Gregg shorthand and the theory presented therin as well as to provide for the development of minimal skills in the ability to transcribe from dictated material given at appropriate rates of speed.

Gregg Shorthand--Diamond Jubilee Series.--The text used in this study was the 1963 edition of Gregg Shorthand--

Diamond Jubilee Series and all references to the term SHORTHAND should be construed to mean the Diamond Jubilee Series.

LIO.--An abbreviation used by the university as a prefix to describe all courses offered by the Department of Business Law, Insurance, and Office Administration.

Delimitations.--This study was intentionally limited to the first quarter of beginning Gregg shorthand offered at Michigan State University during the Winter term, 1964.

The review of literature which comprised Chapter II of this study was delimited in that prognostic studies reported prior to 1957 were excluded except for the inclusion of illustrative cases.

Important Notation.--Prior to reading the ensuing chapters, the reader should be aware that the tape-laboratory facilities utilized in this experiment were purchased by Michigan State University for use with advanced levels of shorthand instruction. In advanced classes, the tape laboratory was used to develop higher writing speeds which was the original purpose for which it was purchased. Therefore, the utilization of these facilities with beginning shorthand students represented an effort on the part of the researcher to explore the possible uses of the equipment in instructional situations other than those originally considered.

CHAPTER II

REVIEW OF LITERATURE

Introduction

This portion of the study was devoted to a review of the literature as it pertained to the use of tape or other media-type laboratories in shorthand instruction. The review involved the examination of numerous separate and distinct pieces of literature covering, for the most part, the period from 1940 to 1964 except in the case of prognostic studies cited which were reported prior to 1957. It was comprised of analyses of articles in professional journals and an examination and analysis of theses and dissertations which have been reported in the various indices. The review was organized into three relatively distinct sections: (1) section one was largely concerned with the historical antecedents of shorthand tape laboratories--language laboratories; (2) section two was primarily concerned with literature pertaining directly to shorthand laboratories; and (3) section three was devoted to a review of literature which pertained to pronostic efforts in shorthand.

Chronological implications.--An initial examination of both the Business Education Index and the Education Index

revealed that prior to 1940, little had been written that pertained to the use of tape-laboratory teaching or other mechanical aids as a means of instruction in shorthand. Knepper[1] points out that teachers were encouraged to investigate the possibilities of using phonographs as early as 1901. However, there does not appear to have been much serious effort expended in this regard until the ten-year period, 1940-50, which included both World War II and the recovery years immediately following it.

History of Language Laboratories

Early references concerning language laboratories.-- One of the first articles dealing with the use of mechanical equipment as an actual part of the teaching process described an experiment conducted from 1941-44 at Green Mountain Junior College, "to provide intensive individualized oral and aural training." A language "studio" for oral practice was opened, records of the lessons were made, and students were made to spend extra time practicing pronunciation, accent, and intonation.[2]

It was 1957, however, before the Education Index carried a classification of "Language Laboratories." In the 1957 issue, ten articles were listed under this category. The

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[1]Edwin G. Knepper, History of Business Education in United States (Ann Arbor, Michigan: Edward Brothers, Inc. 1941), p. 161.

[2]Majorie C. Johnston and Catherine C. Seerley, Foreign Language Laboratories in Schools and Colleges, United States Department of Health, Education and Welfare, Bulletin No. 3 (1959).

real impetus for this rather sudden attention to the use of mechanical devices for the teaching of languages appears to have had its inception during the 1940's and also to have had a direct relationship with the need for competent linguists, which need the world-wide conflict of that time dramatized.

Reason for rapid development of language laboratories.--The present "hear," "speak," "read," and "write" concept of learning a language came about primarily because of a national emergency. During World War II, in the early 1940's, there developed a necessity for training thousands of people in foreign languages quickly. Thus it was that the United States Armed Services turned for help to the American Council of Learned Societies in which people were working in the new discipline called Linguistic Science. For their sources of information, they used native people as "informants." Subsequent developments caused these "informants" to be replaced by language laboratories and reels of magnetic tape.[3]

A gradual development in language laboratory theory and practice had taken place since World War II because of the use of new techniques and materials based on the latest knowledge of linguistic science. This knowledge and material had met

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[3]To Learn a Language, Booklet, Minesota Mining and Manufacturing Company, St. Paul, Minnesota.

with success in specialized training programs for military personnel.[4]

Federal support of language laboratories.--There has been a remarkable change in the teaching of foreign languages since 1958. Title III of the National Defense Education Act of 1958 authorized a program of financial assistance to state educational agencies for projects of local agencies for the acquiring of a laboratory or other equipment needed in teaching modern foreign languages.[5] This was partially a result of the realization that our educational system was not keeping pace with our national needs for persons competent in understanding and speaking modern foreign languages.

First conference on the role of the language laboratory in the secondary school.--In October 1960, a conference was held at the University of Michigan, Ann Arbor, Michigan, to discuss the role of the language laboratory in the secondary school. Mr. Leon S. Waskin, Coordinator for the National Defense Education Act, explained Title III of the Act. This Title III is actually the "purchase of equipment" section of the Act. Waskin explained the conditions under which the money might be allocated including such factors

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[4]Joseph C. Hutchinson, The Language Laboratory, United States Department of Health, Education and Welfare, Office of Education, Bulletin No. 27013 (1961).

[5]Paul E. King, "Audio Electronics in Education," Educational Screen and Audio-Visual Guide (May, 1963), 42: 264-65.

as, what it might be allocated for, how much might be allocated, to whom it might be allocated, what the matching requirements would be, and the requirements which must be met in order to establish a priority ranking for receipt of the money.[6]

Some early experiences with language laboratories.--At George Peabody College for Teachers in Nashville, Tennessee, there has been a college language laboratory since 1960. This modern laboratory was devised to provide, in practical form, something closely skin to the Army Specialized Training Program in that it provided voices of native speakers as models. The consensus was that the modern language teacher could not afford to share the laboratory with teachers of other subjects any more than a typing teacher can share his typewriters.[7]

At Michigan State University, figures showed that for a typical week the language laboratory was in operation about 190 hours of which 85 were regular class hours. About 470 non-language students who used it for music dictation practice, music appreciation, radio and television announcing, and speech correction contributed substantially to the high

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[6]Proceedings of the First Conference on the Role of the Language Laboratory in the Secondary School (unpublished manuscript, University of Michigan Press, Ann Arbor, Michigan, 1961).

[7]Milton L. Shane and Helen Lacy Shane, "Laboratories for Foreign Language Teaching," Educational Leadership (February, 1961), pp. 293-98.

use rate.[8] It was the consensus that the laboratory permitted the instructor to give greater individual attention to students. In a regular classroom, a teacher can give each student only about two minutes' attention; in a laboratory, each student is active the entire hour.[9]

With language laboratories becoming as common in schools as chemistry laboratories, students who intended to teach languages were required to take a methods course in laboratory operation. According to Andretz, the course included instruction on the integration of the laboratory with classroom teaching, recording and use of tapes, operation of equipment, and tape varieties.[10]

As early as 1947, Louisiana State University installed 100 partitioned cubicles equipped for individual listening-speaking practice for students in language courses.[11] By 1950, about 100 colleges and universities had language laboratory facilities.[12]

Possible relation of language laboratories to shorthand laboratories.--Although this writer could find no information that definitedly tied the development of

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[8]S. N. Andretz, "Extra Dividends From An Audio-Laboratory," Educational Screen and Audio-Visual Guide, 42 (November, 1963), pp. 622-23.

[9]Ibid.

[10]Ibid.

[11]Hutchinson, op. cit.

[12]Ibid.

shorthand dictation laboratories to the language laboratory movement, one might justifiably suggest that the National Vocational Act of 1963 may well be to shorthand-dictation laboratories what the National Defense Education Act was to language laboratories.

Review of Selected Existing Literature on Shorthand Dictation Laboratories

Reasons for development of shorthand dictation laboratories.--In an attempt to discover faster and better ways of presenting the material to be covered in shorthand, several schools experimented with the use of one or more types of mechanical devices or aids. For some schools, it was a search for a partial solution to the problem on increasing enrollments; for others, it was the reflection of their sincere desire to extend the effectiveness of their instructors.

Massey College in Birmingham, Alabama, turned to a laboratory-type of presentation for shorthand because "the norm for progress is determined by the modal group, and this generally means lost time for students outside the upper and lower limits of this average."[13] They felt that some means had to be found to extend the boundaries of opportunities for the fast learners and to provide additional

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[13]Frank R. Harwood, "Massey College," Business Education World, 44 (January, 1964), pp. 19-20.

assistance in skill building for the slower students before they became discouraged and dropped out. Tutoring was impractical both from an economic standpoint on the part of the student and from the problem of the availability of teachers since the teachers did not wish to devote time to tutoring. As a result of turning to a laboratory-type of presentation, the staff at Massey have developed the motto, "LS/MFT--Laboratory Shorthand Means Fine Teaching."[14]

Still another reason why one school turned to a shorthand laboratory was the result of a survey of employment agencies and business firms in the Chicago area. The Business Department of Maine Township High School West in Des Plains, Illinois, requested a tape laboratory from their board of education which was rejected. They were told that the subject would be re-opened if and when pertinent data became available. Their survey showed conclusively that the demand for trained stenographers far exceeded the supply. This survey helped convince the Board of Education that a laboratory would help close the gap in training stenographers.[15]

The Vocational and Adult School in Wausau, Wisconsin, experienced still another problem which brought about the

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[14] Ibid.

[15] O. W. Brown, "Maine Township High School West," Business Education World, 44 (January, 1964), p. 17.

investigation of tape laboratories and the setting up of a multiple channel system of dictation for their evening shorthand classes. A typical class would drop from 25 to 3 or 4 for the reason that the teacher had difficulty in dictating to such a diversified group. There was a need for something that would keep each person occupied at his own rate of speed.[16]

Types of Installations

The variance in the type of laboratories installed was somewhat wide. This review of literature revealed that a shorthand laboratory could be installed very simply for about $200 or it could be installed as a very elaborate lay-out at a cost of approximately $25,000. Descriptions of three types of installations--small, medium, and large--are provided in the following paragraphs.

Small Installations.--J. Charles Lord of Quinsigamond Community College in Worchester, Massachusetts, described how to start an electronic dictation laboratory without making a large investment. He felt that for those with limited funds, he would recommend purchasing two phonographs and two tape recorders and having the shorthand room wired at a cost of about $1.50 per student (this cost will vary) plus the cost of earphones.

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[16]"Shorthand Tapes Handle Individual Differences," Business Education World, 39 (June, 1959) pp. 16-17.

He admitted that perhaps this cheaper installation would not be as "pretty" or perhaps not as efficient as a larger, more expensive one; but he felt that the law of diminishing returns indicated a point "where it became less efficient to attempt to be more efficient--that many high-priced consoles are mere status symbols in some secretarial departments."[17]

Elizabeth T. Van Derveer suggested that for both experienced and inexperienced teachers, it is desirable--and less expensive--to begin in a small way with only one or two machines and work into a program gradually. According to Van Derveer, the important thing is to make business rooms special-purpose rooms with special electrical or sound conduits under the floor or along the baseboard so that expansion of programs in relatively simple.[18]

The Vocational and Adult School in Wausau, Wisconsin, has an installation which consists of a mahogany cabinet which houses three Bell Model RT-204 tape recorders that ride on slide-out shelves. Each of sixteen desks is wired and equipped with a 3-way switch to receive recording from any of the three recorders. Sixteen sets of earphones are used.[19]

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[17]J. Charles Lord, "Audio Equipment: What Price Progress," Business Education World, 44 (January, 1964), pp. 10-12.

[18]Elizabeth T. Van Derveer, "Planning for Student-Selected Stenographic Dictation," Business Education World, 44 (January, 1964), pp. 8-10.

[19]"Shorthand Tapes Handle Individual Differences," Business Education World, 39 (June, 1959), pp. 16-17.

Bowling Green (Ohio) State University has a similar installation with three cartridge tape play-back machines and ten listening stations at a 12-foot table with acoustical dividers between the listening stations which are 26 inches wide.[20]

Medium-Sized Installations.--A medium-sized installation would be one which was described by Marting as her "Electronic Learning Center." This consisted of a master console unit operated by the teacher with 30 individual booths for students. These booths each contained a microphone, a headset, and a volume control.[21]

Large Installations.--The staff at Central City Business Institute in Syracuse, New York, believe that they have one of the largest shorthand laboratory installations in the country. In the summer of 1963, they installed a Norelco Shorthand Laboratory consisting of 192 student listening stations divided among four classrooms. Each room has a control board of four dictating-transcribing machines set in a roll-away cabinet.[22]

At Brigham Young University in Utah, a multiple room "escalator" program was organized. Three to five

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[20]Barbara Marting, "Make Use of an Electronic Classroom in Shorthand," The Balance Sheet (February, 1962), pp. 249-250, 286.

[21]Ibid.

[22]"Central City Business Institute," Business Education World, 44 (January, 1964), p. 20.

classrooms are used and taped lessons are piped from a central control room to these individual classrooms.[23]

Cost of Installations.--At Arlington Heights (Illinois) High School, only $200 was spent to initiate a multiple-channel laboratory with thirty receiving stations. The department owned two tape recorders to begin with so the most expensive item was the outlay for thirty headsets at a cost of $3.65 each.[24]

An additional example of a low-cost system is the one installed in 1960 at Cedar Rapids (Iowa) High School. The department purchased a dictation-transcription unit, six receptacles, six ear loops, ear pieces and a loud speaker at a cost of $250.[25]

The Vocational School in Wausaw, Wisconsin, installed their system at a cost of $675 plus the price of the tape recorders. This gave them sixteen receiving stations; the cost also included cutting into the cement floor.[26]

The installation at Massey College consisted of two Orrtronic players and one Orrtronic player-recorder. The

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[23]Ted D. Stoddard and S. El Von Warner, "Brigham Young University," Business Education World, 44 (January, 1964), p. 18.

[24]Charles J. Miller and Hazel Faulkner, "We Set Up a Dictation Laboratory for $200," Business Education World (November, 1960), pp. 18-19.

[25]Gloria Alcock, "Shorthand Homework From Teacher-Make Tapes," Journal of Business Education, 37 (May, 1962), pp. 322-23.

[26]"Shorthand Tapes Handle Individual Differences," Business Education World, 39 (June, 1959), pp. 16-17.

cost of this equipment, the receiving stations, and the library of tapes was less than $1,000.[27]

The Maine Township High School West in Des Plaines (Illinois) purchased a custom-made installation for about $3,000. This installation was developed by Dr. Russell Hosler of the University of Wisconsin.[28]

The Maine Township High School East in Park Ridge (Illinois) believed so strongly in the worth of shorthand laboratories that they have invested $17,000 in their program. The laboratory itself, with thirty-two multiple listening stations each receiving four-channel dictation, cost $4,600. However, the department spent over $12,000 for salaries for teachers' released time to prepare 9,777 tapes, each providing from 10 to 25 minutes of carefully programmed dictation for first and second-year shorthand.[29]

From these examples, it can be seen that a program can be started at any level of development and can progress into the type of installation desired, or remain constant. Dominant as a determinant of the degree of progress are the wishes of the particular school and the financial resources it wishes to commit to such an endeavor.

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[27]Harwood, op. cit.

[28]O. W. Brown, "Maine Township High School West," Business Education World, 44 (January, 1964), p. 17.

[29]William T. Will, "Maine Township High School East," Business Education World, 44 (January, 1964), pp. 16-17.

Pattern of usage of installations.--Almost as many different patterns of usage for shorthand tape laboratories exist as there are tape laboratories in existence. This is somewhat related to the experiences of those who found themselves associated with the development of language laboratories. Morton, for example, asserted that each language laboratory is in some respects, a unique one--different and individual inasmuch as it is supervised by different people, serving different students, and conceived and engineered by different architects and technicians.[30] This would undoubtedly hold true for shorthand laboratories, as this review of literature indicates.

The time usage factor ranged from 18 minutes per day per student to the other extreme of presenting the entire shorthand lesson on tape with no live instruction. One minimum-usage pattern of a laboratory was practiced by Marting in her "Electronic Center," where her students used the "Center" only 18 minutes a day, two days a week for skill-building procedures.[31]

At the Church College of Hawaii, the department found that it worked successfully to have shorthand students use

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[30]Proceedings of the First Conference on the Role of the Language Laboratory in the Secondary School (unpublished manuscript, University of Michigan Press, Ann Arbor, Michigan, 1961).

[31]Marting, loc. cit.

the language laboratory as their shorthand laboratory once a week for an hour.[32]

In Washington High School in Cedar Rapids (Iowa), individual tapes were made for each day's lesson by the teacher; and the students "take" their homework from the tape before school, or during a study hall.[33]

According to the articles reviewed, many laboratories remain open and available all day as well as for one or two hours at night, so that students can get more independent practice. Also several of the articles indicated that all material used for out-of-class practice was dictated on tapes during regular laboratory sessions.

A typical pattern seemed to be one in which regular instruction was given three times a week and then skill-building practice was correlated in the laboratory for an additional hour each week. However, in almost all of these situations, the laboratories were open many hours a week for independent study by students.

Experimentation prior to selection of installation.--Some schools experimented with several patterns of usage before adopting the method which best suited their students. At San Bernadino (California) High School, the department

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[32]Patricia Z. Hanna, "Shorthand Dictation Laboratories at the College Level," Business Education World, 43 (September, 1962), p. 13.

[33]Alcock, loc. cit.

first ran the recorders continuously for 50-minute periods, but experience proved interval timing to be more effective. A timer was set for five minutes; when it rang, the teacher stopped all recorders and reset the timer for two minutes. During the two-minute periods, the students relaxed, asked questions, and checked progress with each other. The timer was then reset for five minutes. They found that knowledge of an up-coming rest encouraged students to work harder.[34]

An interesting program for tape usage was followed in Auerswald's Accounting and Secretarial School in Seattle, Washington.[35] The beginners at Auerswald's used the tape system as a follow-up lesson review. For example, while working on Lessons 4 and 5, their follow-up tape lesson would be Lessons 1, 2, and 3. This was their first opportunity to write from dictated material at 40 and 60 words per minute. The beginner corrected his tape lesson from the text before submitting it to the teacher. In this way he was taught from the first day to rely on his daily knowledge gain in theory.

The intermediate and advanced students at Auerswald's used the tape laboratory for speed building and transcription

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[34]Joe B. Corrigan, "Select Your Speed for Dictation," Journal of Business Education (November, 1959), pp. 64-65.

[35]Earl W. May, "Auerswald's Accounting and Secretarial School," Business Education, 44 (January, 1964), p. 15.

in office-style dictation. They were graded on three speed levels per tape--60 words per minute for accuracy of outline, 70 words per minute for present level of accurate transcription, and 80 words per minute for push to the next level of transcription.

Students who have had shorthand in other schools and need to review at Auerswald's used Gregg lessons 1-70 on tapes. They submitted their shorthand notebooks daily for correction and comment. Following this pattern, some of Auerswald's review students have rejoined the employment market in two weeks or less.

At Illinois State University, the department set up both an electronic shorthand room and an electronic secretarial skills laboratory so that it was possible for shorthand students to do nearly all of their out-of-class practice from dictation. In this institution, the department felt that the electronic laboratory has proved itself to be of greater utility than the electronic shorthand room. The department found out from electronic engineers that automatically reversible tape recorders, sometimes known as continuous-play equipment, were essential to make the laboratory work in the manner they desired. This continuous-play installation plays for as much as nine hours a day, making it unnecessary for students to handle tapes; this procedure eliminates the need for a teacher to be in the room.

For each tape in the laboratory, there is a laminated preview sheet. On the bulletin board in the practice laboratory are pockets filled with these preview sheets numbered according to the corresponding channel. The department felt that for maximum accommodation to students of all stenography classes, all ten of the channels were needed in both the shorthand room and the secretarial laboratory.[36]

Brigham Young University has an installation which could well be described as the ultimate in use of a shorthand dictation system. In this department, they call the dictation system their "multiple room escalator program." Three to five classrooms are made available for the same periods in the day, and intermediate and advanced shorthand students are grouped by their initial writing and transcription ability. For example, all students working on 80 words per minute are scheduled in one room, all of the 90's in another room, etc. During the semester the students advance as fast and as far as their abilities permit. Each complete class period is taught by recorded instruction--no live instruction. Taped lessons are piped from a central control room to the individual classrooms. A graduate assistant supervises the mechanical and clerical

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[36]Lewis R. Toll, "Roundup of Dictation Labs," Business Education World, 44 (January, 1964), pp. 13-14.

aspects of the program. A separate weekly testing laboratory, at a class period other than the regular class period, was conducted to determine when students would go on to the next group. This was determined by transcription competence from three-minute dictation exercises on unfamiliar material.[37]

Building a tape library.--In most instances, the tapes used in shorthand dictation laboratories consisted of both the commercially prepared Gregg tapes and teacher-prepared tapes. Either of these two types are expensive and their costs should be considered in determining the cost of a shorthand dictation laboratory installation.

At Bowling Green (Ohio) State University, the department devised a method of building up their "teacher-made" tape library at a cost no greater than the price of the tapes themselves. Frequently, a shorthand teacher's actual dictation to a class was taped for future use in the laboratory, thus utilizing to the fullest the dictator's time. Then, too, one of the requirements for the "methods students" in business education was to prepare a certain amount of dictation material on tapes. Last, but not least, the department expected both teachers and graduate assistants to prepare tapes in their spare time.[38]

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[37]Stoddard, loc. cit.

[38]Mearl R. Guthrie, "Bowling Green State University," Business Education World, 44 (January, 1964), pp. 21-22.

At Illinois State University, 100 tapes of "three and five minute takes" were prepared by a member of their faculty. It took two months full time to complete this assignment.[39]

Harwood at Massey College feels that a tape library must have sufficient material so the students do not memorize the letters. He stated that a highly desirable library might contain at least 24-36 hours of dictation, with the greater share of the dictation allocated to the lower end of the speed range.[40]

Kinds of tape.--It was the feeling at Bowling Green (Ohio) State University that cartridge types of tapes have the advantage of being able to be used by students on their own during the day. The department at Bowling Green has found this type of tape to be less troublesome as far as maintenance is concerned.[41]

Massey College reported a strong preference for continuous-play type equipment rather than reel to reel. Each tape, used with this type of equipment, is permanently sealed in a plastic container and once identified, it cannot be inadvertently rewound on some other reel. With this

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[39]Toll, loc. cit.

[40]Harwood, loc. cit.

[41]Guthrie, loc. cit.

type of tape, there is no rewinding and it is virtually unbreakable.[42]

Advantages of a Shorthand Laboratory

The advantages of tape laboratories which were cited in the literature reviewed are as follows:

1. The student can decide what type of practice will do him the most good. (In certain instances this decision is still made by the teacher.)

2. The shorthand laboratory lends itself to the advantages of team teaching. Through this procedure, more experienced teachers can supervise the less experienced.[43]

3. A complete laboratory installation such as the "multiple room escalator program" at Brigham Young University can save the institution money by reducing the number of teachers needed. In the Brigham Young University system, three regular faculty members were required to administer this program whereas eight to ten would have been needed under the traditional system.[44]

4. Homework can be done in school and not at home where the possibility of distraction is greater.

5. Dictation of homework for beginning students tends to help prevent students from drawing outlines.

6. Practice from dictation pushes the student, and in any skill development, the learner makes more rapid advancement when being pushed for short intensive spurts.

7. The teacher saves her voice.

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[42]Harwood, loc. cit.

[43]"Central City Business Institute," Business Education World, 44 (January, 1964), p. 20.

[44]Stoddard, loc. cit.

8. Using tapes for make-up work is much more convenient for both the teacher and the student than the traditional method.

9. Multiple listening stations can make a teacher "Twins--he is team teaching all by himself."[45]

10. When students were allowed to progress at their own rate, their interest increased and their level of retention increased.

11. Every student can be engaged profitably in an activity commensurate with his ability at any one time.[46]

12. Students who can't continue with shorthand can use the laboratory to maintain or increase speed.

13. A laboratory offers various speeds and can offer material of current interest.

14. Work need not stop when the teacher is absent.

15. The teacher can observe and give individual help.

16. The shorthand laboratory gives the teacher time to do research or to work out solutions to students' problems.[47]

17. Tape recorders are becoming so common that students can make tapes for their own use by checking out school tapes and taking them home for re-taping.

18. Specialized dictation can be prepared and offered to accelerated shorthand writers.[48]

After the new multiple-channel system was used in the Vocational and Adult School in Wausau, Wisconsin, their

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[45]"Multiple Listening Stations for Shorthand Practice," International Business Machines School Newsletter, Volume I, No. 2.

[46]Marting, loc. cit.

[47]Hanna, loc. cit.

[48]Eileen Colley, "Warren G. Harding Senior High School," Business Education World, 44 (January, 1964), p. 22.

drop-out rate in shorthand classes decreased tremendously. Of the 18 students who made up the first night-school class using electronic equipment, 14 completed the 20-week course. Before using the system, a typical class of 25 would drop to 3 or 4 students.[49]

Another advantage growing out of the use of tape-laboratory instruction in shorthand is cited by the University of South Florida in Tampa which now schedules shorthand classes only three times a week instead of four times. Standards and evaluation procedures are said to be remaining the same as a result of supplementary instruction of shorthand tapes in a shorthand laboratory.[50]

Disadvantages of a Shorthand Laboratory

The authors of articles cited thus far listed very few disadvantages for tape laboratories. Perhaps the relative newness of this method has some bearing on the discovery of some very real disadvantages. However, William T. Will at Maine Township High School East (where they expended $17,000 for their laboratory installation) does suggest that tape dictation can become dull; therefore, motivation becomes increasingly important. Teachers must

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[49]"Shorthand Tapes Handle Individual Differences," Business Education World, 39 (June, 1959), pp. 16-17.

[50]C. C. Miller and E. Ernest Miller, "Shorthand Dictation Laboratories at the College Level," Business Education World, 43 (September, 1962), pp. 11-12.

create new ways to use this aid, and they must exhibit an enthusiasm for increased effort and harder work, which will become contagious to the students.[51]

Preparation of Personnel for Laboratory Use

The installation of this promising educational tool should be preceded by a careful orientation of staff members in order that they might realize the laboratory's full potential. Also, the willingness of the school to finance an adequate library of programmed magnetic tapes should be established. Given appropriate equipment, the degree of success achieved by the laboratory is determined by the teachers and the tape library.[52]

Elimination of Teachers

It seems to be the general feeling of most of the authors cited thus far that shorthand laboratories should not and would not eliminate the need for shorthand teachers. Installation of a laboratory does not mean total elimination of "live" dictation; such dictation can be divided and combined in the proportion found to be most effective for all students concerned in a particular school.[53]

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[51]Will, loc. cit.

[52]Ibid.

[53]"Central City Business Institute," loc. cit.

It should be pointed out, however, that in a large installation such as the "multiple room escalator program" at Brigham Young University, a goodly number of teaching positions in shorthand were eliminated. In 1958, the Business Education Department had 1,200 students and 13 faculty members; in 1963, they had 2,200 students and 15 faculty members. They specifically point out the fact that tape-recorded instruction is primarily responsible for the relative stability in the number of faculty members during a period in which enrollment increased 80 per cent.[54]

Formally Reported Related Research--Tape Laboratories

As more and more schools installed shorthand laboratories there were more and more studies made concerning the value and advantages of the tape laboratory as an educational tool. Educators were basically interested in discovering whether or not shorthand dictation laboratories produced the end result of equally well trained, better trained or faster trained students. In the studies which have been included in this review of literature, there is no indication of significant differences in achievement by students taught with and without a shorthand laboratory.

In Maine Township High School West, one of the teachers is conducting an experiment with two groups--one in a regular

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[54]Stoddard, loc. cit.

classroom and one in a tape laboratory. The classes have been or will be equalized on the basis of Intelligence Quotients, English grades, and a composite percentile.[55]

Lensing conducted a study with 145 second semester shorthand students at two high schools in Wisconsin. A comparison was made of terminal achievement in speed resulting from electronic dictation and live dictation. Three teachers taught both a control class and an experimental class. Achievement was measured by taped dictation tests at six-week intervals. Subsequent analysis showed insignificant achievement differences among the groups.[56]

Crandall undertook a study involving control and experimental groups using the same text, lessons, homework, and with the same instructor. There were four groups involved; one control and three experimental groups. The variables were as follows:

1. Control group.--This group was taught according to the outline in the Teacher's Handbook with new outlines being introduced as the teacher wrote them on the board.

2. Experimental group one.--New outlines were introduced by illustrations in a special notebook. On blank lines below, the students wrote as they heard the instructor say the words. All of the class instruction was recorded on tape.

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[55]Brown, loc. cit.

[56]Ellen L. Lensing, "Recorded Multiple-Challel Dictation for Shorthand Speed Development," Journal of Business Education, 37 (May, 1962), p. 339.

3. Experimental group two.--The tapes provided class instruction.

4. Experimental group three.--The tapes alone provided class instruction; after the tenth lesson, the instructor left the classroom and returned later only for five testing lessons.[57]

There was no significant difference in the groups as to point average. From the final examination consisting of transcribing from shorthand plate in the text for three minutes, there was no significant difference in the achievement of the groups.[58]

A study made by Waldeck which was concerned with aids, materials, and devices for use in teaching shorthand, cited a series of recommendations about practices considered to be suitable for use in the teaching of shorthand. The study consisted of a compilation of comments and suggestions from numerous articles written about shorthand teaching methodology. Even though this study was written in 1953, the only reference to the use of recorded dictation as a mechanical teaching aid in shorthand that is included suggests that wire recorders could be used for dictation and that phonograph records could be used for playing songs, the words of which students could write in shorthand. The study

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[57]Lars G. Crandall, "An Experimental Study in Teaching Shorthand Using Tapes, Text and Special Notebooks," Journal of Business Education (February, 1962), p. 201.

[58]Ibid.

contains no reference to research conducted which involved the use of a shorthand laboratory.[59]

Louis Leslie, in a booklet entitled, "Tape Recording--A New and Basic Teaching Aid in Business Education," explored some of the promises for the use of tape-recorded dictation material for speeding up the student's learning process in shorthand. This work was written in conjunction with Minnesota Mining and Manufacturing Company--a large producer of tape-type materials. It is important to the current study, of which this review is a portion, to note the fact that Leslie's book was written in 1953. This publication date fixes in time what may well be the embryotic stages of development for this recently adopted teaching technique in shorthand.[60]

Taylor developed programmed materials and tapes for use in the teaching of Gregg Shorthand Simplified. It was the purpose of her study to determine whether or not students utilizing programmed materials learned shorthand significantly better than those who did not. The materials were designed for use in beginning shorthand classes. She utilized one control group and two experimental groups; and, at the conclusion of her research, accepted her hypothesis

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[59]Ruth Patterson Waldeck, "Aids, Devices, and Enrichment Materials for Teaching Gregg Shorthand and Transcription," (unpublished Master's thesis, Northeast Missouri State Teachers College, 1953), pp. 59-62.

[60]Louis A. Leslie, Tape Recording--A New and Basic Teaching Aid in Business Education, Minnesota Mining and

that there would be no significant difference in performance at the .05 level between the groups, as measured by final achievement. She did discover, however, that students using programmed materials attained a slightly better performance (not statistically significant, however) than those who did not. Students with as much as 36 weeks of prior shorthand experience were included in the study, and different teachers were used to teach the classes. Taylor recommended, because of the standardized grading periods at the University of Tennessee, that students should be paced in the use of programmed materials to permit the teacher to bring all students together at certain points for evaluation purposes.[61]

Palmer was concerned with both predicting success in elementary shorthand and with identifying possible differences in performance between three groups of students who were being taught shorthand in two different ways. She prepared tapes for use in a multiple-channel dictation laboratory and proceded to test her hypotheses in a controlled-type experimental setting. Her findings indicated that cumulative grade point averages excluding English and prior shorthand

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Manufacturing Company, St. Paul, Minnesota, as cited by Ruth Patterson Waldeck in "Aids, Devices, and Enrichment Materials for Teaching Gregg Shorthand and Transcription," (unpublished Master's thesis, Northeast Missouri State Teachers College, 1953), p. 10.

[61]Helen Williams Taylor, "Development and Evaluation of Programmed Materials in the Presentation of Theory in Beginning Shorthand Classes," (unpublished Doctor's dissertation, The University of Tennessee, 1963) pp. 210-15.

and the Byer's Aptitude Test of Phonetic Perception, although not significant predictors of success in shorthand, were the ones which recorded the highest correlation with success. She also discovered that there was no significant difference in student performance regardless of instructional method utilized. In this study, five members of the control group had prior shorthand experience while one member of one of the experimental groups also had prior shorthand experience.[62]

From these studies one gathers that there is a very real need for additional research in the area of shorthand instruction involving the use of tape-laboratory equipment. This contention is supported by the fact that in the research reviewed no conclusive evidence appeared to the effect that tape-laboratory types of presentation in shorthand instruction had produced significantly better student achievement than had conventional instructional techniques.

Formally Reported Related Research--Shorthand Prognosis

The studies and articles reviewed in this section of the chapter were restricted to available examples of prognostic studies designed to identify and measure predictive criteria for use in placing students in shorthand. Although numerous studies were requested through the inter-library loan

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[62]Elise Douglas Palmer, "Development and Evaluation of Multiple-Channel Dictation Tapes in Beginning Shorthand Classes," (unpublished Doctor's dissertation, The University of Tennessee, 1963), pp. 180-90.

facilities at Michigan State University, several colleges and universities had already established policies of not circulating studies from certain years and of certain subject areas. Therefore, the reviews contained in this section of the paper refer only to those studies which were available and, therefore, represent as comprehensive a search as it was possible to make under existing circumstances.

The information derived from the review of these studies is important to this current study because of their implications for prognosis in shorthand. This fact is especially significant since one of the hypotheses of this study was that there would not be a correlation between raw scores achieved on the Michigan State University Entrance Test Battery and success in shorthand as was reflected by terminal grades.

Hunt conducted a study involving 400 students at the University of Tennessee in beginning shorthand and found that a General Aptitude Test Percentile Rank was the best predictor of success in shorthand but that it, too, was not significant statistically. She also attempted to predict success on the basis of high-school average, college average, first-year English average, E. R. C. Stenographic Aptitude Test Scores, hours of college credit, and English Placement Test Percentile rank but found that none of these factors were accurate enough to warrant labeling them as significant. On the basis

of her findings, Hunt recommended that the E. R. C. Stenographic Aptitude Test not be used for predictive purposes and that the number of college credits taken prior to shorthand not be considered as a significant indicator of a student's probable achievement in shorthand.[63]

Jones attempted to predict shorthand success at the University of Tennessee by using E. R. C. Stenographic Aptitude Test Scores, age in months, general aptitude score, reading and transcription speed after one week's instruction in shorthand, average grade in English composition, and average grade in business subjects prior to enrollment in shorthand. The highest correlation with success was recorded for prior shorthand achievement but even this was not statistically significant. On the basis of these results, she recommended that age and grade average in prior business subjects not be considered as predictive factors as far as shorthand prognosis is concerned.[64]

Prior to the studies of Hunt and Jones, Anderson compiled an abstract of research in shorthand and transcription which pointed out that prior to 1946, 44 research studies in shorthand and transcription had been made in an

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[63]Lillian Alice Hunt, "The Use of the E. R. C. Stenographic Aptitude Test and Other Selected Factors for Prediction of Achievement in First-Year Shorthand," (unpublished Master's thesis, The University of Tennessee, 1954), p. 79.

[64]Lena Ruth Jones, "Prognosis of Shorthand Achievement at the University Level," (unpublished Master's thesis, The University of Tennessee, 1951).

effort to predict success in this area. None of these studies had been able to identify a single measure of prediction of success in shorthand for individual prognosis.[65]

Lang reported the results of a study at the University of Missouri during 1958-59 which was designed to measure the relationship between aptitude for modern foreign languages, vocabulary, linguistic ability, general scholastic aptitude, and achievement in shorthand and transcription at the elementary level. This study involved 90 students and the results were based on the highest rate of student recorded shorthand material dictated for five minute periods and from which transcripts of a minimum accuracy of 95 per cent were prepared. She was unable to identify any predictor of success which was accurate enough to be relied upon. The author recommends, however, that other shorthand teachers conduct similar studies in order to assist in identifying factors which are highly predictive of shorthand achievement.[66]

Selden, writing about criteria for the selection of stenographic students, notes that at least three tests have been designed as prognostic devices to determine stenographic

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[65]Ruth I. Anderson, "Abstracts of Research in Shorthand and Transcription," (unpublished Doctor's dissertation, Indiana University, 1946), pp. 809, 820.

[66]Mary Jane Lang, "Predicting Elementary Shorthand Achievement," The Balance Sheet, Volume XLV (March, 1964), pp. 105-106.

ability but that the relationship between the test scores and achievement have been too low to merit their acceptance. He concludes that although the coefficient of correlation between I.Q. and success in shorthand is only .45, that a student should be informed that his chances for success in shorthand are poor unless his I.Q. is at least 95. He states that prior studies have indicated that between 80 and 90 per cent of pupils with I.Q.'s below 100 drop out of shorthand sometime during the two year period. He further states that achievement in grammar is the most reliable tool for prognosis when counseling pupils about taking shorthand.[67]

Pauk attempted to compare the predictive value of the Turse Prognostic Test of shorthand ability with other measures of prediction. He wanted to see whether or not the four verbal subtests of the Turse test predicted shorthand success better than the three sub tests designed to measure the mechanics of shorthand. He also wanted to see whether or not some of the verbal subtests, either individually or in combination, predict shorthand success as well as the entire Turse Test. In addition he looked at the predictive value for shorthand of the linguistic ability (L-Score) on the A.C.E. Psychological Examination for High School Students. He reported that when the four verbal subtests are combined, they predict shorthand success far better than do the combined three

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[67]William Selden, "Criteria for Selection of Steno-Graphic Students," Journal of Business Education (December, 1961), pp. 105-06.

mechanics of shorthand subtests (.66 vs. .34). He also reported that the verbal subtests individually and in combination predict shorthand success with the same magnitude (.56 to .66) as the total Turse Test (.63 vs. .63). Even the L-Score of the A.C.E. Test predicts shorthand success as well as the total Turse Test (.63 vs. .63). Even the L-Score of the A.C.E. Test predicts shorthand success as well as the total Turse Test (.63 vs. .63).[68]

Whittle reported on efforts expended at the University of Texas to develop information which would increase the accuracy with which probable success in shorthand could be predicted. Sixty students with no prior shorthand were involved and all were taught by the same method. The assumption was made that the terminal grade earned would be an adequate measure of achievement. Achievement was compared with high school grades, attendance, quarter rank in high school class, University of Texas Admission Test Scores, English placement test scores, reasons for selection of the subject, and I.Q. Correlation coefficients were computed between shorthand grades and the variables mentioned. The admission test demonstrated a correlation coefficient of .759 with shorthand achievement and general school achievement (high school grade point average) had a correlation of .586 with achievement in shorthand. Students who ranked

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[68]Walter Pauk, "What's the Best Way to Predict Success in Shorthand," Business Education World, 43 (April, 1963), pp. 7-8.

in the upper two quartiles of their high school classes did better than those who did not.[69]

Sanders conducted a study which involved an analysis of the relationship between A.C.E. scores, years of shorthand in high school and achievement in shorthand at the collegiate level. She discovered that there was no relationship between what was achieved in shorthand classes in high school and what was achieved later. She also discovered that there was no relationship between years of prior shorthand experience and A.C.E. percentile rank. However, she did discover a significant relationship between the A.C.E. percentile rank and achievement in college shorthand classes.[70]

Kirk conducted a study in 1942 to determine the relationship, if any, between performance on a general intelligence test and success in shorthand. In this study, 210 high school pupils were used as subjects and ten teachers agreed to administer mental and shorthand tests to them. All were taught the same type of shorthand and all teachers used the same rules for grading the papers. The Otis Group Intelligence Scale, Advanced Examination, Form B, was used for

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[69]Marie Whittle, "Do We Have Criteria for Predicting Shorthand Success," Business Education Forum, 16 (March, 1962), pp. 25-26.

[70]Celene Honeycut Sanders, "A Study of the Relationship Between Certain Radford College Students' A.C.E. Scores, Years of Shorthand in High School, and Achievement in Shorthand," (unpublished Master's thesis, Virginia Polytechnic Institute, 1961), pp. 35-43.

beginning shorthand students. The shorthand criterion test consisted of two test letters of 116 words and 120 words respectively. They were dictated to the students at approximately fifty words per minute and were checked by both students and teachers. The Gregg Shorthand Rules were used to check all the papers to maintain equality. Kirk found that the correlations obtained in his study between intelligence ratings and scores in shorthand were negligible (.251 ± .089).[71]

Hargrave studied high school students in Decatur and Argenta, Illinois, who wrote one or more of the following tests: Otis Self-Administering Test of Mental Ability, Cross English Test, Detroit Clerical Aptitudes Examination, and the Junior Shorthand Test. The latter of these was chosen because it measured shorthand ability at the end of the first year of shorthand by testing the correct theory of forming shorthand outlines, speed in taking dictation, and accuracy in reading notes. It placed equal emphasis upon theory and upon ability to take dictation and read the notes.

Correlations between the clerical aptitudes test and shorthand achievement were based on 146 cases, between English achievement and achievement in shorthand on 147 cases, and the correlation between mental ability and shorthand

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[71]Harry A. Kirk, "The Relation Between Intelligence Rating and Achievement in Shorthand and Typing," (unpublished Master's thesis, Kent State University, Ohio, 1942), pp. 17, 19, 25, 27, 34.

achievement on 147 cases. The Pearson Product-Moment formula was used in computing the coefficients of correlation in the study. The resultant correlations were mental ability and shorthand achievement (.3288 ± .0496), English Achievement and shorthand achievement (.5179 ± .0407), and Clerical aptitude and shorthand achievement (.3246 ± .0499). Hargrave concluded that the coefficient of correlation between the clerical aptitude test and shorthand aptitude test was only 5 per cent better than chance, and was thus not effective as a predictor. The coefficient of correlation between mental ability and shorthand achievement was not substantial enough to indicate accuracy in prediction using this criterion.[72]

Dennis attempted to predict success in shorthand in Dayton, Ohio, with a group of 64 high school students comprised of 29 sophomores, 25 juniors, and 10 seniors. All the students were enrolled in her shorthand classes. Data used to compare various student aptitudes with subsequent achievement in shorthand were English grades, scholastic achievement grades, Minnesota Vocational Test for Clerical Workers, the Hoke Prognostic Test of Stenographic Ability, and the Rollinson Power-Achievement Tests in Gregg Shorthand.

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[72]Marjorie I. Hargrave, "The Relationship Between Achievement in Shorthand, Intelligence, Clerical Aptitude, and Achievement in English," (unpublished Master's thesis, State University of Iowa, 1942), pp. 5-13.

Students were told that the tests, which were given at various intervals, were used by some large business enterprises and colleges for selection of students and workers. Dennis concluded that the Hoke Prognostic Test and the Minnesota Vocational Test indicated a small probability of the tests being worth while but that scholastic average was of high value in prediction of shorthand success (.85, 153, .52) with their respective errors (.10, .08, .15). English average was an even better predictor with coefficients of (.81, .70, .54) with their respective errors (.04, .07, .14). Dennis indicated that intelligence quotients were poor indicators of success or failure in shorthand; however, used with other measures they might be prognostic indices of success or failure.[73]

Goodenow reviewed prior efforts in shorthand prognosis which had attempted to predict shorthand achievement. As a prelude to her review Goodenow quotes Louis Leslie on prognosis as follows:

> The only valid test is a pre-determined transcription test in which there is close control over the amount of material dictated, the speed at which it is dictated, the speed of transcription required. . . . There are other minor factors involved, but these five at least must be rigidly controlled if any prognostic test is to give us a valuable predictive effect.[74]

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[73]Ester Dennis, "A Study of Available Measures of Prognosticating Success in Shorthand of High School Students," (unpublished Master's thesis, Wittenberg College, Wittenberg, Kansas, no date given in paper), pp. 10- 39.

[74]Jean E. Goodenow, "A Review of Professional Literature Relating to Stenographic Prognosis," (unpublished Master's thesis, State University of Iowa, 1948), p. 34.

Goodnow concluded that on the basis of the studies she reviewed, that English Achievement Test results and school English marks have a definite relationship to success in shorthand but that the error of prediction was too high for them to be used as a sole criterion for prognosis. She also concluded from reviewing the prognostic efforts made before 1948 that foreign language success is related to shorthand success but not in sufficient degree to make it a reliable predictor of success in beginning shorthand. She also indicated that average school marks are not dependable as an indication of shorthand success. Goodenow states that personality and interest are significant in the success of shorthand students but that they are difficult to measure. She indicated that other tests or traits which were investigated included reading comprehension, penmanship rate and quality, spelling memory, vocabulary, age, ability to follow directions, motor action, and general clerical ability but that none was found to be an accurate predictor of potential success in beginning shorthand.

Blacker completed a study at the University of Wyoming which involved 53 high school students in the Laramie High School who enrolled for beginning shorthand. The shorthand criterion used was the average of grades of theory tests given throughout the year. These grades were correlated with the aptitude tests which were the Turse Shorthand Aptitude Test, the Otis Self-Administering Test of Mental

Ability, and the Iowa Silent Reading Test. Mean scores for above-average and below-average students were compared for the three tests and the differences were adjudged to be significant, indicating that the tests should be of value in distinguishing between above-average and below-average students. The correlation coefficient between the total scores on the Turse Shorthand Aptitude Test and shorthand achievement was .58; between the sum of the scores on tests 2, 3, 5, and 7 of the Turse Shorthand Aptitude Test and shorthand achievement was .61. The Otis Test of Mental Ability and shorthand achievement showed a correlation of .38 and the Iowa Silent Reading Test and shorthand achievement showed a correlation of .48. Blacker recommended that the findings of this study be viewed in light of the fact that the number of subjects was limited. As such, she suggested that the findings be considered merely as indicative of what a larger study might discover.[75]

Wright conducted a study in Connecticut the purposes of which were (1) to survey recent literature relating to shorthand prognosis (1940-1962), and (2) to evaluate the Byers' First-Year Shorthand Aptitude Tests by administering them to a group of potential shorthand students at the high

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[75]Margaret S. Blacker, "The Use of Certain Tests in the Prediction of Success in High-School Shorthand," (unpublished Master's thesis, University of Wyoming, Larmaie, 1951), pp. 52-56.

school level. The results of the Byers' Tests were compared with student achievement in shorthand after one year of instruction.

The achievement standards set by Wright were similar to those used by Byers in developing his tests. The achievement test consisted of seven dictated business letters, ranging in speed from 45 to 75 words per minute and each taking 2 1/2 minutes to dictate. Complete data were available for 36 students. She concluded that because the correlations obtained between the Byers' Tests and shorthand achievement were .3737 ± .1511 that they were not accurate enough as predictors of shorthand ability for use in the school system in which she conducted the experiment. She did find, however, that a correlation of .6822 ± .0940 was produced by comparing the Phonetic Percaption Subtest of Byers' Test with shorthand achievement and that there was a higher correlation between these two items than there was between any other two measures in the study. Wright restricted her review of recent literature to prognostic studies which were concerned with prognosis at the high school level. None of the studies cited produced correlations of sufficient stature to warrant their being labeled as accurate predictors of shorthand success.[76]

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[76]Ellen M. Wright, "A Summary of Recent (1940-1962), Selected Findings in Shorthand Prognosis with Specific Reference to the Use of the Byers' First-Year Shorthand Aptitude Tests at the High School in Southington, Connecticut," (unpublished Master's thesis, Central Connecticut State College, New Britain, Connecticut, 1963), pp. 38-40.

Anderson conducted a study which consisted of reviewing 298 research reports, of which 235 were theses, dissertations and formal reports, and found that 44 of these formal research studies were devoted to prognosis but that none had been able to identify a single predictor of success in shorthand. She also indicated that several investigations revealed low correlations between intelligence scores and shorthand marks. The Hoke Prognostic Test of Stenographic Ability failed to share a high correlation with shorthand achievement. And, investigators did not agree upon the predictive value of the Turse Shorthand Aptitude Test. Anderson points out that "there is little agreement in the results obtained by persons studying the problem of prognosis in shorthand, but that some have found English marks, scholastic achievement, and foreign language marks to be among the best measures yet selected to predict success or failure in shorthand.[77]

Frink conducted a similar study to Anderson's but chose to cover the years 1946-57. She analyzed and synthesized the findings of theses, reports of research from professional journals, and monographs, professional literature from publications, and comprehensive notes taken from 258

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[77]Ruth I. Anderson, "An Analysis and Classification of Research in Shorthand and Transcription," (unpublished Doctor's dissertation, Indiana University, 1946) as cited by Ruth I Anderson in an article entitled, "An Analysis and Classification of Research in Shorthand and Transcription," The National Business Education Quarterly, 16 (October, 1947) p. 51.

professional literature references. All items reviewed dealt with shorthand and/or transcription.[78]

She also indicated that 17 of the studies she reviewed dealt specifically with determinants of success or failure in shorthand and transcription, and that of all the studies she reviewed, only three were experimental studies conducted between the years 1945 to 1955 out of a total of 117 studies. Frink further stated that the criterion for achievement of both beginning shorthand and transcription was the final grade for the course. In summarizing her analysis of those studies dealing with attempts to prognosticate success in beginning shorthand and transcription, Frink made the following statements:

> ...by far the greatest number of studies has been conducted on prognosis, or predictive measures, in which attempts were made to isolate factors which would predict with a fairly high degree of accuracy and prior to study the level of achievement in shorthand which students would attain.
>
> Two reports indicated intelligence was a better predictor of failure than of average or superior achievement. However, there was general agreement that intelligence is not a good predictor of success in beginning shorthand, although it is as closely related to shorthand as to most academic subjects. One writer expressed the belief that the most important factor is not the amount of intelligence which a student possesses but the extent to which the ability possessed is used.

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[78]Inez Frink, "A Comprehensive Analysis and Synthesis of Research and Thought Pertaining to Shorthand and Transcription, 1946-1957," (unpublished Doctor's dissertation, Indiana University, 1961) p. 28.

> The E.R.C. Shorthand Aptitude Test was found to have little predictive value as judged from the low correlation coefficients obtained. The Hoke Prognostic Test was reported as practically useless as a single predictor and there was disagreement regarding the value of the Turse Shorthand Aptitude Test. In general, it is believed that none of the shorthand prognostic tests can be used as a single predictor.
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> English grades were found to not show a sufficiently high degree of relationship for individual prediction in shorthand.[79]

Much of what has been reported concerning prognostic efforts in the area of shorthand learning since Anderson's review of the literature in 1947 and Frink's review of the literature in 1957 has been largely devoted to local types of research studies utilizing various combinations of tests which have been purported to contain elements or measures which were supposedly indicative of potential ability in shorthand. Most of these studies have been done at the Master's level and a few of them are not available for circulation. However, those that have been available appear to be somewhat representative of those reported in professional journals because of the similar nature of the criteria used for predictive purposes. None of those which were reviewed reported the use of any new criterion for evaluation nor did they report the discovery of any accurate predictors of success in shorthand. In an effort to provide breadth to the limited number of prognostic

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[79] Ibid., p. 37.

studies available on an inter-university loan basis, individual studies were requested from thesis directors at various schools. A review of these studies, although limited in number, is contained in this chapter.

Veon conducted a study which was designed to determine the relationship of learning factors found in certain foreign-language aptitude tests to the prediction of shorthand achievement in college. The investigator attempted to find a group of tests or a single test in the area of foreign-language prognosis which would give a higher prediction in shorthand than had been previously reported in research studies. The tests selected for this investigation included: (1) American Council on Education Psychological Examination for College Freshmen, 1944 edition, (2) Iowa Placement Examination, New Series, Revised, Foreign Language Prognosis Test, Form A, (3) Luria-Orleans Modern Language Prognosis Test, and (4) Carmichael's Shorthand Learning Test, Semester I (used as the shorthand criterion of achievement). The tests were administered to 299 elementary shorthand students at The George Washington University during the academic years 1945-46, 1946-47, and 1946-48.

Veon found that the Iowa Placement Examinations, Foreign Language Aptitude Test, Form M, yielded a correlation of .6374 with the shorthand criterion test. The Symond's Foreign Language Prognosis Test provided a higher correlation

with the shorthand criterion, .7192, than that obtained on the Iowa test (.6374). A fairly low correlation was obtained between the Luria-Orleans Modern Language Prognosis Test and the shorthand criterion test, .3165.

The American Council on Education Psychological Examination for College Freshmen, 1944 edition, correlated .5102 with the shorthand criterion. In addition, low correlations were obtained between chronological age and the various tests administered in the study: with the shorthand criterion, .2024; with the ACE test, .2947; with the Iowa test, .2643; with the Symond's test, .2134; and with the Luria-Orleans test, .1011. The multiple correlation was found to be .5421 which seemed to indicate that the combination of tests used in the study was not particularly effective in predicting success in shorthand.[80]

Louis Leslie stated what he believed were some basic concepts concerning prognostication by researchers in the shorthand field. His thesis is as follows:

> The problem in prognosis for shorthand (not for transcription) is to determine on the one hand the intensity of willingness and extent of co-operation that may be expected in the learning of shorthand, and on the other hand the general mental ability and the work and studyhabits of the prospective pupil. . . .It is also true, as previously stated,

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[80]Dorothy Helene Veon, "The Relationship of Learning Factors Found in Certain Modern Foreign-Language Aptitude Tests to the Prediction of Shorthand Achievement in College," (unpublished Doctor's dissertation, George Washington University, 1948) as cited by Veon in the 1950 Delta Pi Epsilon Research Award Series, Robert A. Lowry, Editor, pp. 66-69.

> that no willing co-operative high school pupil, properly taught, can fail to learn shorthand. It is also true, however, that there are degrees of success of failure. All other things being equal (such as intensity of desire and extent of co-operation), the student with the greater degree of general ability and with the better study and work habits will achieve a higher degree of skill and success than the student with a lower general mental ability and with less well-developed work habits.[81]

Missling conducted a study at Shawano, Wisconsin High School involving two groups of shorthand students. The first group consisted of twenty students who were given the Turse Shorthand Aptitude Test prior to enrolling in shorthand. Upon completion of one year of shorthand, this group was analyzed again to determine whether or not the test was valid in predicting success. Correlations were made to compare individual parts of the Turse Shorthand Aptitude Test with first-year achievement and also to compare achievement in shorthand with performance on the total test. Word sense was the factor on the Turse Test having the greatest bearing on success in first-year shorthand. A correlation of .51 was found between first-year achievement and the total scores on the Turse Test. The second group consisted of 36 students who had completed only a year of shorthand. They were also tested with the Turse Test and the total test correlation with success in shorthand was .54. In still another part of this study, she

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[81]Louis A. Leslie, Methods of Teaching Gregg Shorthand, Gregg Publishing Division, McGraw-Hill Book Company, Inc., New York, 1953, p. 287.

compared achievement in first and second year shorthand with the Henmon Nelson Test of Mental Ability, grades in all high school courses excluding English, English grades, and typewriting grades. The correlation between achievement for each year and average high school grades was the greatest in both instances. The achievement of the second class at the close of a first year of shorthand was also correlated with the scores on the Henmon Nelson Test, average high school grades excluding English, English grades, and typewriting grades. Average high school grades showed the highest correlation. Class 1 showed a correlation of .74 in comparison with .73 for class 2.

Missling concluded that the study indicated that predictions made from total scores on the Turse Test seem fairly reliable. She also indicated that correlations show that all high school grades are the greatest factor in determining success of a shorthand student. (.74 for the first class and .73 for the second class.)[82]

McFarlane did a study in Wisconsin at La Crosse, involving the use of the E.R.C. Stenographic Aptitude Test for prediction in shorthand. Two groups of students were involved; group I consisted of 66 eleventh and twelfth-grade students who had already studied shorthand for one

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[82]Lorraine Missling, "Prognostic Testing in Shorthand," (unpublished Seminar Report, University of Wisconsin, 1954), pp. 36-39.

year, group II consisted of 67 students who studied first-year shorthand for one year. Both groups were given the E.R.C. Stenographic Aptitude Test before they started to study shorthand. On the basis of the total score of this test a prediction was made for each student. Essentially, they were assigned the following levels of probability for success: excellent, good, fair, and poor. A second prediction was made for each student in both groups on the basis of the average of the percentile ranks the student received on the five separate parts of the E.R.C. test. Once again, the categories were: excellent, good, fair, and poor. A third set of predictions were based on typewriting grades, average of ninth and tenth grade English grades, average of all grades in ninth and tenth grades except English and typewriting, I.Q. and reading level score from the Progressive Reading Test administered in grade ten. McFarlane concludes from her research that the E.R.C. test would be a better predictor of a student's success in first-year shorthand than in the second. She concludes further that the E.R.C. test appeared to have some value in predicting shorthand success, but that the total scores or the average of percentile ranks on the parts of the test do not give evidence of being a satisfactory prognostic instrument when used alone. A combination of factors, including the typewriting grade, proved to be a much more satisfactory method of predicting shorthand success than

either the E.R.C. Test total score or the average of the percentile ranks on the E.R.C. test when used singly. However, even this combination of factors approach did not achieve statistically significant reliability as a predictor of success in shorthand.[83]

Byers constructed an aptitude test for use in predicting success in shorthand. He attempted to use tests that he hoped would measure the following items which he believed were indicative of success in shorthand:

1. proportion readiness
2. phonetic perception
3. hand dexterity
4. observation aptitude
5. retention ability
6. pattern from parts
7. mechanics of English
8. academic aptitude
9. motivation and interest[84]

Buyers was able to show a multiple correlation of .76 between proposed aptitude tests and results on the semester shorthand accomplishment test. However, he contends that some teachers are consistently more successful than are others. High correlations probably depend, according to Byers, as much on the type and quality of the teaching of shorthand as they do on any intrinsic relationship

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[83]Ruth M. McFarlane, "A Study of Shorthand Prognosis at Central High School, La Crosse, Wisconsin," (unpublished Master's thesis, University of Wisconsin, 1954), p. 33.

[84]Edward E. Byers, "Construction of Tests Predictive of Success in First Year Shorthand," (unpublished Doctor's dissertation, Boston University, 1958), p. 36.

existing between the learning process involved in shorthand and the types of activities represented in aptitude tests.[85]

The studies cited in the preceding section of this review of literature pertain directly to prior prognostic efforts in shorthand research. Although some appear to be more sophisticated in their construction, there is ample reason to believe that none achieved its intended purpose; that of isolating and identifying a single predictor of probable success in shorthand. Therefore, it would appear reasonable to assume that additional effort should be expended in an attempt to identify and isolate significantly accurate predictors of shorthand success.

Attitudes Toward Shorthand Laboratories

The following are selected examples of attitudes expressed by students and staff members about their experiences with tape laboratories in taking and teaching shorthand. Although not comprehensive in nature, these examples represent common statements made by student participants when they were asked to enumerate their reactions to this type of instruction.

Students.--Day-school students at Massey College liked "live dictation" better than electronic dictation, but they recognized taped instruction as a worth-while supplement.

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[85] Ibid., p. 83.

High school students at the same college felt that the flexibility offered each student in the tape laboratory was especially attractive and an important timesaver in individual progress.[86]

Palmer found that students preferred the seclusion and privacy afforded them by the individual booths used in her experiment. Sample comments from the students in Palmer's study indicated that the students thought the private booths to be "100 per cent better." Auxiliary statements by still other students supported this contention almost completely.[87]

Teachers.--Massey College staff members generally agreed that students have moved along faster in their speed building than was the case prior to the use of the laboratory.[88]

NABTE Survey

In an effort to provide yet another source of information about the status of tape-laboratory instruction in business education, a questionnaire-type survey was made of those National Association of Business Teacher Education Institutions which were listed in the 1963 issue of the

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[86]Harwood, loc. cit.

[87]Palmer, op. cit., p. 258.

[88]Harwood, loc. cit.

National Business Education Quarterly as active members.[89] This group of institutions was selected because of their important role in the preparation of future business teachers. In addition, it was felt that they would be in a strategic position to describe unreported types of research being conducted at their own institutions or in other institutions within their respective states as well as any studies that might have been overlooked in reviewing related research. A copy of the questionnaire used appears in the Appendix.

Purposes of the NABTE survey.--The purpose of this survey was three-fold: (1) to determine the number of business teacher-training institutions which were members of this group that utilized a tape-laboratory approach to teaching shorthand; (2) to determine the number of these institutions which had, and utilized, traditional language-laboratories for shorthand instruction; and (3) to identify the amount and kinds of research being conducted involving the use of these language laboratories in the teaching of shorthand.

A total of 289 NABTE Institutions were included in this survey. Sixty per cent of this total, or 175, responded by returning the questionnaire. The results of the survey indicated that of those responding 54 have tape laboratories

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[89] National Business Education Quarterly, John L. Rowe, Editor, 32 (December, 1963), pp. 73-77.

designed and used for teaching shorthand. This same group reported that there are 149 language laboratories in their institutions, eight of which are also used to teach shorthand. In almost every instance in which an institution possessed a shorthand laboratory, that institution also had a foreign language laboratory installation. Eleven responding institutions indicated that they had conducted some type of research involving the use of their installation but did not specify the nature of this research nor did they cite the author. Of these, seven were listed as staff studies, one was listed as a Master's study, and three were listed as doctoral studies.

When they were asked if they personally knew of any shorthand research being conducted which involved a tape laboratory in their state, 150 replied no, 15 replied yes, and 10 did not respond. Many of those who replied yes to this question cited research being conducted outside of their own state which caused a high degree of duplication. For example, several of those who responded yes named an institution that had already been named by others who had also responded yes to this question. When these citations were examined, it was obvious that all but a few were studies which had already been reviewed for this study. For the remaining few, personal letters were sent to the institution and/or party named as being affiliated with shorthand tape-laboratory research. None of these resulted

in confirmation that they were, in fact, conducting formal research but that they, in some instances, were considering it.

One respondent replied that his institution planned to use its foreign language facilities next year while still another respondent stated that his institution would have a new shorthand tape laboratory next year. Only one institution reported that it did not teach shorthand.

Summary

In addition to the references cited in the review of literature proper and other sections of this study, 43 other articles were analyzed to determine their relationship, if any, to this study. In each case, the judgment was made that although many articles were written about some phase of instruction or method in shorthand that appeared to be closely related to the study, they did not, in fact, possess related information of significant stature to warrant their inclusion.

Much of that which was found to be pertinent to this study appears to have been written largely in the past five years. The articles written prior to this time deal, for the most part, with prognostic efforts and still others herald the coming use of tape laboratories as a teaching device in shorthand. Formal research studies involving tape laboratories, which have been reported, appeared exclusively during the era from 1959 to 1964.

It appears that the majority of the materials written about tape shorthand laboratories might be logically classified into three distinct categories: (1) historical influences of language laboratories, (2) early attempts at exploration and usage of pre-cursory types of installations, and (3) modern usage and experimental exploration of possible uses and applications of tayp-laboratory facilities.

Although much of that which was written about the language-laboratory era was available for review, such was not always the case in the last two categories. The advent of microfilming of formal research studies caused some colleges and universities to remove earlier works from circulation, thus making it literally impossible for researchers at other institutions to obtain copies of these studies for review. This fact was especially true with master's theses which were written about prognostic experiments in an earlier era. However, in each such case, comparable studies were available to serve as examples of prior efforts in prognosis.

This review of literature revealed the fact that there was a very real need for experimental research in the area of shorthand learning and also that although many studies had been completed which included attempts to identify predictors of success in the study of shorthand, none had been successful in isolating a single accurate predictor. This review of literature was also important

to this study in that it revealed a definite lack of formally reported research which dealt with the use of multi-channel shorthand tape laboratories and their impact upon the teaching-learning situation in shorthand.

CHAPTER III

PROCEDURE

Course Offerings

For the winter term 1963-64, Michigan State University offered two sections of beginning Gregg shorthand. Three sections had originally been scheduled, but Section One was dropped prior to registration. Section Two was scheduled to meet in Room 304 Berkey Hall and Section Three was scheduled to meet in 311 Berkey Hall. Both sections were scheduled to meet on Monday, Tuesday, Thursday, and Friday of each week and both were afternoon sections. Section Two met at 1 p.m. and Section Three met at 3 p.m.

Registration

No reference was made in the registration materials to denote either beginning shorthand section as being other than the typical, conventional, beginning shorthand course offered each term by Michigan State University. In addition, no indication was made that either or both sections would be taught the new Diamond Jubilee Series of beginning Gregg shorthand.

Students who elected to take beginning Gregg shorthand during the winter term selected their courses without knowledge of the significance of their choice. Each student

prepared a program that consisted of a series of subjects which included either Section Two or Section Three of beginning Gregg shorthand. Advisors did not have prior knowledge of which section was the experimental class and which section was the control class.

Randomization of Student Choice of Section

It was assumed that the students who elected either Section Two or Section Three of beginning Gregg shorthand for the winter term 1963-64 would, through their own selection process, randomly distribute themselves between the two sections as to the following criteria: Raw Scores achieved on the Entrance Test Battery taken by all incoming Freshmen at Michigan State University (which included sections on English, reading, verbal, informational, and numerical). A total raw score was available for the verbal, information, and numerical sections which constitute the College Qualification Test portion of the Entrance Test Battery. It was also assumed that the very size of the student body (25,821 on-campus enrollees at the beginning of the winter term, 1964) added to the possibility that the students would randomly select beginning Gregg shorthand during the winter term, 1964. This last statement is made with full recognition of the fact that all enrollees for the winter term, 1964 were not really potential students for a beginning shorthand class. However, the fact remains that all students could have elected beginning shorthand since no pre-requisites exist as conditions of entry to the course.

Equality of Experimental and Control Sections

Test results used.--In an attempt by the researcher to establish the equality or inequality of the two sections studied, the Entrance Test Scores of each participating student were secured from the Office of Evaluation Services of the University in order to establish the degree to which the two groups were comparable. These scores are derived from a battery of examinations which were described by Warrington as follows:

> Measures are obtained for four areas, all of which we think are highly relevant to success in college. These areas are as follows: General Academic Ability, Language Usage, Reading Comprehension, and Quantitative Ability. Most of the tests have been developed locally by faculty members of the Office of Evaluation Services. We feel that these tests are good tests and the fact that several of the test writers have served and/or are serving as consultants to most of the better known testing operations supports this claim.
>
> The one standardized test regularly used is the College Qualification Tests (CQT) published by the Psychological Corporation of New York City. This instrument is designed to measure several abilities which are indicative of success in college. The test yields four scores: verbal or vocabulary (CQT-V), general information (CQT-I), numerical (CQT-N), and a total score (CQT-T). The total score provides the best single index of college ability for Michigan State University students in general, although (CQT-V) supplemented by (CQT-I) seems to relate most closely to success in courses in which verbal facilities is important, such as social science and literature. while (CQT-N) supplemented by (CQT-I) appears to be most closely related to success in technically oriented courses which make demands on quantitative ability, such as physical science, chemistry, or mathematics.
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> Other locally developed tests used are described below. The Michigan State University English Placement Test (E) consists of objective test items representing various aspects of sentence structure, and organization.

> Although the test is intended primarily to identify students who may require assistance from the Preparatory English Program, the test has proved to be a satisfactory and convenient means of identifying students for hours sections.
>
> The Michigan State University Reading Test (R) is a test of reading comprehension. The score is based upon the student's ability to answer questions based on reading passages representative of several academic areas at the University. The test is not restricted to the simple mechanics of reading, but rather the score provides some measure of factors involved in critical thought. The test is useful to faculty members in any decision requiring some knowledge about the student's verbal ability.[1]

On the basis of this prior description of the Entrance Test Battery used by Michigan State University, it was decided that the two sections should be compared as to their equality of performance on each of the sections of the battery including the total score for the College Qualification Series consisting of Verbal, Informational, and Numerical Tests. The statistical procedures selected for the comparison were an "f" test[2] for variance of scores and a "t" test[3] for difference between the means of the scores of the two groups.

The results of these two comparisons of the beginning groups revealed that there was no statistically significant

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[1] W. G. Warrington, Director, Office of Evaluation Services, Report to the Board of Trustees, Michigan State University, (unpublished manuscript) January 10, 1964.

[2] $$f = \frac{\Sigma x^2 - \frac{(\Sigma x)^2}{N}}{N - 1}$$

[3] $$t = \frac{\bar{x}_1 - \bar{x}_2}{Sp\sqrt{1/N_1 + 1/N_2}}$$

difference between them. This fact is important to the study because it substantiated the assumption that the students of the two sections entered the course with no significant difference between the groups in aptitude for college-level work as shown by their scores on this test battery, which is regularly used for prognostic purposes. Tables 25, 26, 27, 28, 29, 30, in the Appendix list the scores achieved by members of both sections on the subtests of the Entrance Test Battery.

Definition and Control of Essential Variables

Variable one.--Student selection for participation in both the experimental and control sections was adjudged to have been the result of a process of randomization of student choice as to section.

Assumption

The assumption was made that the two sections would be comparable because students registered for either section of beginning shorthand without prior knowledge of the significance of their choices.

Control

An "f" test of the variance of scores achieved by students on the Michigan State University Entrance Test Battery was conducted. In addition, a "t" test of the difference between the mean scores achieved by members of both sections on the Entrance Test Battery was used as further evidence of inter-section equality.

A pre-test was used as the criterion test to further identify the members of both sections as to prior shorthand experience. This test served to

validate students' statements about the amounts and kinds of prior shorthand training they had experienced.

Variable two.--The variation in instructional process deemed most crucial to the study was one which involved the number of instructors used to teach the two sections.

Assumption

The assumption was made that since the same instructor taught both sections, no significant variation in instructional process occurred except that which may have resulted from the tape-laboratory approach used with the experimental section.

Control

No attempt was made to estimate statistically or otherwise the degree of variation, if any, in the teaching process utilized by the same instructor in two different sections of the same course. However, a daily program of time allocation by activity was used to routinize instructional behavior, as much as was considered pedagogically sound, and to identify that segment of time devoted to the use of the tape-laboratory approach in the experimental section.

Variable three.--The variation in instructional process resulting from the use of a tape-laboratory approach in the experimental section but not in the control section was planned as an integral part of the teaching process.

Assumption

The assumption was that the dependent variable would be the use of a tape-laboratory approach as a teaching technique in the experimental section.

Controls

One-half of each period, for the experimental group, was allocated for use of the tape-laboratory facilities as an instructional aid. All other techniques used for instructional purposes in both sections of beginning shorthand were common to both groups.

In addition, a daily lesson plan was used to serve as a guide for making the instructor's presentations in both sections comparable. This daily lesson plan also made provision for the use of the tape-laboratory facilities during one-half of each period for the experimental section as a teaching-learning aid.

A daily anecdotal record for each section was kept in an effort to insure equality of time allocation as called for by the daily lesson plan and to record subjective observations and impressions.

Variable four.--Comparability of classroom facilities was considered to be worthy of scrutiny as a possible variable.

Assumption

The assumption was made that important considerations as to classroom comparability should be those of size, physical facilities, physical location, ease of accessibility.

Control

The two sections were scheduled for rooms with approximately the same student-accommodation ratings. These rooms were on the same floor of the same building and contained the same types of facilities except for the tape-laboratory facilities in the room occupied by the experimental section. Although the tape-laboratory contained standard as well as electric typewriters, the students were not allowed to use them for transcription.

Variable five.--Class size as to the number of students in each section was adjudged to be important as a possible variable in the study.

Assumption

The assumption was made that the size of the two sections should not differ appreciably to avoid the possibility of varied instructional patterns which might have resulted from such inequality in size.

Control

A limitation was placed on enrollment so that neither section exceeded 30 students. Allowances were made for students who dropped or added the course within the period prescribed by the University for such changes.

Variable six.--The composition of the two sections as to the number of male and female members was considered as a possible variable for purposes of this study.

Assumption

It was assumed that the two sections would consist primarily of females and that the number of males would not be great enough to influence the outcomes of the study.

Control

Even though the number of male and female members did not vary appreciably between the two sections, an analysis was made to determine the impact, if possible, of this slight variance in sex distribution.

Variable seven.--The amounts and kinds of student practice done outside of class were considered important components of a possible variable which might result if study habits were different.

Assumption

The assumption was made that the elementary nature of the course and the fact that it was not usually associated with mechanical aids for presentation or practice greatly limited the possibility of students using such aids for out-of-class study.

Control

No student in either section was encouraged to use recorded dictation material as a method of studying shorthand outside of class.

> Two questionnaires were given to the members of both sections in an effort to identify the types and kinds of out-of-class study habits and the techniques they used during the term. In no instance were the students of either section apprised of the fact that they were members of an experimental study. Members of the control section were not told of the existence of a tape laboratory for shorthand or informed that they constituted the control section of an experimental study.

Additional information sought on participants.--In addition to the data sought concerning the comparability of the two sections as to academic aptitude, the relative performances of the two sections as to terminal grades, and the accuracy of subtest scores of the Entrance Test Battery as predictors of success in beginning shorthand, it was decided that examinations should be make of the course loads carried by members of both sections, the fields of major study of members, the age range of both sections, and the distance and time factor imposed on some members who had classes prior to beginning shorthand. This additional information was sought in an effort to discern possible variables or factors that might have a significant bearing on student achievement. For purposes of this study, these additional factors were not treated statistically unless there appeared to be a definite indication that there would be a relatively high correlation obtaining. Data concerning these additional factors are presented in a separate section of the chapter on findings (Chapter IV) apart from findings which deal directly with the major and minor sub-problems which were treated statistically.

Instructional Techniques

General plan of course.--There were certain factors, some limiting, others open-ended, which had a distinct bearing upon the manner in which the actual class periods were used.

Among the limiting factors which had to be given consideration were these:

1. Established course standards, that is those normally required at Michigan State University for this particular course, LIO 201, Beginning Gregg Shorthand I, had to be met. Since a discussion of the relative merits of fixed standards for any course versus the freedom of "fitting the course to the individuals enrolled" is outside the province of this particular study, none will be attempted here. Standards for LIO 201, at the time at which this study was made, were these:

> For a grade of A--the student must be able to transcribe (in longhand) with 95 per cent accuracy three, two-minute dictations given at the rate of 80 words per minute on "new-matter dictation."
>
> For a grade of B--the student must be able to transcribe (in longhand) with 95 per cent accuracy three, three-minute dictations given at the rate of 60 words per minute on "new-matter" dictation.
>
> For a grade of C--the student must be able to transcribe (in longhand) with 95 per cent accuracy three, two-minute dictations given at the rate of 60 words per minute on "new-matter" dictation
>
> For a grade of D--based on a combination of many things but essentially an indication of performance slightly below the minimum standards for a grade of C.

2. Established course content must be essentially that required in LIO 201 for the reason that these students would progress into LIO 202. Unless the standards met and the course content covered were those designated for LIO 201, the students might be at a decided disadvantage in subsequent courses in the shorthand sequence, particularly in LIO 202. The course content for LIO 201, at the time this study was carried on, was roughly the first half of the theory lessons covering Gregg shorthand. That is, students entering LIO 202 would be expected to cover the second half of Gregg theory. These brief statements concerning "the first and second half" of Gregg shorthand theory are self-explanatory to any teacher of Gregg shorthand, regardless of the text he might be following and needs, therefore, no further discussion for purposes of this study.

3. The established testing program for all grades at all levels in LIO 201 is based on testing new matter only which is a relatively new innovation in Beginning Shorthand I at Michigan State University. Formerly, the grades of D. C, and B were based upon performances of the student in taking dictation from "familiar" matter. For purposes of this study, the relative merits of "new matter" versus "familiar" material from a learning standpoint have no bearing, but perhaps one factor should be mentioned. Since the students, even on the final day of the course, would not have been "exposed" to one-half of shorthand

theory, they could not be expected to take dictation on new-matter other than material containing vocabulary covered by the sounds and principles of writing that they had studied. This meant, in brief, that the instructor must carefully construct new material containing vocabulary consistent with the word-building principles covered in the first half of Gregg shorthand theory.

4. The established length and number of class hours for LIO 201, Beginning Shorthand I at the time this study was made consisted of meeting four days a week, Monday, Tuesday, Thursday, and Friday for a fifty-minute period on each of the four days. Four credit hours were assigned to the course with the usual number of honor points available for each grade achieved, four honor points for an A, three for a B, two for a C, and one for a D. A discussion of possible "best patterns" of sequence and hours to be spent in Beginning Shorthand I is not germane to this study. The study was conducted under the existing pattern which may or may not have been highly conducive to the maximization of shorthand learning.

Among open-ended factors having a bearing upon the study were these:

1. The pattern of daily procedure was long established by precedent as well as by consensus of the present faculty teaching in the secretarial area at Michigan State University and features the principle of complete freedom on the part of

the instructor to cover the course content and to devise his classroom presentations and activities in whatever manner he deems most effective for his particular talents and those of his students, provided he "gets results.' In other words, two teachers of the same course might divide their fifty-minutes of class time in entirely different manners, present the shorthand theory in entirely different ways, on different days, and be equally effective in getting students to the same point of mastery of shorthand theory and in the ability to take dictation and to transcribe at the standards mentioned earlier. It was not the purpose of this study to present the pros and cons of such flexibility of method, but it should be pointed out that such freedom of choice did have a bearing upon the pattern of procedure chosen for this study. This freedom of choice leads directly into the second open-ended factor having a bearing upon the general plan devised for the course as taught in this particular study.

2. The choice between "experimentally replicable" or "educationally generalizable" created the dilemma of deciding just what should be done within the block of time allocated to the use of the tape laboratory in the experimental class. This dilemma is possibly best described in the following paraphrased contentions of Page on the subject. According to Page, researchers in the social sciences are handicapped when they attempt to select a problem for study because of

the many variables in any behavioral situation. The problem is essentially whether to research a problem that is experimentally replicable (i.e., one which is easy to duplicate in method and result) or one which is educationally generalizable (i.e., one which has relevance and actually occurs in the school, or one that can reasonable be expected to occur in other situations).

A certain degree of each characteristic is essential if a study is to have relevant conclusions; but too often researchers, in their attempts to isolate social or classroom processes, erect conditions different from those of the classroom, and in doing so, alter the very processes they desire to measure.

Although a considerable degree of replicability seems necessary to represent a statable truth, generalizability appears to be far more fundamental; the results will often be "looser," but they will be more relevant than many tightly reproducible laboratory studies.[4]

The longer the researcher and the experienced participating instructor discussed the possibilities of exactly what should be done with the block of time devoted to use of the tape-laboratory equipment in the experimental class, the more convinced they were that the dilemma pointed

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[4]Ellis Batten Page, "Educational Research: Replicable or Generalizable?" Phi Delta Kappan, 39 (March, 1959) pp. 302-305.

out by Page was a very real one. Especially were they convinced of the truth of his statement that researchers in the social sciences often erect conditions different from those of the classroom in their attempts to isolate social or classroom processes, and in doing so, alter the very processes they desire to measure.

It would have been much simpler, and certainly much more replicable, to have devised an absolutely rigid pattern for every minute of the "taped time," with each student within the class receiving at all times exactly the same dictation, with no variations whatever, with the teacher intervening at no time either to give directions or help to the entire group of individuals. In fact, such a situation would have been definitely replicable. Such a situation, however, would have certainly had little relevance to what would actually occur in the classroom in which a competent teacher was attempting to use the tape laboratory in a manner which would facilitate or improve the learning situation. This latter contention was supported by the results of investigations into the effectiveness of tape laboratories for teaching purposes. Keating, who wrote on the effectiveness of language laboratories as teaching devices, was assailed for his method of evaluation. He attempted to measure the effectiveness of the language labs used by a group of schools in the New York area and, through certain tests came to the sweeping

conclusion that language labs were no good. According to Keating, reviews of his report were made by several professors in leading universities. Their consensus seemed to be that Keating's study did not measure adequately the effectiveness oflanguage labs. One reviewer cited a three-year study by Sarah Lorge, also of New York, on the same topic. She came out with the opposite findings--that the labs were effective. It was believed that this difference resulted from differences in approach to the use of the lab. Keating took existing labs and compared them with existing non-lab classes. He attached no special concern to the ways in which the labs were used. Lorge was particularly concerned with this and was able to control closely the experimental labs and the teaching therein. One of the reviewers cited in this article maintained that it was insufficient simply to use a language laboratory. Both students and teachers must be specifically oriented to the particular contribution that the laboratory can make to the problem of language learning. The laboratory, like many other specialized types of communication media, actually interferes with the task of education, unless it is adapted to the special tasks for which it is particularly suited.[5]

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[5]R. F. Keating, "Reports on the Keating Report: Review of a Study of the Effectiveness of Language Labs," American School and University, 36 (December, 1963), pp. 33-35.

The advantages and disadvantages of both the "experimentally replicable" and the "educationally generalizable" type of "block" were explored with only the one major advantage outstanding for the experimentally "replicable" plan namely, that an absolutely rigid plan and control of that plan for the tape block would be its experimentally replicableness. This one advantage did not seem to warrant defense against several of the advantages which stood forth when an "educationally generalizable" plan for using the block of time devoted to the tape laboratory was considered. First of all, the very purpose of the study was to attempt to find out how the use of a tape laboratory in teaching beginning shorthand might contribute to student achievement. Inherent and implicit in this use of a tape laboratory was the principle that the laboratory would be utilized insofar as possible in a manner that had relevance and actually occurred in the school or one that can be expected to occur in other situations.

Therefore, the decision was made to set up the time devoted to the use of taped material in a manner that might be productive of results that would be educationally generalizable rather than experimentally replicable. In short, the experienced instructor was to feel free to utilize the tape laboratory within the given time in whatever manner she deemed most helpful to the various class members on a given day. This decision, to allow the instructor to make

day-to-day adaptations within the tape block, made it possible for her to use a wider variety of taped materials and to vary their uses from one individual to another in a manner that would not have been possible had the taped time been set up on a plan so rigidly adhered to that it would be experimentally replicable down to the minutest fraction of time or to the exact duplication of how each section of a given tape was used.

Factors Kept Constant in the Two Classes

The following factors were kept constant in both classes.

1. Daily lesson plans or time schedules.--The time schedules and the materials covered were identical for each class, except for the blocks devoted to "taped instruction" in the experimental class. Again, it should be pointed out that the taped portions were not just "replications" of what the instructor did in the control class for a like number of minutes, but were blocks of instructional time that allowed the instructor more time and freedom in the area of individual instruction.

For the first three days of class, both classes were taught in identical manners since there was no dictation of connected material, either "live" or taped until the third day of class.

A typical lesson plan follows.

Thursday, January 23, 1964
Groups 1 and 2
Instructor: Green
Presenting Lesson 8, p. 49.
Practicing on Lesson 7.

	Control	Experimental
1:10-1:20 3:10-3:20	Review and spell words in lesson 7 and brief forms	Tape on for first part of dictation of lesson 7
1:20-1:30 3:20-3:30	Present brief forms in lesson 8 and new theory on amounts and quantities "ly" and "aa" and "ia"	Same
1:30-1:50 3:30-3:50	Dictate connected material from lesson 7 and work with individuals	Tape for the connected material from lesson 7 also work with individuals
1:50-2:00	Continue dictation add untimed new material dictation made up out of today's words and theory to date.	Take class off tape for variety and for dictation of new material made up out of today's words and theory to date

2. New-matter dictation.--This type of dictation was given "live" in each class instruction. It was not the purpose of this study to discuss the relative merits of the <u>early introduction</u> of "new-matter" dictation or the <u>delaying of the introduction</u> of "new-matter" material. However, the ability to handle new matter was developed from the moment the students had mastered word building principles and basic vocabulary sufficient to allow the instructor to create daily new-matter

materials consistent with the students' shorthand "exposure" up to that point.

The decision was made to give the daily new-matter dictation practice "live" in each class for several reasons: first, and perhaps foremost, the use of the chalkboard for preview, for illustration, and for demonstration of outlines requested by the students was a very integral part of the ten-minute session. Second, verbal exchange between students and instructor was almost equally important in this portion of the presentation, and such exchange could be handled more efficiently without the use of the tape equipment. Third, as early as the ninth lesson, the instructor has sensed that a beginning class can "take" just so much instruction and/or dictation on tape before there is a need for variety. Presenting the new-material skill-building portion of the lesson "live" the last ten minutes of the class served to re-orient the class members with the instructor. This was deemed important in the light of the observations the instructor found herself writing into the daily anecdotal records that were kept.

3. Presentation of new lessons was kept identical.--The classes were presented with identical "new" and "review" lessons each day. It was felt that if there was no significant difference between the groups as to aptitude for college work at Michigan State University (and it was found that there was no significant difference), then it was

reasonable from a pedagogical standpoint to expect them to be paced equally in the presentation of new theory. The theory covered was presented in Lessons one through thirty in the Diamond Jubilee Series Text of Gregg Shorthand Simplified and reviewed through presentation of Lessons forty-nine through fifty-three, each of which was a review of six previous lessons in the beginning section of the text.

4. Testing was kept identical within the two groups.-- Exactly the same tests were administered to the two groups, in as identical a manner as possible, and always on the same days. Early tests, administered not for incorporation in the final grades for the term but for purposes of "progress" indicators, such as brief-form tests, and one-minute new-matter tests, were given on identical days. The first of the two-minute new-matter 60 words a minute tests was given on Tuesday, February 11, the nineteenth day of class, more or less as an indicator to enable the instructor to ascertain, insofar as possible, the progress of the class on new matter. The major testing program, or "takes," came in the last ten class sessions after all of the theory to be covered in this first term of shorthand had been presented. All tests were, of necessity, teacher composed because no "new-matter" tests synchronized with the theory presented in the first thirty lessons of Diamond Jubilee Shorthand were available.

5. Previews for tests were kept identical in both classes.--In order that previews for each test could be kept identical, the instructor made brief lists of the exact words from each test which would be put on the board and/or dictated for preview.

6. Basic vocabulary review sheets were identical in both classes.--To aid students encountering difficulty with "new matter" at such an early stage in their shorthand learning, the instructor prepared "basic vocabulary" sheets for distribution to the members of both classes. A definite effort was made to incorporate many of these words in the new-matter dictation tests.

7. All dictation tests were dictated "live" in both classes.--In order that the experimental class would not be taking their tests under conditions different from those in which their new-matter skill building had been developed, all new-matter dictation and new-matter skill-building was presented "live" (for reasons discussed under "2" of the "Factors Kept Constant in the Two Classes").

8. All transcripts were written in longhand in both classes.--To provide for equality of opportunity between the two sections, since only one of the rooms used contained typewriters, all transcripts were prepared in longhand.

9. The same instructor taught both classes.--Both classes were taught by the same instructor. This was done to maintain, to the highest degree possible, similarity of instructional technique.

10. Anecdotal daily records were kept on both classes.--Each day the instructor recorded a brief record of the class period, noting the day's activities, various and varying student reactions, over-all progress, individual student's difficulties or successes, and her own feelings concerning the particular day's work. While these anecdotal records in no way produced measurable data of any kind, they did present a great deal of subjective and judgmental information about the class activities and the "evidences of learning" each day. Probably, in an effort to maintain that "certain degree of experimental replicability essential if a study is to have relevant conclusions," the instructor adhered too rigidly to the commitments of the lesson plans (to devote essentially half of every period to taped instruction and practice) to maximize the potential for "educational generalizability" that a tape laboratory holds.

For variety's sake, for re-establishing teacher-pupil rapport, it might have been well for the teacher to ignore occasionally the laboratory facilities on a given day and to work closely with the entire group; and on another day, when the laboratory work was being particulary effective, to devote almost all of the period to the taped material. Such freedom was not utilized in this experiment, but such freedom might produce "more relevant" results in a typical teaching situation.

Factors Not Held Constant to the Two Groups

Actually, only those activities which were carried on during the time that the tape laboratory facilities were being utilized in the experimental class and those which were carried on for the corresponding non-taped portions of the control class were not held constant. Again, it should be reiterated that it would have been possible to have duplicated the instructor's verbal participation in the control class for use in the experimental class, thereby having no variable except that what the instructor said and/or dictated in the control class was taped in the experimental class. Such a usage of the tape laboratory, it was deemed, would be sacrificing all meaningful results for exact replicability. Such a limited use of the tape laboratory was not even considered though the possibility was recognized. Instead, the best possible use of the equipment and materials available was effected.

This "best possible use" was a judgmental matter at best, but the judgments were based upon certain psychologically sound principles of skill building. Among those principles taken into account in determining the manner and materials to be used in the block of time devoted to the use of taped materials for shorthand were these:

1. Any desired achievement on the part of the pupil must be the result of a planned teaching procedure on the part of the teacher.

2. A teaching procedure that is helpful in one stage of skill learning may be useless or even harmful in another stage.

3. Skill is best developed in intensive bursts of energy of perhaps 30 to 90 seconds.

4. As in language arts, shorthand and transcription are best developed by extensive rather than be intensive practice.

5. Skill is not a fixed or static state.

6. Easy practice material develops speed more effectively than difficult practice material.

7. Skill develops most effectively under practice conditions.

8. Consciousness of or conscious direction of the mechanical details of the skill impair or inhibit the skill.

9. Skill is best developed when the individual practices at a speed which forces him to work at the point just below one at which confusion sets in.

10. Skills are best learned under the most favorable conditions.

These same principles were applied in the control class, also, but with slightly different applications.

It was evident from the list just cited that there must be a variety of materials and activities if the learner was to gain skill. It was also evident that not all of the principles could be applied with equal effectiveness at all times--nor should they be in view of the principle given in "2" above. Therefore, it was decided that taped materials must provide variety, opportunity for individuals to work at varying speeds, and in different manners of working at varying times, if the tape laboratory were to be

an effective media for developing skill on the part of learners who would be varying in ability. Perhaps the tape laboratory's potential for providing for individual learning rates was, and is, one of the most promising aspects of its utilization as a teaching media insofar as shorthand is concerned.

Types of tapes used.--Tapes used were of two types when origin was concerned: commercial tapes and teacher-prepared tapes. The commercially prepared tapes were provided, free of charge, by the Gregg Division of the McGraw-Hill Book Company. These tapes were correlated with the text being used for the course, beginning with Lesson 3, and provided the main portion of the taped material, especially in the early stages of the course. Reels 1 through 11, covering the lessons through 24, were dictated by Robert L. Grubbs, Ed.D., University of Pittsburgh; reels 12 through 24, covering lessons 25 through 30, were dictated by Edwin R. Bowman, New Rochelle (New York) High School; and reels 24 through 36, covering lessons 49 through 53 (the review lessons covering the first 30 lessons) were dictated by Howard L. Newhouse, Professional Service Specialist, Gregg Publishing Division. Dictation for each lesson was given at three speeds in varying patterns of one letter at a time, repeated at the two higher speeds, or of combinations of letters depending upon such factors as letter length, difficulty of material, and judgment of the dictator. Speeds ranged

from 40-45-50 for lesson 3 through 12, to 50-55-60 for lessons 13 through 18, to 55-60-65 for lessons 19 through 24, to 60-65-70 for lessons 25 through 30, and to 70-80-90 for lessons 49 through 52, and 80-90-100 for lesson 53.

Beginning with Lesson 17, the instructor prepared two series of concomitant tapes; one geared to the faster students in the group and one geared to the slower. The material covered in those tapes was essentially the same as that on the Gregg tapes; that is, Lesson 17 on the Gregg tape and Lesson 17 on the two instructor-prepared tapes contained material from Lesson 17. The manner of presentation or of dictation was different on the instructor-prepared tapes were prepared as supplements with five objectives in mind: (1) to provide more very short intensive speed spurts than the commercial tapes provided; (2) to provide greater interval differences between "spurts"; (3) to provide 1 and 2 at two different levels--one level for the slower students and one for the faster; (4) to provide for a wider range of individual differences; and (5) to provide a wider range of practice materials.

Instructor-prepared tapes utilized, primarily, adaptations of the pyramid plan of speed building developed by Blanchard and of the minute-plan developed by Leslie and others. The pyramid plan is essentially an "over-reach first" plan, especially adaptable to the "short intensive bursts of

speed" principle; the minute plan (smaller segments than minutes of time may be utilized if desired) is essentially a "building up from a lower to a higher speed" plan. Since one of the primary purposes of preparing the auxiliary or supplementary tapes was to provide greater opportunity for intensive speed spurts, the pyramid plan was utilized more freely than the minute plan, especially with the faster group of tapes.

Instructor-prepared tapes also utilized the twenty-word interval span rather than the five-word interval used on the Gregg tapes. This greater interval between speed spurts was used in an effort to gain greater intensity of effort for short bursts of energy. Students are frequently motivated to "reach" a bit more when the reach exceeds the grasp in short intensive spurts; hence, the use of the twenty-word interval between spurts. Speeds on the tapes for the faster groups ranged about twenty words above the corresponding Gregg tapes (later forty words on the top reaches for perhaps ten seconds).[6]

Individual help methods were not held constant.--To the extent that experimental conditions allowed, individual help for students varied somewhat. For example, the manner in which the instructor endeavored to help individual students was essentially the same; but in the control class everything

[6]The tape-laboratory facilities utilized in this experiment were manufactured by Fleetwood Manufacturing Company, Zeeland, Michigan, and consisted of forty stations with four recorders encased in a console.

else in the way of dictation or instruction literally stopped while the teacher had individual students recite, spell, read, et cetera. In the experimental class, the instructor merely turned a button on the panel of the console and had a two-way conference, discussion, teaching, and/or listening session with an individual student while the rest of the class went on with whatever activity they were being instructed on tape. Instruction for the remainder of the experimental class could proceed simultaneously with the individual-help session.

Group participation was not held constant.--The experimental class by the very nature of the commitment of approximately half of their class period to the use of the tape did not participate "as a group" in as many activities a day as did the control group. Taking dictation from the tape-laboratory facilities via a headset automatically set each student off by himself even at those times when all students in the group might be taking the same tape. The individual student was scarcely, if at all, aware of the group at such times. The minute his head set went on, he was in "solitary" to a certain extent, rather than reacting as a part of a group.

Immediate reinforcement was not held constant.--Programmed learning makes much of the value of "immediate reinforcement" or "reward" upon the learning activity of the learner. Immediate reinforcement takes many forms--

knowledge that one is right, a piece of candy that the "teaching machine" pops out for a first-grader's correct answer, or praise as encouragement. The closer group contact that the control class had with the instructor undoubtedly provided a different kind of immediate reinforcement than was present in the experimental class during the taped portions of the period. Or this fact could be stated conversely. An individual student in the experimental class, in a sort of closed-circuit, two-way conversation with the instructor, was receiving a different kind of reinforcement from that of the student whose every contact with the instructor was a "before the entire class" performance. But whatever the immediate reinforcements were, and measurable they were not, it is safe to state that neither the quality or quantity of such reinforcements was held constant in the two sections, by the very nature of the difference in the variable established.

Practiced dictation pattern was not held constant.--It was impossible to get in as many minutes of actual dictation per student in the control class as in the experimental class since all individual help and recitation in the control class was given with a cessation of dictation, while in the experimental class the dictation on tape could go on regardless of how much time the instructor might be taking with one particular student. For that reason, to "make up for lost time," the instructor tended to work more and more, as the

term went on, in the control class by using the pattern of "short, intensive speeds spurts" and to work at these spurts by twenty-word intervals.

A second notable difference was that during the second half of the term, the speed-building dictation in the control class was paced more and more to the better students. This pacing was not done to make things difficult for the slower students, but rather as a lesser-of-two-evils approach. Unless the faster students were given dictation that challenged them in sufficient quantity, they would not develop the speeds required by the top standards for the class. If speeds were paced primarily to the slower students, the top students would not be able to meet the top requirements.

In the experimental class, the utilization of three kinds of tapes, each with a variety of speeds, made it possible for each student to work at a speed that was forcing for him but that did not need concern his neighbor. In the control class, the instructor was well aware that when she was giving the major portion of the dictation at "stretching speeds" for the better students, the poorer students were undoubtedly working not "just below the point where confusion sets in" but well above that point. For that reason, she utilized very, very short intensive spurts, hoping that the brevity would help keep the slower student from being confused for long. (It should be stated here that previous classes and

classroom research had assured the instructor that this instructional procedure in shorthand worked remarkably well.

Prior Shorthand Training

No attempt was made to exclude registrants from either section on any basis, other than by those procedures normally followed at Michigan State University. Through rather careful advising and consultation with individual students, the staff at Michigan State University has been able to obtain what they believe to be a rather high degree of correct placement of students regarding the level of the course they enter in the shorthand sequence. That is, students with a semester or more of shorthand rarely enroll in beginning shorthand. Thus, those students with some prior shorthand experience were allowed to remain in whatever section they had enrolled in. However, they were not included in the statistical analysis of the study. This exclusion of such students from the study was done to eliminate contamination of the data which were derived from comparative analyses of performance.

In an effort to insure that students with prior shorthand experience would not be ranked as beginners, the following procedures were used: On the first day of class, each member of each section was asked to record the following information on a 3 by 5 inch card-type questionnaire.

1. Name
2. Student number
3. Quarter level of collegiate attainment
4. Amount of prior shorthand training and at what level of instruction
5. Academic major
6. Age
7. Date of entry to Michigan State University

Pre-test.--In an effort to substantiate or refute student claims about prior shorthand training, a pre-test was given the first day of class to determine each student's familiarity level with respect to Gregg shorthand. The pre-test consisted of the following items:

1. A three-minute transcription test from shorthand plate material (actual reproduction of expertly-written plate material) from Gregg Shorthand Simplified--Diamond Jubilee Series, 1963 edition.

2. A three-minute recognition test consisting of ten theory words to be transcribed into English and ten English words to be transcribed into shorthand outlines.

3. A three-minute recognition test consisting of ten brief forms to be transcribed into English and ten English words to be transcribed into brief forms.

Pre-test samples are included in the Appendix.

A subsequent comparison of each student's stated amount of prior shorthand experience, as indicated on the individual care-type questionnaire mentioned earlier, and his performance on the three sections of the pre-test results indicated that the average and modal scores for all tests included in the pre-test were zero. Three students were able to recognize as many as four items on the brief-form section written in shorthand but indicated, in written form, that they had

purchased their texts early enabling them to recognize some rudimentary forms of shorthand symbolism. These were discounted as being inappropriate for consideration as prior shorthand experience. An additional check was provided by an examination of each student's personnel folder which, in turn, confirmed that each student had responded accurately about his prior shorthand experience.

Descriptive Data About Participants

Composition of sections.--For purposes of the study, only those students who had no prior shorthand training were included in the statistical analysis. Table 1 shows the composition of the two sections with respect to the amount of prior shorthand experience of each member.

As Table 1 shows, the experimental section consisted of nineteen true beginners and eleven others. In the latter category, five had one college quarter of prior shorthand, two had one high school semester of prior shorthand, one had one summer session of prior shorthand, and one had one-half year of Gregg Notehand. The total number of students in this section, including beginners and non-beginners, was thirty.

Table 1 also shows that the control section consisted of twenty-one true beginners and five others. In the latter category, one had one college quarter of prior shorthand, one had one highschool year of prior shorthand, one had one summer session of prior shorthand, and one had one-half

year of Gregg Notehand. The total number of students in this section, including beginners and non beginners, was twenty-six.

TABLE 1

TYPES AND AMOUNTS OF PRIOR SHORTHAND TRAINING POSSESSED BY MEMBERS OF THE EXPERIMENTAL AND CONTROL SECTIONS

Prior Shorthand Experience	Number of Experimental Section Members	Number of Control Section Members
None	19	21
1 College term	5	1
1 High-school Year	2	1
1 High-school Semester	2	1
1/2 Year Gregg Notehand	1	1

Academic level of participants.--Table 2 shows that the academic level differential of the students comprising the two sections was not great. As Table 2 shows, the experimental section contained one senior, two juniors, four sophomores, and twelve freshmen. The control section differed somewhat in having four seniors, but also had two juniors and four sophomores as well as eleven freshmen. Because the variation of level was slight, no attempt was made to equalize the groups.

TABLE 2

ACADEMIC LEVEL OF MEMBERS OF THE EXPERIMENTAL AND CONTROL SECTIONS

Class Standing	Number of Experimental Section Members	Number of Control Section Members
Seniors	1	4
Juniors	2	2
Sophomores	4	4
Freshmen	12	11

Sex distribution of participants.--The sex distribution of the members of both sections is shown in Table 3. As this table shows, the experimental section contained three males while the control section consisted entirely of females. This was not considered to be significant because of the limited number of males involved even though they did not distribute themselves evenly between the two sections.

TABLE 3

SEX DISTRIBUTION OF EXPERIMENTAL AND CONTROL SECTIONS

Sex	Number of Experimental Section Members	Number of Control Section Members
Male	3	0
Female	16	21
Total	19	21

Age range of participants.--Table 4 shows the age range of the members of both the experimental and control sections. The ages of students in the experimental section ranged from eighteen to twenty-one years of age while in the control group, the ages ranged from eighteen to twenty-two years of age. Table 4 also shows that the modal age for both groups was eighteen years of age with an almost equal distribution of the remaining cases. This factor, when considered with the grade level distribution shows that the students in both sections were quite similar as to age or grade level. One might, therefore, assume that subsequent performance should not be influenced to any great degree by the very slight difference in these factors.

TABLE 4

AGE RANGE OF MEMBERS OF EXPERIMENTAL AND CONTROL SECTIONS EXPRESSED IN YEARS

Age	Number of Experimental Section Members	Number of Control Section Members
22	0	2
21	2	3
20	1	1
19	4	5
18	12	10

Study-habit questionnaire.--In an effort to identify other factors which may have contributed to performance

within or between the two sections studied, two questionnaires were submitted to members of both sections. The first questionnaire was submitted prior to midterm and the second questionnaire was submitted immediately prior to the final day of class. All questionnaires were returned except one from a member of the control section.

These two questionnaires were constructed to assess, as nearly as possible, the amounts and kinds of study and practice done by each student. Chapter IV contains the results of these questionnaires in table as well as narrative form.

Instructional Facilities

Location and time.--As was indicated in an earlier section of this chapter, Section two of beginning Gregg shorthand for the winter term 1963-64 was scheduled to meet at 1 p.m. on Monday, Tuesday, Thursday, and Friday of each week of the term. The classroom assigned for this section was Room 304 in the third-floor wing of Berkey Hall which contained all other classrooms and laboratories used by Michigan State University for formalized instruction in typewriting and shorthand. Also indicated earlier in this section was the fact that Section three of beginning Gregg shorthand for the winter term 1963-64 was scheduled to meet at 3 p.m. on Monday, Tuesday, Thursday, and Friday. Both sections met for a total of forty 50-minute sessions

over the period of one term. Section three was assigned to Room 311 in the third-floor wing of Berkey Hall which was previously described.

Comparability of facilities.--The two rooms were comparable with these exceptions Room 304 contained a multi-channel tape laboratory console unit with 40 connecting work stations. Room 304 also contained 12 electric and 28 manual typewriters of various makes. No use was made of these machines by the students enrolled in the experimental section, since no typewriters were available for use by the control section in the room that they occupied.

The desks provided for student use in both rooms were comparable; they consisted exclusively of secretarial-type desks of metal construction.

Limitation of Class Enrollments

To facilitate a statistical comparison of the two sections as to homogeneity and achievement, each section was limited to approximately thirty students.

Additional Analyses Performed

Comparability of the two sections.--In addition to the initial comparison of the two sections as to their performance on the Entrance Test Battery of the University, a re-analysis of this type was made at the end of the experiment to determine whether or not the fact that some students had dropped from each section had altered the homogeneous nature of the two sections.

Entrance Test Battery as a predictor of success in beginning shorthand.--One of the main problems with which this study was concerned was the possible predictive value which the Entrance Test Battery of the University might have for beginning shorthand. Therefore, the scores achieved by members of both sections on the Entrance Test Battery were programmed for utilization with the CDC-3600 Computer involving a multiple-correlation analysis to determine if there was, in fact, a correlation between these scores and the grades students received in beginning shorthand.

Comparison of terminal performance of the two sections.--Another of the main problems with which this study was concerned was the possible effect that the use of tape-laboratory approach in the experimental section might have upon the performance of that section as compared to the performance of the control section which was taught in a traditional manner. A Chi-square statistical analysis was made of the terminal grades received by members of both sections to determine whether or not there existed a statistically significant difference in performance between the two sections. This was done to test the hypothesis that the use of the tape-laboratory approach with the experimental section would not result in a significantly better performance by that group when compared to the performance of the control section.

Additional information sought on participants.--In addition to the data sought concerning the comparability of the two sections as to academic aptitude and terminal grades, and the accuracy of subtest scores of the Entrance Test Battery as predictors of success in beginning shorthand, it was decided that examinations should be made of the course loads carried by members of both sections, and the distance and time factor imposed on some members who had classes prior to beginning shorthand. This additional information was sought in an effort to discern possible variables or factors that might have a significant bearing on student achievement. For purposes of this study, these additional factors were not treated statistically unless there appeared to be a definite indication that there would be high correlations obtaining. Data concerning these additional factors are presented in a separate section of the chapter on findings (Chapter IV) apart from findings which deal directly with the major and minor sub-problems which were treated statistically.

CHAPTER IV

FINDINGS

Primary Findings

This portion of the study contains the results of comparisons of inter-section student performance on various tests. It also contains a series of analyses based on data derived from intra- and inter-section student performance on a number of criteria considered to have been possible indicators of subsequent student achievement in beginning shorthand as reflected in terminal grades.

The items included for consideration are arranged, wherever possible, in the order of their occurence during the regular term. Thus, the following list of items is indicative of the arrangement of the remainder of this chapter:

1. An analysis of Pre-test Scores achieved by members of both sections.
2. An analysis of Post-test Scores achieved by members of both sections
3. A comparative analysis of the terminal performance of the two sections.
4. An analysis of Entrance Test Battery scores as possible predictors of success in beginning shorthand for both sections.

5. A comparative analysis of the mean scores attained on the subtests of the Entrance Test Battery by members of both sections according to terminal grade in beginning shorthand.

6. A re-analysis of the equality of the two beginning groups.

7. A comparison of entrance test scores achieved by members of both sections on a grade-level basis.

8. An analysis of the average number of credit hours carried by members of each section who aligned themselves into groups according to terminal grades received in beginning shorthand.

9. An analysis of the credit hours of grades earned in courses carried by members of both sections according to terminal grades received in beginning shorthand.

10. An analysis of the major course of study of members of both sections according to terminal grades received in beginning shorthand.

11. An analysis of the number of absences accrued by members of both sections according to terminal grades received in beginning shorthand.

12. An analysis of the out-of-class study habits of members of both sections.

13. An analysis of terminal grades received in beginning shorthand by students who did and did not have a class immediately prior to beginning shorthand.

Pre-test Results

Each student was given a pre-test on the first day of class which consisted of the following items:

1. A three-minute transcription test from plate material which consisted of approximately 180 total words possible for transcription.

2. A three-minute test on theory words which consisted of ten words written in shorthand to be transcribed into their English counterparts and of ten words written in English to be transcribed into their shorthand counterparts.

3. A three-minute test on brief forms which consisted of ten brief forms written in shorthand to be transcribed into their English counterparts and of ten brief forms written in English to be transcribed into their shorthand counterparts.

A comparison of inter-section performance on the pre-test revealed that the average score achieved by members of both sections on the three-minute transcription-from-plate material section of the test was zero. This was not considered unusual since the only participants in this pre-test were class members who had no prior shorthand experience. When their performance was checked on the remaining four sections of the pre-test, which consisted of transcribing twenty items written in English into shorthand and transcribing twenty items written in shorthand into English, the resultant average score was zero. The high degree of comparability between the two sections studied further substantiated the contention that the sections were, equal as to the amount of prior shorthand experience possessed by the members of the two sections.

Post-test Results

The post-test used in this study was an exact replica of the pre-test used with these two sections of beginning shorthand. This replication was made in an effort to maintain, as closely as possible, the equality of the measuring instruments. It was believed that true beginners would not and could not retain any semblance of what the pre-test had contained let alone remember the items that comprised the pre-test.

A comparison of inter-section student performance on the post-test revealed that the average score achieved by members of the experimental section on the three-minute, longhand transcription test was 26.58 gross words per minute while members of the control section achieved an average of 26.52 gross words per minute on this same portion of the post-test. The remaining portion of the post-test was divided into four units, each of which consisted of two sub-units comprised of ten shorthand symbols and ten longhand words. Student performance on these four units of the post-test were as follows:

Unit one	- Experimental average words correct	8.94
	Control average words correct	9.33
Unit two	- Experimental average words correct	8.50
	Control average words correct	8.57
Unit three	- Experimental average words correct	9.70
	Control average words correct	9.76
Unit four	- Experimental average words correct	9.10
	Control average words correct	8.80

Table 5 contains the raw scores achieved by members of both sections on the sub-portions of the post-test. Also presented within this table are average and modal scores for both sections on each respective sub-portion of the test.

Although Table 5 shows little difference in performance on the various sub-portions of the post-test by members of either section, a further analysis of the raw data contained in this table was undertaken. An "f" test of the variance of

TABLE 5

A COMPARISON OF RAW SCORES ACHIEVED BY MEMBERS OF BOTH SECTIONS ON THE SUB-PORTIONS OF THE POST-TEST, INCLUDING AVERAGE AS WELL AS MODAL SCORES FOR EACH SECTION ON EACH PORTION

Transcription Test		Sub-Portion (1)		Sub-Portion (2)		Sub-Portion (3)		Sub-Portion (4)	
E	C	E	C	E	C	E	C	E	C
35	36	10	10	10	10	10	10	10	10
31	35	10	10	10	10	10	10	10	10
31	33	10	10	10	10	10	10	10	10
31	32	10	10	10	10	10	10	10	10
31	32	10	10	10	10	10	10	10	10
31	32	10	10	10	10	10	10	10	10
30	29	9	10	9	9	10	10	10	10
27	29	9	10	9	9	10	10	10	9
27	29	9	10	9	9	10	10	10	9
27	29	9	10	9	9	10	10	9	9
26	28	9	10	9	9	10	10	9	9
23	28	9	9	9	9	10	10	9	9
23	27	9	9	9	9	10	10	9	8
22	26	8	9	8	9	9	10	8	8
21	24	8	9	8	8	9	10	8	8
18	23	8	9	8	8	9	10	7	8
18	23	8	9	8	8	8	10	7	8
	21	8	9	8	7		9		8
	21	7	9	7	7		9		8
	20		8		7		9		8
	0		6		3		8		6

Average Scores: Transcription Test E--26.58, C--26.52; Subtests: (1) E--8.94, C--9.33, (2) E--8.5, C--8.57, (3) E--9.7, C--9.76, (4) E--9.1, C--8.8. Modal Scores: Transcription Test: E--31, C--29; Subtests: (1) E--9, C--10, (2) E--8, C--9 (3) E--10, C--10, (4) E--10, C--10. (All scores represent the number correct.

scores on each of the sub-portions of the test was conducted and revealed that there was a statistically significant difference between the sections on the longhand transcription portion of the test. There was no significant difference between the scores of the two sections on the remaining portions of the test as shown by this analysis of variance technique for comparison. A "t" test of the differences between the means of each of the sub-portions of the post-test was conducted and revealed that in each case there was no significant difference.

Terminal Performance of the Two Sections

One of the major hypotheses of this study was that there would not be a significant difference between the performance of the two equated sections of participants. Table 6 presents the results of a number and percentage analysis of the grades assigned to members of both sections.

The analysis of Table 6 showed that of the 19 members of the experimental section, 4, or 21 per cent, received the grade of A; 5, or 26.3 per cent, received the grade of B; 3, or 15.8 per cent, received the grade of C; 7, or 36.8 per cent, received the grade of D; and no student received the grade of F. On the other hand, of the 21 members of the control section, 6, or 28.6 per cent, received the grade A; 9, or 42.9 per cent, received the grade of B; 3, or 14.3 per cent, received the grade of C; and 3, or 14.3 per cent,

received the grade of D. No student received the grade of F. It is apparent from reading this table that the control section had not only more grades of A and B but also had fewer grades of D. Three members in each section achieved terminal grades of C.

TABLE 6

NUMBER AND PER CENT OF GRADES ACHIEVED BY MEMBERS OF BOTH SECTIONS AS TERMINAL GRADES IN BEGINNING SHORTHAND

Terminal Grade	Number of Experimental Section Members	Per Cent	Number of Control Section Members	Per Cent
A	4	21	6	28.6
B	5	26.3	9	42.9
C	3	15.8	3	14.3
D	7	36.8	3	14.3
F	0	0	0	0

Percentage figures will not total 100 per cent due to rounding off.

In order to test thoroughly the hypothesis that there would not be a significant difference in the performance of the two sections, it was necessary to compare statistically the performance of the two sections through the use of

See Appendix for discussion and hypotheses concerning possible reasons for the pattern of grade distribution during this experiment.

a Chi-square analysis.[1] The results of this statistical analysis indicated that with 95 per cent probability there was a difference in the performance of the two sections. Chi-square (X^2) was equal to 8.386. Therefore, the hypothesis that there would not be a significant difference between the terminal performance of the two sections was rejected.

Entrance Test Battery Scores as Predictors of Success in Beginning Shorthand

A second major hypothesis of this study was that there would not be a significant correlation between achievement in beginning shorthand and student performance on certain subtests comprising the Entrance Test Battery of Michigan State University, both within the control and experimental sections and between the two sections.

Statistical analysis of entrance test battery scores as predictors of success in beginning shorthand.--In order to determine the true relationships which may have existed between student scores on the Michigan State University Entrance Test Battery and their subsequent grade-level achievement in beginning shorthand, a statistical analysis was made. Multiple correlation analysis was used to compare the entrance test scores attained by members of both sections

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[1] $X^2 = \sum_{A, B, C, D} \frac{(f_e - f_t)^2}{ft}$

with achievement in beginning shorthand. Table 7 provides a listing of the subtests and their respective correlations with success in beginning shorthand for members of the experimental section.

TABLE 7

CORRELATIONS BETWEEN MICHIGAN STATE UNIVERSITY ENTRANCE TEST BATTERY SUBTESTS AND GRADES ACHIEVED BY MEMBERS OF THE EXPERIMENTAL SECTION IN BEGINNING SHORTHAND

Subtests	Correlations
CQT-Informational	.3997
CQT-Total Score	.3290
CQT-Verbal	.2014
CQT-Numerical	.2006
R-Reading	.1999
E-English	.0598

CQT = College Qualification Test

The results of this analysis revealed that none of the correlations between the Entrance Test Battery Subtests and subsequent performance in beginning shorthand for the experimental section were substantial enough to possess predictive value of grades for potential shorthand students. This contention that the correlations were not in substantial enough to describe them as significant is supported by Hull who stated that coefficients of correlation below .45 or .50 are practically useless for differential prognosis and that r's of .50 to .60 are of some value while r's of .60 to .70

are of considerable value and those of .70 to .80 are of decided value.[2] As Table 7 shows, the most substantial correlation obtained was between the Information Subtest Scores and subsequent achievement in beginning shorthand (.3997). The remaining scores, when ranked in the order of their prominence, were: CQT-Total Score, .3290; CQT-Verbal, .2014; CQT-Numerical, .2006; R-Reading, .1999; and E-English, .0598. It would, therefore, appear that the Information subtest of the College Qualification Test was the best predictor of success in beginning shorthand at Michigan State University for tape laboratory types of presentation even though it was not statistically significant.

Table 8 provides a listing of the subtests and their respective correlations with success in beginning shorthand for members of the control section.

TABLE 8

CORRELATIONS BETWEEN MICHIGAN STATE UNIVERSITY ENTRANCE TEST BATTERY SUBTESTS AND GRADES ACHIEVED BY MEMBERS OF THE CONTROL SECTION IN BEGINNING SHORTHAND

Subtests	Correlations
CQT-Numerical	.4310
E-English	.3757
CQT-Total Score	.1905
CQT-Verbal	.1056
CQT-Informational	-.1189
R-Reading	-.1158

[2]Clark L. Hull, Aptitude Testing, Yonkers on the Hudson: World Book Company, 1928, p. 273, as cited by Jean Elizabeth

The results of this analysis, as shown in Table 8, revealed that none of the correlations between the Entrance Test Battery Subtests and subsequent performance in beginning shorthand for the control section were substantial enough to possess predictive value of grades for potential shorthand students. As the table indicates, the most substantial correlation obtained was between the Numerical subtest scores and subsequent achievement in beginning shorthand (.4310). The remaining scores, when ranked in their order of prominence, were: E-English, .3757; CQT-Total Score, .1905; CQT-Verbal, .1056; CQT-Informational, -.1189; and R-Reading, -.1158.

When Tables 7 and 8 are compared, it is apparent that the rank order of prominence of the correlations and subtests differs appreciably. For example, although the Numerical subtest is the best obtained predictor for the control section (.4310), it is somewhat less prominent for the experimental section (.2006). Another example is the English subtest correlation. In the control section this was the second best predictor obtained (.3757), but for the experimental section it was the least satisfactory predictor of success in beginning shorthand obtained in this study (.0598). The best predictor obtained in this study for the experimental section was the CQT-Informational sub-test (.3997) but this

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Goodenow, "A Review of Professional Literature Relating to Stenographic Prognosis" (unpublished Master's thesis, State University of Iowa, 1948), p. 8.

same subtest obtained a negative correlation of -.1189 for the members of the control section. The second best predictor for the experimental section obtained in this study was CQT-Total Score (.3290) but it proved to be a considerably weaker predictor for the control section where it ranked third in order of prominence based upon the numerical ordering of the correlations obtained in this study.

It is important to note at this point that an earlier discussion (page 60, Chapter III) of the relative merits of the Entrance Test Battery subtests as predictors stated that the English, Reading, Verbal, and Informational subtests were based on experiences similar to those found in Michigan State University courses which required adeptness in the aptitudes thought to be measured by the tests. That same discussion defined the Numerical subtest as one based on the aptitudes thought to be required in science-and mathematics-type courses rather than vocabulary-oriented courses. It also defined the Total Score of the College Qualification Test as the best single predictor of academic success at Michigan State University. These statements appear to substantiate to some degree the correlations obtained in this study for the experimental section where CQT-Informational was the best predictor obtained and the CQT-Total Score was the second best predictor obtained. However, such was not the case for the control section where CQT-Numerical was the best predictor obtained even though E-English was

the best predictor obtained and was indicative of the predictive value ascribed to it.

Therefore, one might assume, for purposes of this study, that no specific performance level on the Entrance Test Battery could be construed as indicative of actual grade-level attainment in beginning shorthand at Michigan State University regardless of whether the students were taught in a conventional fashion similar to the technique used for the control section or by utilizing a tape-laboratory approach similar to the one used in this study.

Comparison of inter-and intra-section performance.--Sub-units were constructed within the two sections on the basis of terminal grades to allow for a better comparison. Table 9 shows the relationship of these various sub-units within and between the two sections analyzed. A comparison of the mean scores on the Entrance Test Battery of each of these sections revealed marked differences. Sub-unit "A" of the Control Section had a mean score of 131.8 while the "B," "C," and "D" sub-units had mean scores of 120.6, 115.3, and 120.3 respectively. Also shown in Table 9 are sub-units "A," "B," "C," and "D" of the experimental section which had mean scores on the Entrance Test Battery of 129.7, 135.8, 143.6, and 112.5 respectively.

TABLE 9

A COMPARISON OF MEAN SCORES ATTAINED ON THE MICHIGAN STATE UNIVERSITY ENTRANCE TEST BATTERY BY MEMBERS OF THE EXPERIMENTAL AND CONTROL SECTIONS AS TO TERMINAL GRADE

Terminal Grade	Experimental Section Mean Scores	Control Section Mean Scores
A	129.7	131.8
B	135.8	120.6
C	143.6	115.3
D	112.5	120.3

Within the Control Section, the mean scores descend in direct relation to the grade received with sub-unit "D" being the one exception in that it had a comparable mean score to the sub-unit "B" of its section. Within the Experimental Section, the direct opposite is true--mean scores ascend as grades descend, except in sub-unit "D" whose mean score (112.5) was considerably lower than any other sub-unit in either section.

A comparison of the mean scores attained by both sections as to grade level of terminal performance are also

shown in Table 9. This comparison shows that sub-unit "C" of the Experimental Section had a mean score superior to that of any other sub-unit in either group. In addition, sub-unit "B" of the Experimental Section had a considerably higher mean score (135.8) than did either sub-units "A" or "B" of the control section.

The findings demonstrate that Michigan State University students with high academic aptitude, as reflected by Entrance Test Battery Scores, did not fare as well grade-wise in beginning shorthand when taught with tape-laboratory techniques as when they were taught by a traditional method. Students with low academic aptitude fared better in the traditional instructional setting.

Analysis of the Continuing Equality of the Two Sections

Shortly following the original statistical analysis of the equality of the two beginning sections, two members of the experimental section and four members of the control section withdrew from the course. Such withdrawals were allowed in accordance with University policy governing withdrawals. In each case, the student in question was released from the course for personal reasons. Since these withdrawals might have destroyed the equality of the two sections as to aptitude for college-level course work, as measured by the University Entrance Test Battery, the two sections were compared once again utilizing the scores of

those beginning students who actually completed the course. An "f" test and "t" test analysis of the possible differences in variances and means of the scores members attained on the Entrance Test Battery revealed that there was still no significant difference between the two sections.

Comparison of Entrance Test Scores Achieved by Members of Both Sections on a Grade-Level Basis

As was stated in Chapter I, one of the main purposes of this study was to determine, if possible, predictors of potential success in beginning shorthand at Michigan State University by analyzing statistically the correlations between student scores on subtests of the Michigan State University Entrance Test Battery and subsequent performance in beginning shorthand. In an effort to achieve this purpose, it was deemed advisable not only to compare Entrance Test Battery scores and final grades within the two sections and between the two sections but also to compare the Entrance Test scores and final grades on a composite basis involving both sections. To accomplish this, the Entrance Test Battery scores of all students who had achieved a terminal grade of A, regardless of section, were considered as one unit for purposes of comparison with the Entrance Test Battery scores of all those students who had achieved terminal grades of B, C, and D. Thus, by consolidating the scores of students from the two sections

on the basis of the terminal grades they received in beginning shorthand, it was possible to compare the Entrance Test Battery scores of the four resultant grade-level units to see if they differed significantly.

When these four grade-level units were compared using an "f" test to determine whether or not the variances of the scores between the grade-level units were significant, the following differences and similarities were discovered: (1) On an "f" test, the A unit and the B unit differed significantly as to their performance on the English subtest score of the Entrance Test Battery. They also differed significantly as to performance on the Informational score of the College Qualification portion of the Entrance Test Battery. (2) On an "f" test, the A unit and the C unit differed significantly as to their performance on the English subtest of the Entrance Test Battery. (3) On an "f" test, the B unit and the C unit differed significantly as to their performance on the Total Score of the College Qualification portion of the Entrance Test Battery. (4) All other combinations of comparisons between the four grade-level units, other than those cited, revealed no significant differences between any two groups compared regardless of the criteria used for comparison.

When these four grade-level units were compared using a "t" test for differences in the means, the following differences and similarities were discovered: (1) On a "t"

test, the A unit and the D unit differed significantly as to their performance on the English subtest score of the Entrance Test Battery. They also differed significantly as to performance on the Total Score of the College Qualification Test portion of the Entrance Test Battery. In each instance, the A unit performed appreciably better than the D unit. (2) All other combinations of comparisons between the four grade-level units, other than those cited, revealed no significant differences between any of the two groups compared regardless of the criteria used for comparison.

The results of these "f" and "t" test comparisons between the various composite grade-level units indicated that performance on the English subtest provided the most consistent and accurate measure of the difference in aptitude for shorthand between the students who comprised the A unit and those who comprised the D unit. These two groups were also significantly different as to their performance on the College Qualification Portion of the Test Battery. The total score for this portion of the Test Battery is composed of the scores students achieved on the CQT-Verbal, CQT-Informational, CQT-Numerical portions of the test. As has been previously stated, in each of the two prior comparisons, the A unit achieved scores which were substantially higher than those achieved by their counterparts in the D unit. When the B unit and the D unit were compared on the English subtest of the Entrance Test Battery,

the results of the "t" test indicated a significant difference between them. In this case as in all previous cases, the B unit had achieved scores on the English subtest which were substantially larger than those achieved by their counterparts in the D unit.

The fact that the A unit and D unit differed significantly as to their performance on the English subtest of the Entrance Test Battery and as to their performance on the College Qualification Test portion of the Entrance Test Battery is important to the study because it definitely shows that students at Michigan State University with above-average aptitude in the area of English did significantly better in beginning shorthand than did their peers with less ability in this area. It also showed that students with above-average aptitudes for college-level work, as measured by the College Qualification Test, did significantly better in beginning shorthand than did their peers with less ability in these areas.

When the four grade-level units were compared on the basis of their performance on the various subtest of the Entrance Test Battery, the results of the "f" test comparison showed that the A unit and B unit differed significantly on both the English subtest and on the Informational portion of the College Qualification Test. Subsequent comparisons between the A unit and the C unit showed them to be significantly different on the English subtest. The B unit and the

C unit, when compared, were found to be significantly different on the Total Score derived from the College Qualification Test. These latter comparisons, involving the use of an "f" test, tended to support the contention that performance on the English subtest provided the best single indicator of success or lack of success in beginning shorthand. They also tended to support the contention that the Total Score of the College Qualification Test was also a significantly reliable indicator of probable success in beginning shorthand. In each set of comparisons, the students with the higher scores on the subtest used (English, Total Score, and Informational) also achieved the highest grades in beginning shorthand.

Secondary Findings

In an effort to provide as much information as possible about those students who participated in the study, it was decided that additional factors should be analyzed.

This portion of the study contains a series of analyses which involved the following items:

1. An analysis of the average number of credit hours carried by members of each section who aligned themselves into groups according to terminal grades received in beginning shorthand.

2. An analysis of the credit hours of grades earned in courses carried by members of both sections according to terminal grades received in beginning shorthand.

3. An analysis of the major course of study of members of both sections according to terminal grades received in beginning shorthand.

4. An analysis of the number of absences accrued by members of both sections according to terminal grades received in beginning shorthand.

5. An analysis of the out-of-class study habits of members of both sections.

6. An analysis of terminal grades received in beginning shorthand of students who did and did not have a class immediately prior to beginning shorthand.

Credit hours carried.--This analysis was made in an effort to determine whether or not the number of credits carried might have had a relationship to the grades members earned in beginning shorthand. It was designed to establish the average number of hours of college credit carried by the members of both sections according to terminal achievement. Table 10 presents the results of this comparison of hours of college credit carried and final grade earned by members of both sections

TABLE 10

AVERAGE NUMBER OF CREDIT HOURS CARRIED BY MEMBERS OF EXPERIMENTAL AND CONTROL SECTIONS ACCORDING TO TERMINAL GRADE IN BEGINNING SHORTHAND

Terminal Grade	Average Number of Credit Hours	
	Experimental Section	Control Section
A	15.5	16.5
B.	15.4	12.7
C	15.0	11.6
D.	15.3	14.6

As Table 10 shows, the students who received "A's" in both sections carried approximately the same number of credit hours (experimental--15.5, control--16.5). However, students who grouped themselves into the "B" and "C" categories of their respective sections differed in that these who were experimental section members carried, on the average, approximately one additional three-credit course more than that which their counterparts in the control section carried. The two "D" groups were comparable to approximately the same degree that the "A" groups were. The fact that there existed an inequality between the two sections as to the number of college credits carried was not considered to have influenced the outcome of the study since no group carried an abnormally large credit load. (The University defines a normal credit or course load as one involving 16 credit hours).

In addition, it was readily apparent to the researcher that the number of credits carried per student was not an accurate common base upon which two groups of individuals might be compared. This is especially so when one considers that courses vary from student to student as to their difficulty and to their demands upon student time, and so forth.

Grades earned.--Another characteristic which was deemed worthy of examination was the number of credits of "A's," "B's" "C's," and "D's" earned by members of both

sections in all their courses for the term. It was realized that distinct comparisons would be difficult to make because of the variance in class size, but it was also realized that there might exist identifiable trends in performance when students were aligned on the basis of terminal achievement in beginning shorthand and by section. A duplicate copy of each student's grades for the term was obtained from the Registrar's Office of the University and grades were compiled in tabular form for use in the study as shown in Table 11.

TABLE 11

CREDIT HOURS OF GRADES EARNED IN COURSES CARRIED BY MEMBERS OF BOTH SECTIONS ACCORDING TO TERMINAL GRADE EARNED IN BEGINNING SHORTHAND

Terminal Grade in LIO 201	Grades Earned	Experimental Section Credit Hours	Control Section Credit Hours
	A	14	11
	B	27	26
A	C	6	25
	D	0	7
	F	0	4
	A	4	11
	B	20	35
B	C	20	16
	D	0	6
	F	3	3
	A	2	0
	B	15	7
C	C	8	17
	D	5	3
	F	0	3
	A	5	0
	B	26	3
	C	34	17
D	D	13	7
	F	0	0
Total		202	201

An inspection of Table 11 reveals that the members of both sections earned approximately the same total number of credit hours even though the control section had two members more than the experimental section. When the number of credits of course work at each grade level for each section was compared, the percentages of each grade level earned were as follows:

1. Grade of A--Experimental section - 12 per cent
   Control section - 11 per cent
2. Grade of B--Experimental section - 44 per cent
   Control section - 35 per cent
3. Grade of C--Experimental section - 34 per cent
   Control section - 37 per cent
4. Grade of D--Experimental section - 9 per cent
   Control section - 11 per cent
5. Grade of F--Experimental section - 1 per cent
   Control section - 5 per cent

The experimental section, earned (on a percentage basis) more A's and B's and fewer C's, D;s, and F's than did their counterparts in the control section.

This pattern of grades appeared to be normal in view of the fact that the members of the experimental section attained higher mean scores on the College Qualification Test than did their peers in the control section.

Major course of study of participants.--Michigan State University utilizes a University College system for freshmen and sophomore students which assigns responsibility for these students to the Dean of the University College. Although the students do not officially declare majors until

their junior year, they are advised on a dual-enrollment basis by advisors in the college of their intended major. On this basis, for example, freshmen and sophomores who intend to major in business education are assigned a business education adviser in the College of Education, even though they have not as yet achieved junior status. Students who do not elect to designate a major interest area are designated by the University as NP, or non-preference students are advised by University College undergraduate advisers. Under this system, students in each of these categories are free to elect subjects throughout the University without regard for their designation of major. All non-preference students involved in this study were in the process of changing their designation either to business education or secretarial administration, both of which are bachelor degree programs. Table 12 presents the major program of study for the members of the two sections.

As Table 12 reveals, the experimental section was composed of one Elementary Education Major, one Mathematics Education Major, six non-preference students, five Secretarial Majors, one Journalism Major, one Television Major, one Mathematics Major, one Sociology Major, and two Business Education Majors. Of the members of this section, seven were enrolled in majors (Secretarial Administration and Business Education) which normally require shorthand as an integral part of the undergraduate program. Although the six mon-preference students involved in this section

had indicated their intent to declare either Business Education or Secretarial Administration as their major, they did not do so during the term.

TABLE 12

MAJOR PROGRAMS OF STUDY OF MEMBERS OF EXPERIMENTAL AND CONTROL SECTIONS

Major	Number of Majors	
	Experimental Section Members	Control Section Members
Elementary Education	1	3
Mathematics Education	1	0
Non-preference	6	7
Secretarial Administration	5	1
Journalism	1	0
Television	1	0
Mathematics	1	1
Sociology	1	0
Business Education	2	2
Physical Therapy	0	1
Spanish	0	1
English	0	1
French	0	1
Social Science	0	2
Speech	0	1

The control section was made up of three Elementary Education Majors, seven non-preference students, one Secretarial Administration Major, one Mathematics Major, one Physical Therapy Major, two Business Education Majors, on Spanish Major, one English Major, one French Major, two Social Science Majors, and one Speech Majors Of the members of this section, three were actually enrolled in major

(Secretarial Administration and Business Education) which normally require shorthand as an integral part of the undergraduate program. Although the seven non-preference students involved in this section had indicated their intent to declare either Business Education or Secretarial Administration as their major, they did not do so during the term.

Number of absences by members of both sections.-- Table 13 shows the number of absences accumulated by members of both sections and is organized according to their final grade in beginning shorthand.

As Table 13 shows, no member of sub-unit A of the experimental section had more than two absences while two members of the comparable sub-unit of the control section had as many as four absences for the term. The average number of absences for sub-unit A of the experimental section was 1.5 and the average number of absences for sub-unit A of the control section was 1.8. There appeared to be no significant difference in the average number of absences between these two sub-units.

This same table shows that two students in sub-unit B of the experimental section had six absences each while one of their counterparts in sub-unit B of the control section also had as many as six absences. However, the average number of absences for these B sub-units was 1.8 for the experimental section and 1.55 for the control section. In

sub-unit C of the experimental section, no student had an absence; but in sub-unit C of the control section, one student had five absences. The average number of absences for sub-unit C of the experimental section was zero but it was 2.66 for sub-unit C of the control section.

TABLE 13

NUMBER OF ABSENCES ACCRUED BY MEMBERS OF BOTH SECTIONS ACCORDING TO TERMINAL GRADE RECEIVED IN BEGINNING SHORTHAND

Experimental Section			Control Section		
Student	Terminal Grade	Number of Absences	Student	Terminal Grade	Number of Absences
1	A	1	1	A	4
2	A	2	2	A	1
3	A	2	3	A	4
4	A	1	4	A	0
			5	A	0
			6	A	2
5	B	7	7	B	3
6	B	0	8	B	1
7	B	1	9	B	1
8	B	0	10	B	0
9	B	1	11	B	1
			12	B	2
			13	B	0
			14	B	0
			15	B	6
10	C	0	16	C	5
11	C	0	17	C	2
12	C	0	18	C	1
13	D	5	19	D	0
14	D	2	20	D	5
15	D	0	21	D	0
16	D	6			
17	D	3			
18	D	1			
19	D	6			

Sub-unit D of the experimental section had two class members who had six absences and one who had five absences. In sub-unit D of the control section, one class member had five absences while his two companions had none. The average number of absences for sub-unit D of the experimental section was 3.28 while in sub-unit D of the control section, it was 1.6.

It is important to note that little difference existed between sub-units A and B of both sections as to the average number of absences members of those units had. However, the difference that existed between the C sub-units (experimental = 0, control = 2.66) may well have been attributed to a number of possible causes, not the least of which may have been the "holding power" of the tape laboratory for students. This may have been especially true for those who could foresee the possibility for success through utilization of the facilities of the laboratory. Another difference existed between the D sub-units as to average number of absences by members of these two groups (experimental - 3.28, control - 1.6). This may have been the result of the fact that the experimental section met two hours later on each day than did the control section, which may have accounted for much of the higher rate of absence in sub-unit D of the experimental section.

Study Habits of Participants

In an effort to identify possible study habits and trends that might have had a bearing on the achievement patterns of the members involved in the study, two questionnaires were given to the members of both sections. The questionnaires were identical in the information sought with two exceptions; one, the directions for the second questionnaire contained reference to the fact that the information desired was for the second half of the term; and two, the questions concerning classes attended prior to the hour the students were in beginning shorthand were omitted since this information had already been obtained in the first questionnaire. A copy of the questionnaire appears in the Appendix.

The following information was derived from a compilation of student responses to the various segments of the questionnaires. Each grouping of responses is presented in both narrative and table form.

Approximate total hours studied.--Table 14 shows the approximate number of hours studied by members of both sections during the first one-half of the term, as well as during the second half of the term.

An inspection of student responses to a questionnaire designed to determine the total number of hours spent in out-of-class study of shorthand per week revealed, as Table 14 shows, that the experimental section had studied

TABLE 14

APPROXIMATE NUMBER OF HOURS PER WEEK MEMBERS OF BOTH SECTIONS SPENT STUDYING SHORTHAND OUT OF CLASS FOR THE FIRST AND SECOND HALF OF THE TERM

Experimental Section Hours Studied		Control Section Hours Studied	
Prior to Mid-term	After Mid-term	Prior to Mid-term	After Mid-term
30	20	21	25
21	15	19	18
15	15	18	18
14	14	16	15
14	14	15	14
14	14	14	14
13	13	13	14
12	12	13	12
11	12	12	12
10	12	12	11
10	10	12	10
10	10	11	10
10	9	11	10
8	8	10	9
8	8	10	8
8	7	10	8
7	6	9	8
6	5	8	8
6	5	7	6
		7	5
		7	5

Total hours studied per week for first half of the term: 227 experimental, 225 control. Average number of hours studied per week for the first half of the term: 11.9 experimental, 10.7 control. Average number of hours studied per week for the second half of the term: 11 experimental, 11.4 control.

approximately 227 hours each week prior to mid-term for an average of 11.9 hours per person per week while the control section estimated that they had studied approximately

225 hours each week for an average of 10.7 hours per person per week prior to mid-term. This table also shows that for the second half of the term, the experimental section studied a total of 209 hours per week for an average of 11 hours per person per week while the control section estimated their total out-of-class study time to have been 240 hours each week for an average of 11.4 hours per person per week. The trend in study-time utilization shows that the experimental section studied fewer total hours during the second half of the term while the control section increased their study time by about 15 minutes per person per week during this second half of the term. This may have directly influenced the outcome of the study because, as has already been demonstrated, the control section did significantly better in beginning shorthand when compared to the experimental section.

Time spent studying alone.--Members of both sections were also asked to indicate what portion of their time they had spent studying shorthand alone. Table 15 shows their responses, arranged to indicate the portion of their time they spent in solitary study of shorthand during the first and second halves of the term.

Table 14 indicates that of the 19 members of the experimental section, 7 members studied alone all the time during the first half of the term while 9 members did so during the second half of the term; 5 indicated that

TABLE 15

PORTION OF TIME SPENT STUDYING SHORTHAND ALONE AND OUT OF CLASS BY MEMBERS OF BOTH SECTIONS FOR THE FIRST AND SECOND HALF OF THE TERM

	Experimental Section		Control Section	
Portion of Study Time	Prior to Mid-term	After Mid-term	Prior to Mid-term	After Mid-term
All	7	9	9	6
1/3	5	7	5	4
1/2	3	0	2	3
2/3	3	2	5	8
None	1	1	0	0

they spent about one-third of their time studying alone during the first half of the term, while 7 members did so during the second half of the term; 3 members of the experimental section studied alone about one-half of the time during the first half of the term but only 2 did so during the second half of the term; 3 estimated that they studied alone two-thirds of the time during the first half of the term, but only 2 indicated that this was so for the second half of the term; 1 member indicated that he never studied shorthand alone during the first half of the term and 1 member also indicated that he never studied shorthand alone during the second half of the term.

Of the 21 members of the control section who were asked the same question, 9 said they always studied alone during the first half of the term while 6 indicated that

that this was so for them during the second half of the term; 5 members said that they studied alone about one-third of the time during the first half of the term while 4 indicated that they did so during the second half of the term. Only 2 members of the control section studied alone one-half of the time during the first half of the term, but 3 members stated that they did so during the second half of the term. Five members estimated that they studied alone two-thirds of the time during the first half of the term and 8 members concluded that this was their method of studying shorthand for the second half of the term. No member indicated that he never studied alone for either half of the term. From the data presented, one might conclude that more students in the experimental section studied alone during the second half of the term than did so during the first half. One might also conclude that members of the control section studied alone far less during the second half of the term than they did during the first half.

Time spent studying near but not with others.--Participants of both sections were asked to estimate the amount of time they had spent studying shorthand near but not with other students who were not studying shorthand. Table 16 shows the results of their estimations.

TABLE 16

PORTION OF TIME SPENT BY MEMBERS OF BOTH SECTIONS STUDYING SHORTHAND NEAR BUT NOT WITH OTHER STUDENTS WHO WERE NOT STUDYING SHORTHAND OR SLEEPING

	Experimental Section		Control Section	
Portion of Study Time	Prior to Mid-Term	After Mid-Term	Prior to Mid-Term	After Mid-Term
All	9	5	1	1
1/3	3	4	8	6
1/2	1	2	4	3
2/3	1	1	4	8
None	2	2	5	2

As Table 16 shows, 9 members of the experimental section said that they did all of their studying near other students during the first half of the term while only 5 said that this was true for them during the second half of the term. Three members of the experimental section indicated that they spent about one-third of their time studying near other students during the first half of the term, and 4 estimated that this was true for them during the second half of the term. Only 1 member of the experimental section studied near other students one-half of the time during the first half of the term, but 2 members indicated that this was their mode of study for about one-half of their study time during the second half of the term. Two members of the experimental section said that they never studied near other students during

the first half of the term and the same number of members indicated that this was the case for them during the second half of the term.

In the control section, 1 member indicated that he spent all of his study time which was devoted to shorthand near but not with other students who were not studying for the first half of the term. For the period following mid-term, 1 member said that he utilized all his study time which was devoted to shorthand in this manner. Eight members of the control section said that they spent about one-third of their study time which was devoted to studying shorthand in this manner during the first half of the term. Four members said that they spent two-thirds of their shorthand study time in this manner during the first half of the term, but their numbers increased to 8 members for the second portion of the term. Five members indicated that they never studied near other students who were not studying or sleeping during the first half of the term, while only 2 said that this was true for them during the latter half of the term.

The habit of studying near but not with others who were not studying shorthand appears to have been practiced more frequently during the first half of the term by the experimental section, as a whole, than during the second half of the term. The control section, however, utilized this study technique less frequently during the first

half of the term and more frequently during the second half of the term.

Time spent taking dictation from other students.--Members of both sections were asked to estimate the amount of time they spent taking dictation from other students during both the first and second halves of the term. Table 17 presents the amount of time spent by members of both sections who took dictation from other members as a means of studying shorthand.

TABLE 17

PORTION OF OUT-OF-CLASS STUDY TIME SPENT IN TAKING DICTATION FROM OTHER STUDENTS BY MEMBERS OF THE EXPERIMENTAL AND CONTROL SECTIONS

	Experimental Section		Control Section	
Portion of Study Time	Prior to Mid-term	After Mid-term	Prior to Mid-term	After Mid-term
All	0	0	0	0
1/3	4	7	6	10
1/2	0	0	2	0
2/3	0	0	0	0
None	15	12	13	11

As Table 17 shows, 4 members of the experimental section indicated that they had utilized this procedure to study for about one-third of their study time, which was devoted to studying shorthand, during the first half of the term; while 15 members of the experimental section said that they had not used this procedure. During the

second half of the term, 7 members of the experimental section also indicated that they had spent about one-third of their study time which was devoted to studying shorthand in taking dictation from other students.

Six members of the control section pointed out that they had spent about one-third of their study time which was devoted to the study of shorthand in taking dictation from other students during the first half of the term. Two other control-section members said that they had utilized this study procedure about one-half of the time for study during the first half of the term. When the members of the control section were polled at the end of the second half of the term, 10 members indicated that they had spent about one-third of their study time which was devoted to studying shorthand in taking dictation from other students. In each case mentioned, the remaining members of the control section indicated that they had not used dictation from other students as a method of study during either half of the term.

The differences between the two sections as to the utilization of taking dictation from other students as a method of study for shorthand were minimal. In the experimental section, the number of members who utilized one-third of their study time in taking dictation from other students changed from 3 students prior to mid-term to 7 students during the second half of the term. The

control section members varied their study habits from the first half of the term in that 6 members had used dictation from other students for one-third of their study time which was devoted to studying shorthand during the first half of the term while 10 members used their procedure about one-third of the time during the second half of the term. Although 2 members of the control section utilized this study procedure during the first half of the term for about one-half of their study time, no student stated that he had used this method during the second half of the term for any portion of his study. This fact was important to the study because it indicated that there was little difference between the two sections as to the use of dictation from other students as a method of studying shorthand and thereby should not have influenced the results of the study.

Time spent studying by using tapes or records.-- It was considered important to know what portion of their study time students devoted to the use of dictation from tapes or records in their study procedure. Table 18 presents information concerning the use of taped or recorded dictation material for study by members of both sections.

As Table 18 shows, only one member of the experimental section used this method of study about one-third of the time during the first half of the term, and none used this

TABLE 18

PORTION OF TIME SPENT USING TAPES OR RECORDS TO STUDY SHORTHAND BY MEMBERS OF BOTH SECTIONS OUTSIDE OF CLASS

Portion of Study Time	Experimental Section		Control Section	
	Prior to Mid-term	After Mid-term	Prior to Mid-term	After Mid-term
All	0	0	0	0
1/3	1	0	1	2
1/2	0	0	0	0
2/3	0	0	0	0
None	18	19	20	19

procedure during the second half of the term. One member of the control section stated that he had utilized taped or recorded dictation material during the first half of the term for about one-third of his study time and two members indicated that they had spent about one-third of their study time using taped or recorded dictation during the second half of the term.

The number of students utilizing this procedure of study during either portion of the term in either section never exceeded two students. This meant that the great majority of students in the experimental section (18 out of 19) and in the control section (19 out of 21) did not use recorded dictation material for study out of class during the entire term. It is important to the study in

that it identifies the fact that students did not make use of taped or recorded material for out-of-class study and thereby did not appreciably affect the outcome of the study by so doing.

Portion of time students read plate material twice before writing it.--Students of both sections were asked to indicate how often they read their plate material twice before writing it during their study time. Table 19 provides information concerning the amount of time members of both sections used this study procedure.

TABLE 19

PORTION OF TIMES MEMBERS OF BOTH SECTIONS READ THEIR PLATE MATERIAL TWICE BEFORE WRITING IT DURING THEIR OUT-OF-CLASS STUDY TIME

Portion of Time	Experimental Section		Control Section	
	Prior to Mid-term	After Mid-term	Prior to Mid-term	After Mid-term
All	11	12	12	12
1/3	1	0	5	5
1/2	1	1	0	1
2/3	4	4	3	0
None	2	2	1	3

As Table 19 shows, 11 members of the experimental section stated that during the first half of the term they always read their plate material twice before writing it. Twelve members of this section indicated that they did so during the second half of the term. One member

of the experimental section used this method of study about one-third of the time during the first half of the term; another member utilized this procedure about one-half of the time during the first half of the term and 4 members used this procedure about two-thirds of the time during the first half of the term. Only 2 members of this section stated that they had not read the plate material twice before writing it during the second half of the term.

Twelve members of the control section indicated that they read the plate material twice before writing it during both the first and second half of the term. Five members of this section indicated that they also used this study procedure during both the first and second half of the term while 1 member stated that he used this procedure about one-half of the time during the second half of the term. Three members of this experimental section stated that they utilized this method of study about two-thirds of the time during their study efforts for the first half of the term. One member indicated that he did not use this method of study during the first half of the term and 3 members stated that they did not read the plate material twice before writing it during the second half of the term.

In reviewing the information contained in Table 19, which shows the portion of times members of both the

experimental and control sections read the plate material twice before writing it during their out-of-class study time, it is apparent that there was little difference in study habits within the two sections or between the first and second halves of the term. Although 12 members of the control section utilized this procedure of study compared to 11 members of the experimental section, the difference was not considered to be appreciable. During the second half of the term, the number of experimental members using this pattern of study all of the time was equal to the number who did so in the control section but the number of experimental members, in addition to this, who used this study pattern two-thirds of the time was considerably more than their counterparts in the control section (0). The control section changed its study pattern habits more markedly during the second half of the term than did the experimental section in that fewer members read the material twice before writing it. This may have indicated that some members of the control section felt secure in the knowledge that they were doing well in the course and therefore decided not to use this procedure quite so heavily. In addition, this study pattern--reading the plate material twice before writing it--is typically a beginning study pattern that one might expect students to discard as soon as their confidence in their ability reached a level that gave them a feeling of security.

Table 20 was constructed in an effort to determine whether or not there was a marked difference as to final grade between those who read their plate material twice before writing it and those who did not. As the table shows, about one-half of those who received A's in the experimental section always read their plate material twice before writing it during the first half of the term. One-fourth of them indicated that they did so two-thirds of the time and one said that he never read his plate material twice before writing it during the first half of the term. Of this same group, three-fourths stated that during the second half of the term they did read their plate material twice before writing it. When the performance of the A group was compared with that of the D group, as to this portion of the study habits, there was little difference in the number or per cent of them who performed similarly. Fifty-seven per cent of the D group always read their plate material twice before writing it during the first half of the term and the same number indicated that this held true for the second half of the term also. The fact that forty-three per cent of the D group read their plate material twice before writing it about two-thirds of the time during the first half of the term adds substance to the statement that the D group spent considerably more of its time reading plate material twice before writing it than did any other group in the experimental section.

TABLE 20

PORTION OF TIME MEMBERS OF BOTH SECTIONS READ THEIR PLATE MATERIAL TWICE BEFORE WRITING IT DURING THEIR OUT-OF-CLASS STUDY TIME ARRANGED ACCORDING TO TERMINAL GRADE RECEIVED

	Experimental Section			Control Section	
Portion of Time	Prior to Mid-term	After Mid-term		Prior to Mid-term	After Mid-term
All	2	3		2	2
1/3				2	1
1/2			Grade of A		
2/3	1			1	1
None	1	1		1	2
All	3	4		6	7
1/3				1	1
1/2			Grade of B		
2/3				1	1
None	1	1		1	
All	2	1		2	2
1/3	1			1	1
1/2			Grade of C		
2/3		2			
None					
All	4	4		1	1
1/3				2	
1/2			Grade of D		
2/3	3	2			
None					1

Only one-third of those who received A's in the control section read their plate material twice before writing it during the first half of the term. An additional one-third of this group studied in this manner one-third of the time they studied shorthand and one-sixth of them did so two-thirds

of the time they studied shorthand. An additional one-sixth of them never read their plate material twice before writing it during the first half of the term. Their counterparts in the D group of the control section indicated that one-third of them always read the plate material twice before writing it during the first half of the term and an additional two-thirds of them read the material twice before writing about one-third of the times they studied shorthand.

During the second half of the term, the percentage of A group members who always read their plate material twice before writing it remained the same as during the first half of the term (33 1/3 per cent). However, the percentage of those in the A group who never read their plate material twice during the second half of the term rose from 16 2/3 per cent during the first half of the term to 33 1/3 per cent during the latter half. One-third of the members of the D group of this control section always read their plate material twice before writing it during the first and secondhalves of the term. Two-thirds of this group did so one-third of the time during the first half of the term but during the second half of the term, one-third of the members read their plate material twice before writing it about 50 per cent of the times they studied shorthand and one-third of them did not do so at all.

It would appear that the marked change in study habits took place within the A group of the control section during the term. This was evidenced by the fact that one-third of their membership never read their plate material twice before writing it during the latter half of the term even though a like number did so during the first half of the term. The D group of the experimental section utilized this method of study more frequently than any other group in either section. On the basis of this analysis and the information derived from it, one could assume that there was no observable link between reading shorthand plate material twice before writing it and success in shorthand.

Time spent in writing from plate material.--Members of the two sections were asked to indicate the portion of their study time that they devoted to writing from plate material as part of their study. Table 21 presents information concerning the portion of study time that members of both sections devoted to writing from plate material.

As Table 21 shows, during the first half of the term, 18 of the 19 members of the experimental section specified varying amounts of study time that they devoted to this pattern of study. Of these 18, 4 indicated that they wrote from plate material all of the time; 1 stated that one-third of his time was spent in writing from plate material; 3 members said that they spent about one-half of their time

studying in this fashion; 10 members indicated that they spent two-thirds of their time writing from plate material; and 1 member stated that he spent no time, during his study pattern, in writing from plate material. During the second half of the term, these same 19 members of the experimental section divided their time as follows: 1 spent all his time writing from plate material, 8 indicated that they spent about two-thirds of their time writing from plate material, and 1 stated that he spent no time writing from plate material during his study time.

TABLE 21

PORTION OF STUDY TIME SPENT IN WRITING FROM PLATE MATERIAL BY MEMBERS OF BOTH SECTIONS

	Experimental Section		Control Section	
Portion of Study Time	Prior to Mid-term	After Mid-term	Prior to Mid-term	After Mid-term
All	4	1	4	0
1/3	1	0	1	5
1/2	3	9	7	6
2/3	10	8	9	9
None	1	1	0	1

As Table 21 shows, the control section had 4 members who spent all of their study time writing from plate material during the first half of the term while only 1 member indicated that he spent about one-third of his study time in writing from plate material. Seven members

indicated that they spent about one-half of their study time writing from plate material and 9 members of this control section stated that they used about two-thirds of their study time writing from plate material. During the second half of the term, members of the control section reported that 5 of them utilized writing from plate material as a study pattern for about one-third of the time and 3 of them spent about one-half of their study time in writing from plate material. Nine members of the control section indicated that they utilized writing from plate material about two-thirds of the time during their study efforts, and only 1 student indicated that he did not use this procedure during the second half of the term.

The general trend exhibited in Table 21 appears to be one of a decrease in the amount of time devoted to writing from plate material as the major pattern of study. This was due, largely, to the change in directions given the class about study habits as the term progressed. The instructor had encouraged them to (a) read from plate quickly, (b) copy from plate quickly, and (c) quickly write from the key in shorthand. The technique added under "c" might have been more than enough to cause them to decrease the amount of time spent on any one facet of their study pattern.

Total time spent studying shorthand each week.--In an effort to add further clarity to the analysis of student

study behavior patterns, the researcher asked the students to estimate the total number of hours they spent in studying shorthand each week of the term. The responses to this question are presented in Table 22 along with a comparison of total hours studied to terminal grade received in beginning shorthand.

Although no specific number of hours indicated by any group of students appeared to correspond to any definite degree with the final grade received, it was obvious from Table 22 that the students who indicated larger numbers of study hours were the ones who, as a general rule, received the lower grades. This may indicate that slower students generally need to invest more time in study in order to achieve minimum grades, or it may indicate that these students did not utilize efficient and rewarding types of study habits during the time they devoted to study.

Section members who met and did not meet classes prior to beginning shorthand.--It was considered important to assess, if possible, the probable impact that meeting another class immediately prior to beginning shorthand may have had on the performance of members of both sections who had such commitments. Because of the University's rapid physical development, the distance between classrooms is is often great enough to make it difficult for the students to get from one class to the next in the allotted ten-minute

students must now, in some instances, travel twice the distance formerly required between classrooms merely because their schedule called for a class meeting in a building which did not exist when the original concentric map of campus travel times and distances was computed. (See Appendix for a concentric map of the campus.)

TABLE 22

TIME SPENT STUDYING SHORTHAND EACH WEEK BY MEMBERS OF BOTH SECTIONS ACCORDING TO TERMINAL GRADES IN BEGINNING SHORTHAND

Hours Studied by Students	Terminal Grades Received by Students: Experimental Section A	B	C	D	Control Section A	B	C	D
25							1	
20				1				
18						1	1	
15	1					1		
14				2	1	2		
13			1					
12		1	1	2	1	1		
11								1
10	1	1	1		1	1		1
9		1				1		
8		1		1	1	2	1	
7	1							
6		1		1	1			
5	1				1			

Student class schedules were examined in an attempt to determine whether or not students in one section or the other traveled greater distances to attend beginning shorthand. In the process of analyzing this factor, it was deemed important to identify those students who had a class prior to beginning shorthand and those who did not in order that some estimate might be made, if possible, of the probable effect that having a prior class might have had upon achievement in beginning shorthand. Table 23 indicates the days of the week on which members of both the experimental and control sections had classes prior to beginning shorthand.

As Table 23 shows, ten members of the experimental section had a class prior to beginning shorthand on Monday, Tuesday and Thursday while only six members of this section had a class prior to beginning shorthand on Friday. The fact that only one member of the control section had a class prior to beginning shorthand may have influenced the outcome of the study in that the majority of the members of this section (20 out of 21 members) were not forced to travel any great distance during the ten-minute period normally allowed between classes. However, students who did not have a class immediately prior to beginning shorthand

could have come further distances from part-time jobs, off-campus residences, or from eating establishments located both on and off campus.

TABLE 23

NUMBER OF MEMBERS OF BOTH SECTIONS WHO HAD A CLASS THAT IMMEDIATELY PRECEDED BEGINNING SHORTHAND ON THE DAYS INDICATED

Day	Number of Students Having Prior Class	
	Experimental Section	Control Section
Monday	10	1
Tuesday	10	0
Thursday	10	1
Friday	6	1*

*Only one member of the control section had a class prior to beginning shorthand. Over one-half of the experimental section members had a class prior to shorthand on at least three days of the week.

No attempt was made to identify the distance-time factor in these latter cases because of the apparent possibility of widespread variance in day-to-day behavior patterns which these students may have used. This was not considered to be the case for those who had commitments to attend classes immediately prior to beginning shorthand for the reason that they were subject to both the factor of distance (between buildings where classes were offered) and the factor of time (the ten-minute interval between classes allowed for passing).

The only apparent difference which is observable from this data is the time element of between-classes travel imposed on over half of the experimental section members which resulted from the fact that they attended a class immediately prior to beginning shorthand. No attempt was made to measure the physiological effect of having had a class immediately prior to beginning shorthand on the members of either section. This was deemed to be impractical because students could have chosen any number of modes of travel between classes besides walking. The fact that the students could have elected varying methods of transportation between classes made it quite impossible to attribute significance to the distance factor.

Table 24 was constructed to show a comparison of final grades achieved in beginning shorthand and the distance students came who had classes immediately prior to beginning shorthand.

Although these buildings are not close in the normal sense of the word, they are within what might be called normal walking distance. However, Case and Wonders Halls are by far the greatest distance from Berkey Hall where the two sections of beginning shorthand were taught. As can be seen in the table, the two students coming to beginning shorthand from their classes in Case and Wonders Halls received grades of A and C respectively. The

remaining students within the experimental section achieved a wide range of grades with no particular pattern having evolved between grades received and the buildings students were in prior to shorthand.

TABLE 24

BUILDING FROM WHICH MEMBERS OF BOTH SECTIONS CAME WHO HAD CLASSES PRIOR TO BEGINNING SHORTHAND AND TERMINAL GRADES MEMBERS ACHIEVED

Terminal Grade of Student		Prior Class	
Experimental Section	Control Section	Building	Days
A		Bessey	M
A		Berkey	T, Th
A		Berkey	T, Th
A		Case	M, T, Th, F
B		Union	M, F
B		Bessey	M, T, Th, F
	C	Bessey	M, Th, F
C		Berkey	M
C		W.I.	T, Th
C		Wonders	T, Th
D		Berkey	M
D		Bessey	T, Th, F
D		Erickson	T, Th
D		Berkey	M
D		Bessey	M, T. Th, F

Summary of the Findings

An analysis of Pre-test scores achieved by members of both sections revealed that those students labeled as true beginning shorthand students were, in fact, beginners. The average scores on all portions of the Pre-test were zero.

When the Post-test scores were analyzed, it was possible to show a statistical difference (on "f" test, on longhand transcription portion) between the performance of the experimental and control sections as to terminal grades received. In this case, the control section did significantly better.

A comparative analysis of the terminal performance of the two sections revealed that the control sections did significantly better than their counterparts in the experimental section as to terminal grades in beginning shorthand.

The Entrance Test Battery scores were examined as possible predictors of success in beginning shorthand. Multiple correlation analysis revealed that although there was some correlation between certain portions of the Entrance Test Battery and terminal grades in beginning shorthand, none of these coefficients of correlation were considered high enough to warrant identifying them as being accurate.

When the scores of students from both groups were averaged by the computer to give a mean score by grade level attained in beginning shorthand, it was obvious that the experimental students who received the grade of C in beginning shorthand had considerably higher average entrance test battery score (as a group) than did any other group within either section. Another phenomenon

which occurred was the fact that as grades descended in the experimental section (not including the D group) the mean score for the Entrance Test Battery increased. By the same token, in the control section, as grades descended, the mean scores for the Entrance Test Battery also decreased with the exception of the D group which equaled approximately the B group.

To ensure that the two sections had remained equal throughout the experiment even though some students had withdrawn from the sections, the two groups were re-analyzed. The results of this statistical analysis proved that the the two groups were not significantly different.

When the members of both sections were once again compared in an attempt to determine whether or not they differed appreciably as to their performance in beginning shorthand, it was decided that they should be joined on the basis of grades. Thus, all A's, regardless of section, were put into one category called grade-level A. Each other grade-level unit was constructed in the same manner. When the A's, B's, C's, and D's were compared to each other on the basis of their scores on various portions of the Entrance Test Battery, it was possible to show statistically that students who achieved an A in beginning shorthand, regardless of section, were significantly different from their peers in the D grade-level unit, in their performance on both the English subtest of the

Entrance Test Battery and the College Qualification portion of the Entrance Test Battery. In other statistical comparisons, the A unit and the C unit differed significantly as to their performance on the College Qualification portion of the Entrance Test Battery as did the B and C units. The A and B units differed significantly as to their performance on the English subtest.

An analysis of the average number of credit hours carried by members of each section who aligned themselves into groups according to terminal grades received in beginning shorthand showed that the members of the experimental section, percentageiuise, carried more credits as a group and as individuals than did the members of the control section.

However, this difference in the number of credits carried was not considered significant for reasons presented previously in this chapter. Also, percentagewise, the members of the experimental section earned more grades of A and B and fewer grades of C and D than did the members of the control section.

This pattern of grades was considered normal for the experimental section members because of their higher scores on the Entrance Test Battery. This is not to say that the control section did not earn more A's and B's in beginning shorthand.

Several other analyses were made of various possible differences which might have existed between the two sections. Such items as major course of study, number of absences, study habits, and having had a class immediately prior to beginning shorthand did not appear to have a measurable influence upon the results of the study.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Nature of the Problem

This study was an analysis of the effects of the use of a tape-laboratory approach upon achievement in beginning collegiate shorthand classes. The study was also concerned with idendifying possible predictors of success in beginning collegiate shorthand classes.

The study was divided into three distinct phases. The first phase of the study was concerned with measuring the difference, if any, in terminal achievement between two groups of students who were enrolled in beginning shorthand but who were taught utilizing two different techniques. The second phase of the study consisted of an analysis of the relationship between student scores on the University Entrance Test Battery and their subsequent achievement in beginning shorthand. The third phase of this study was composed of a series of analyses designed to measure the relationship, if any, between performance in beginning shorthand and observable varying factors which may have contributed to success or the lack of success.

The hypotheses under test.--The terminal performance of the two sections of beginning shorthand were compared by testing the following null hypotheses:

1. That the use of a tape-laboratory approach as a part of the instructional process for the experimental section would not result in significantly better performance. Performance standards were based on the total number of words transcribed correctly from dictation by the end of the term

   a. on three or more two-minute takes at 60 words per minute using new material

   b. on three or more three-minute takes at 60 words per minute using new material

   c. on three or more two-minute takes at 80 words per minute using new material.

2. That there is not a correlation between achievement in beginning shorthand and student performance on certain subtests comprising the Entrance Test Battery of Michigan State University within the control and experimental sections and between the two sections.

3. That additional factors such as the differential in ages of the members of the two sections, the differential in number of college credits carried per student in each section, the differential in the number of absences accrued by each member of each section, and the differences in study habits of the members of each section would not appreciably affect student performance in beginning shorthand.

Purposes of the study.--The purposes of this study were: (1) to determine, under controlled experimental conditions, the effect of the utilization of a tape-laboratory approach to teaching shorthand on the performance of a selected group of beginning shorthand students at Michigan State University; (2) to determine, if possible, predictors of potential success in beginning shorthand at Michigan State University by statistically analyzing the correlations between student scores on the subtests of the

Michigan State University Entrance Test Battery and subsequent performance in beginning shorthand, as reflected in the form of terminal grades; and (3) to examine additional factors which might have influenced the results of the study such as, the age of the participants, the major fields of study of the participants, average number of college credits carried per participant in each section as compared with terminal grades achieved in beginning shorthand, number of absences accrued by members of each section, and study habits of members of each section.

Importance of the study.--The importance of and need for this study were clearly demonstrated when the following facts were considered:

1. Secondary school and college enrollments across the nation have increased rapidly and by so doing have placed heavy instructional burdens on qualified staff personnel who are actively engaged in teaching shorthand.

2. There is a need to provide better and faster means of teaching skill subjects to potential business teachers to meet the demand for such personnel in the secondary school system.

3. There is a need to provide better and faster means of teaching skill subjects to potential secretaries to meet the demand for such personnel in business and industry.

4. There is a need to identify and develop effective teaching aids in the shorthand skill area to meet more adequately the demands placed upon present and future personnel who are and will be faced with teaching vocational shorthand to job-bound youth.

5. There is a need to contribute to the fund of knowledge about how people learn shorthand best and to identify possible predictors of success in shorthand as a means of conserving both time and human resources.

6. There is a need to investigate the many possible methods of using tape-laboratory facilities in an effort to identify patterns of utilization which produce the best results in the least amount of time.

An examination of the professional literature regarding the use of tape laboratories in the teaching of elementary Gregg shorthand revealed a lack of research data which was primarily concerned with the use of such equipment to teach the Diamond-Jubilee Series of Gregg Shorthand which was recently introduced into many of the secondary schools of the nation. In fact, no research of this type has been reported which utilized this revised system of Gregg shorthand in conjunction with a tape-laboratory approach. It was, therefore, considered important to investigate the learning possibilities which this new system had as it related to the use of a tape-laboratory approach for teaching in beginning shorthand. This consideration was based on the belief that it would provide implications for the redesign of current teaching methodology in the area of teacher training and that it could also serve as a guide to current and prospective teachers.

This study was also important because it was designed to discover, if possible, reliable criteria for estimating probable success in beginning collegiate shorthand. The identification of such criteria has not as yet been reported;

and yet Frink,[1] in her analysis of shorthand research for the years 1946-57, reported estimates of shorthand attrition as high as 50 per cent with actual reported failures ranging from 16 per cent to 49 per cent. Thus it was important to undertake an analysis of the possible existence of such criteria at Michigan State University for use on the local level as well as for the implications this analysis may have had for other institutions.

The portion of this study which was devoted to the identification of possible predictors of success in beginning Gregg shorthand, Diamond Jubilee Series, was important as a further probe into the area of prognosis in that it identified the status of Entrance Test Battery Subtest Scores as possible predictors of success for Michigan State University students in beginning shorthand. The results of this analysis have implications of both local and national importance. On the local level, the results of this analysis provided a basis for further research in the area of prognosis. By so doing, it contributed to a growing fund of information about what kinds or types of students appear to prosper under one or another instructional technique in beginning shorthand at Michigan State University. On the national level, this portion of the study added confirming-type data to the existing fund of knowledge about prognosis and helped to further clarify

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[1]Frink, op. cit., p. 32.

the role of various criteria as predictors of potential success in beginning shorthand. By so doing, it has further delineated the need for differing kinds of analyses in the area of prognosis which have thus far not been reported.

Limitations of the study.--The study was directly concerned with the implications for improved teaching and learning which a tape-laboratory approach might have in beginning shorthand classes. No attempt was made to extrapolate the findings to other levels or types of shorthand instruction whether they be at the secondary or collegiate level or whether they be at a performance level beyond beginning Gregg Shorthand, Diamond Jubilee Series, as was taught at Michigan State University during the winter term, 1964.

The findings were further limited to the two sections of beginning shorthand taught at Michigan State University as LIO 201, which is chiefly concerned with departmentally established standards of performance. No attempt was made to consider the implications of the findings for other shorthand systems than Gregg.

Summary of the Procedures

Definition of the population.--The population was composed of 40 beginning shorthand students who had no prior shorthand experience. These 40 students were divided between the two sections of the course as follows: (1)

The experimental section had 19 members, and (2) the control section had 21 members. In addition to these 40 members who had no prior shorthand experience, the experimental section had 11 other members with prior shorthand experience and the control section had 5 other members with prior shorthand experience. None of the 16 members with prior shorthand experience were included in the study. This was done to avoid the obvious influence that their prior shorthand experience might have had upon the results of the study.

Collection of the data.--The assumption was that the students who enrolled in the two sections of LIO 201, Beginning Gregg Shorthand for the winter term 1964 would randomly distribute themselves between the two sections as to aptitude for college-level course work, as could be measured by their performance on the Entrance Test Battery of the University. To establish the equality or inequality of the beginning groups as to their aptitued for college-level course work, student scores on the subtests of the Entrance Test Battery were treated statistically utilizing both an "f" and "t" test analysis. This analysis was repeated at the end of the term and involved only those "true beginners" who had no prior shorthand experience. In both cases, the original analysis and the analysis at the end of the term, the two sections proved to be not significantly different as to their aptitude for college-level course work as measured by the Entrance Test Battery.

A Pre-test was administered to the members of both sections on the first day of class to serve as the criterion test and to provide a basis for checking the claims of students that they had no prior shorthand experience.

The same instructor taught both sections to provide a control over the possibility of variance in instructional procedure which might have resulted from the use of more than one instructor. The same instructional procedure was utilized for both sections with the one notable exception being the use of the tape-laboratory facilities for one-half of the instructional period each day for the experimental section. The same lesson plans and the same textbook were used for both sections with the only divergence being the pre-planned use of the tape-laboratory facilities for the experimental section during one-half of the period each day and traditional classroom procedures for the control section. Anecdotal records were kept in each section to aid in comparing instructional procedures and observed results in an effort to maintain uniformity of presentation.

A study-habit questionnaire was presented to members of both sections prior to mid-term and also prior to the end of the term. This questionnaire consisted of items directly concerned with how students studied.

A Post-test was administered to the members of both sections on the last day of class to serve as both the criterion test and also to measure the difference in group

performance, if any, between the two sections involved in the study. An "f" test statistical procedure was used to assess the comparability of the variances of the two sections on the various portions of the post-test and a "t" test statistical procedure was used to assess the difference between the mean scores of the two sections on each sub-portion of the Post-test.

The terminal achievement levels of the two sections, as was reflected by the final grades achieved by members of both section, was compared utilizing a Chi-square statistical procedure to determine the statistical significance of the difference in inter-section performance, if any.

A multiple-correlation core program written for use with Michigan State University's Control Data Corporation 3600 computer was used to identify the correlations, if any, between student scores on the Entrance Test Battery of the University and subsequent achievement in beginning shorthand.

Additional utilization of this same multiple-correlation core program and the Control Data Corporation 3600 computer provided an analysis of the mean scores attained by students on the Entrance Test Battery of the University according to their final grade grouping in beginning shorthand.

Comparisons were made between grades achieved in beginning shorthand and various factors which might have contributed to student performance in beginning shorthand, such as (1) total credit hours carried, (2) total grades earned in all subjects for the term, (3) the major course of study of each participant, (4) the number of absences accrued by each member, and (5) the number of students who had a class immediately prior to beginning shorthand as a measure of the time-distance factor of stress which may have affected performance in beginning shorthand.

Findings

Difference in Achievement between Tape and Non-tape

1. The assumption that the two beginning sections were, not statistically different as to their aptitude for college-level course work was supported by the results of an "f" test for variance of subtest scores within and between the two sections and by the results of a "t" test of the difference between the means of the subtest scores of the two sections. These same testing procedures were used at the end of the term to further substantiate that the two sections were homogeneous as to aptitude for college-level course work even though four members of one section and one member of the other section had withdrawn from class.

2. The results of the Pre-test indicated an average score of zero on all sub-portions of the test with the exception that three members of the class had purchased their books early and were able to identify as many as three out of the forty possible items which comprised four of the sub-portions of the Pre-test. The results of this Pre-test supported student claims that they had no prior shorthand experience. A subsequent check of student personnel records further substantiated their contentions.

3. The results of the Post-test were treated statistically with an "f" test for the comparability of variance in sub-portion Post-test scores and were found to differ significantly. A "t" test for the difference in means of the scores of the two sections revealed a significant difference between the two sections on the Post-test. In each of the two analyses, the control section had higher scores.

The results of the post test, in which the control section performed significantly better than the experimental section (as measured by an "f" test) on the longhand transcription portion of the test, supports the findings of the study that the control section achieved better in terms of terminal performance than did their counterparts in the experimental section.

4. The terminal performances of the two sections were compared and found to differ significantly. A Chi-square analysis revealed that $X^2 = 8.386$. Therefore, the null hypothesis that there would be no significant difference in the performance of the two sections is rejected.

Reliability of Entrance Test as Predictors

1. A multiple-correlation analysis of the relationship between Entrance Test Battery Scores and subsequent achievement in beginning shorthand revealed no significant correlation between any one of the subtest scores and achievement in beginning shorthand. Therefore, the null hypothesis that there would not be a significant correlation between student scores on the Entrance Test Battery and subsequent achievement in beginning is accepted.

2. A series of "f" and "t" test comparisons were conducted involving student scores on the subtests of the Entrance Test Battery. This series combined the students with like grades from both sections into four categories based upon the grade they received in beginning shorthand. The results of these comparisons showed that there was a significant difference in student performance on the English subtest between students of both sections who received a terminal grade in beginning shorthand of "A"

or "B". These same two groups differed significantly as to their performance on the Informational subtest. ("f" test). Those students receiving terminal grades of "A" and "C" differed significantly as to their performance on the English subtest. Those students receiving terminal grades of "B" and "C" differed significantly as to their performance on the College Qualification portion of the Entrance Test Battery which was represented by the total score for the Verbal, Informational, and Numerical subtests, ("f" test)

During the "t" test phase of this series, it was discovered that those students who received a terminal grade of A and D differed significantly as to their performance on the English subtest and they also differed significantly as to their performance on the College Qualification portion of the Entrance Test Battery which was represented by the total score for the Verbal, Informational, and Numerical subtests. All other combinations, for purposes of comparison, revealed no significant difference between the various grade-level units.

3. The hypothesis that there would be no observable trend of relationship between student achievement in beginning shorthand and such factors as: (1) major fields of study, (2) average number of college credits carried per participant in each section, (3) number of absences accrued by members of each section, and (4) study habits of members of both sections, is accepted.

Conclusions

From an analysis of the findings of this study which pertained to the effect of a tape-laboratory approach on achievement in beginning collegiate shorthand and from an analysis of the observable relationships between student scores on the University Entrance Test Battery and subsequent achievement in beginning shorthand, the following conclusions have been drawn. These conclusions are pertinent to this study; substantiating research will be necessary before they can be generalized.

1. That the use of tape-laboratory facilities as an instructional aid in the teaching of beginning shorthand does not guarantee an increase in the ability of students to take and accurately transcribe new-matter dictation material as measured by the existing departmental standards at Michigan State University.
2. That performance on the existing University Entrance Test Battery does not provide an accurate measure for predicting individual success in beginning shorthand at Michigan State University. However, certain subtests of the Entrance Test Battery, such as the English subtest, do provide an accurate indicator of probable success in beginning shorthand to the extent that they differentiate between minimal and maximum

performance as measured by terminal grades. (That is, low scores on the English subtest were possessed significantly more often by students who attained grades of D than those students who attained grades of A.) Furthermore, the College Qualification portion of the Entrance Test Battery which is comprised of the Verbal, Informational, and numberical subtests does provide an accurate indicator of probable success in beginning shorthand to the extent that it differentiates between minimal and maximum performance as measured by terminal grades. (That is, a low composite or total score for these three subtests was possessed significantly more often by students who attained grades of D than those students who attained grades of A.)

3. That the mean scores attained on the Entrance Test Battery by all members of the various grade levels within beginning shorthand were not indicative of the terminal grade received; and that students with high academic aptitude did not fare as well grade-wise when taught beginning shorthand with an approach, involving the use of tape-laboratory facilities. Students with low academic aptitude fared better in the traditional instructional setting.

4. That grades earned in all courses taken by a student while enrolled in beginning shorthand are not indicative of performance in beginning shorthand.
5. That the major course of study of participants is not valuable as a predictor of success in beginning shorthand.
6. That the number of absences accrued by students is not valuable as a predictor of success in beginning shorthand.
7. That the number of total hours spent in studying shorthand is not valuable as a predictor of possible success in beginning shorthand.
8. That the methods of studying shorthand do not bear a direct relationship to achievement in beginning shorthand.
9. That there is no abservable relationship between a student's having a class immediately prior to beginning shorthand and his performance in beginning shorthand or vice versa.

Recommendations

The following recommendations are made from the findings and conclusions of this study.

1. That further research be carried on in beginning shorthand to determine, if possible, the most efficient method or methods of use for tape or recorded types of presentations.

A. It is suggested that attention be directed to the use of control and experimental groups in which all in-class instruction is "live" but where one section is assigned to the lab for all out-of-class activities.

B. It is also suggested that attention be directed to the use of control and experimental groups in which all in-class instruction is taped but where one group has access to an in-class tutor while the other does not.

2. That beginning shorthand students be allowed to use the tape-laboratory facilities for study during all levels of instruction. This practice would serve to increase student facility with the equipment. It would also increase the amount of dictation time each student has been exposed to, thus hopefully increasing his or her skill in taking dictation.

3. That teacher -and commercially-prepared taped material be developed utilizing an over-reach method of speed building involving short intensive spurts of new-matter material. This recommendation is based on the researcher's expert opinion which, in this case, was based in part on his experience during the operation of this equipment.

4. That additional research be conducted to explore the possibilities of predicting success in beginning shorthand by utilizing a combination-of-factors approach, including attitudinal scales.
5. That further attempts be made to isolate additional predictors of success in beginning shorthand by maintaining a perpetual-inventory type of record of student scores on the Entrance Test Battery and their terminal grades in beginning shorthand for purposes of correlation analysis.
6. That tape-laboratory facilities be used to supplement "live" instruction but not to supplant it during the earlier stages of shorthand instruction.
7. That additional experiments be undertaken to examine the possible effects that spaced rather than massed practice and meeting periods might have upon performance in beginning shorthand.
   A. In this recommendation, the term spaced was utilized to indicate dispersed rather than congregated time units.
   B. In this recommendation, the term massed was utilized to indicate grouping of time units such as one might have in blocked (double or triple) periods.

8. That an experiment be conducted in an attempt to determine the possible implications of presenting beginning shorthand through the use of coordinated programmed materials and taped dictation materials but without the direct supervision of an instructor.

APPENDIX

PRE-TEST AND POST-TEST SUB-PORTIONS

Please sign this paper on this line._____

Please write the English equivalent or word for each of the shorthand outlines given below. Write in the space just to the right of each shorthand outline. If you have no idea of the work that the shorthand outline stands for, just leave the space blank. It is quite possible that you will leave the entire page blank.

1.  _____
2.  _____
3.  _____
4.  _____
5.  _____
6.  _____
7.  _____
8.  _____
9.  _____
10.  _____

Now, please write the shorthand outline (using Gregg Shorthand) for each of the following words. Write in the space provided at the right of each of the English words. If you have no idea of what the shorthand outline should be, just leave the space blank. It is quite possible that you will leave the entire page blank.
(Note: None of the words in the first list on this page is included in the list below.)

1. dough _____
2. compose _____
3. each _____
4. large _____
5. line _____
6. enough _____
7. quite _____
8. sensible _____
9. efficient _____
10. toward _____

PRE-TEST AND POST-TEST SUB-PORTIONS

Please sign this paper on this line._____

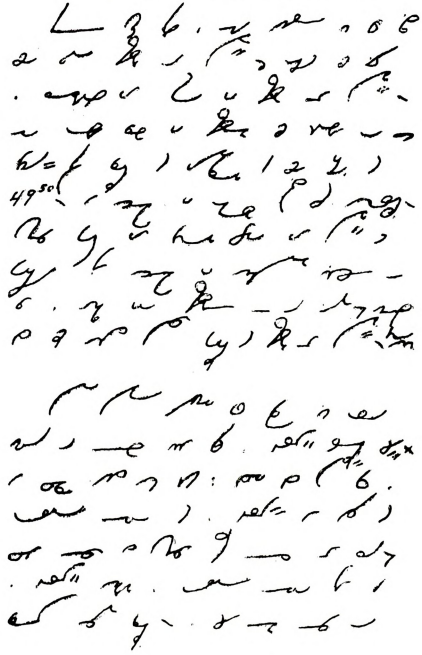
Please write the English word or words for each of the brief forms given below in Gregg Diamond Jubilee Shorthand. Write in the space just to the right of each brief form. If you have no idea of what the brief form represents, just leave the space blank. It is quite possible that you will leave the entire page blank.

1. _____
2. _____
3.  _____
4. _____
5. _____
6.  _____
7.  _____
8.  _____
9.  _____
10. _____

Now, please write the shorthand outline for each of the following brief forms in the space provided at the right of the English words. If you have no idea of what the shorthand form is, leave the space blank. It is quite possible that you will leave the entire page blank. (Note: None of the forms in the first list is included in the list below.)

1. I _____
2. it, at _____
3. with _____
4. for _____
5. this _____
6. and _____
7. one, won _____
8. those _____
9. present _____
10. put _____

PRE-TEST AND POST-TEST SUB-PORTION



NOTE: Traced from actual textbook plate material used.

STUDENT PROFILE

Control Group					Entrance Test Scores					
	Term	Major	Absences	Grade	E	R	V	I	N	T
1	So-2	Math	4	A	25	38	66	45	44	155
2	So-1	Physical Therapy	4	A	27	33	45	50	45	140
3	F-2	Non-preference	4	A	29	25	53	47	37	137
4	S-2	Spanish	0	A	28	30	65	48	22	135
5	J-2	English	0	A	28	26	53	42	24	119
6	F-2	Non-preference	2	A	23	21	46	36	23	105
7	F-2	Business Education	3	B	30	28	61	61	45	167
8	F-2	Elementary Education	1	B	31	36	65	53	38	156
9		Speech	1	B	30	34	66	49	23	138
10	S-2	Social Science	0	B	20	30	42	41	35	118
11	S-2	Elementary Education	1	B	19	21	50	48	20	118
12	F-2	Elementary Education	2	B	22	18	48	39	27	114
13	F-3	French	0	B	13	22	44	44	14	102
14	So-2	Non-preference	0	B	30	29	40	30	27	97
15	F-2	Non-preference	6	B	21	18	28	28	20	76
16	So-1	Non-preference	5	C	33	39	70	55	24	149
17	S-2	Social Science	2	C	24	29	43	50	22	115
18	F-2	Business Education	1	C	13	22	26	37	19	82
19	F-2	Secretarial	0	D	20	26	49	51	30	130
20	F-2	Non-preference	5	D	17	33	55	42	12	109
21	F-2	Non-preference	0	D	22	32	54	47	21	102

STUDENT PROFILE

Experimental Group					Entrance Test Scores					
	Term	Major	Absences	Grade	E	R	V	I	N	T
1	So-2	Elementary Education	1	A	30	36	63	56	37	156
2	J-2	Math Education	2	A	*	31	41	50	45	136
3	F-2	Non-preference	2	A	22	26	61	46	13	120
4	J-2	Secretarial	1	A	24	33	40	42	25	107
5	So-3	Non-preference	7	B	25	35	69	61	36	166
6	F-2	Non-preference	0	B	35	32	58	46	49	153
7	So-2	Non-preference	1	B	27	31	53	54	40	147
8	F-2	Non-preference	0	B	32	30	53	51	21	125
9	So-2	Secretarial	1	B	22	19	33	34	21	88
10	F-2	Television	0	C	25	24	55	49	49	153
11	F-2	Non-preference	0	C	30	31	54	55	32	141
12	F-2	Secretarial	0	C	31	26	55	48	34	137
13	F-2	Math	5	D	25	27	52	44	34	130
14	S-2	Sociology	2	D	23	33	54	51	22	128
15	F-2	Business Education	0	D	26	31	42	43	38	123
16	F-2	Journalism	6	D	18	39	60	49	14	123
17	F-2	Secretarial	3	D	10	20	43	32	25	100
18	F-2	Business Education	1	D	22	25	33	35	26	94
19	F-2	Secretarial	6	D	18	26	44	29	17	90

TABLE 25

RAW SCORES ACHIEVED BY MEMBERS OF BOTH THE EXPERIMENTAL AND CONTROL SECTIONS OF THE ENGLISH PORTION OF THE MICHIGAN STATE UNIVERSITY ENTRANCE TEST BATTERY

Experimental Section (19)	Control Section (25)
***	33
35	31
32	31
31	30
30	30
30	30
27	29
26	28
25	28
25	27
25	27
24	25
23	25
22	24
22	23
22	22
22	21
18	20
18	20
10	19
*	19
	17
	13
	13
	**

* One student subsequently withdrew.
** Four students subsequently withdrew.
***One student excused from this test because of prior college experience.
Both comparisons showed no significant difference between the two groups.

TABLE 26

RAW SCORES ACHIEVED BY MEMBERS OF BOTH THE EXPERIMENTAL AND CONTROL SECTIONS OF THE READING PORTION OF THE MICHIGAN STATE UNIVERSITY ENTRANCE TEST BATTERY

Experimental Section (20)	Control Section (25)
39	42
36	39
35	38
33	36
33	34
32	33
31	33
31	32
31	32
31	30
30	30
27	29
26	29
26	28
26	27
25	26
24	26
20	25
19	22
15	22
*	21
	21
	18
	18
	10
	**

* One student subsequently withdrew.
** Four students subsequently withdrew.
Both comparisons showed no significant difference between the two groups.

TABLE 27

RAW SCORES ACHIEVED BY MEMBERS OF BOTH THE EXPERIMENTAL AND CONTROL SECTIONS ON THE VERBAL PORTION OF THE COLLEGE QUALIFICATION SECTION OF THE MICHIGAN STATE UNIVERSITY ENTRANCE TEST BATTERY

Experimental Section (20)	Control Section (25)
69	70
63	66
61	66
60	65
58	65
55	65
55	61
54	55
54	53
53	53
53	52
52	51
44	50
43	49
42	48
41	46
40	45
35	44
33	43
33	42
*	40
	34
	33
	28
	26
	**

* One student subsequently withdrew.
** Four students subsequently withdrew.
Both comparisons showed no significant difference between the two groups.

TABLE 28

RAW SCORES ACHIEVED BY MEMBERS OF BOTH THE EXPERIMENTAL AND CONTROL SECTIONS ON THE INFORMATIONAL PORTION OF THE COLLEGE QUALIFICATION SECTION OF THE MICHIGAN STATE UNIVERSITY ENTRANCE TEST BATTERY

Experimental Section (20)	Control Section (25)
61	61
56	55
55	55
54	54
51	51
51	50
50	50
49	50
49	49
48	48
46	48
46	47
46	47
44	45
43	44
42	42
35	42
34	41
32	41
29	39
*	37
	36
	30
	29
	28
	**

* One student subsequently withdrew.
**Four students subsequently withdrew.
Both comparisons showed no significant difference between the two groups.

TABLE 29

RAW SCORES ACHIEVED BY MEMBERS OF BOTH THE EXPERIMENTAL AND CONTROL SECTIONS ON THE NUMERICAL PORTION OF THE COLLEGE QUALIFICATION SECTION OF THE MICHIGAN STATE UNIVERSITY ENTRANCE TEST BATTERY

Experimental Section (20)	Control Section (25)
49	45
49	45
45	44
40	38
38	37
37	37
36	35
34	31
34	30
34	27
32	27
26	27
25	24
25	24
22	23
21	23
21	22
17	22
14	21
13	20
*	20
	19
	15
	14
	12
	**

* One student subsequently withdrew.
**Four students subsequently withdrew.
Both comparisons showed no significant difference between the two groups.

TABLE 30

RAW SCORES ACHIEVED BY MEMBERS OF BOTH THE EXPERIMENTAL AND CONTROL SECTION ON THE TOTAL SCORE PORTION OF THE COLLEGE QUALIFICATION SECTION OF THE MIGHIGAN STATE UNIVERSITY ENTRANCE TEST BATTERY

Experimental Section (20)	Control Section (25)
166	167
157	157
153	156
153	155
147	149
141	140
137	138
136	137
130	135
128	130
125	128
123	119
123	118
120	118
115	115
107	114
100	109
94	108
90	105
88	102
*	102
	97
	93
	82
	76
	**

* One student subsequently withdrew.
**Four students subsequently withdrew.
Both comparisons showed no significant difference between the two groups.

CORE2 PROGRAM--CORRELATION AND/OR REGRESSION ANALYSIS

ID,7,19. EXPERIMENTAL GROUP

SSCP(X(1)...X(7))*

(7XF1.0,5F2. ,F3.)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO. 1

1	7.000000	2	50.000000	3	36.000000	4	63.000000	5	56.000000	6	37.000000
7	156.000000										

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 19 OBSERVATIONS
1	7.000000	101.00000
2	30.000000	445.00000
3	36.000000	555.00000
4	63.000000	963.00000
5	56.000000	875.00000
6	37.000000	578.00000
7	156.000000	2417.00000

TOTAL RAW OBSERVATIONS= 19
NUMBER OF OBSERVATIONS DROPPED= 0
NUMBER OF OBSERVATIONS IN PROBLEM= 19

STATISTICS ON VARIABLES IN PROBLEM

VAR.NO.	FIRST OBSERVATION	LAST OBSERVATION	MEANS	STANDARD DEVIATIONS
1	7.000000000	4.00000000	5.31578947	1.20428086
2	30.00000000	18.00000000	23.42105263	8.07131952
3	36.00000000	26.00000000	29.21052632	5.24488054
4	63.00000000	44.00000000	50.68421053	10.05016657
5	56.00000000	29.00000000	46.05263158	8.61828601
6	37.00000000	17.00000000	30.42105263	11.14209131
7	156.0000000	90.00000000	127.21052632	23.28579178

SIMPLE CORRELATIONS

	1	2	3	4	5	6	7
→ 1	1.000000	.59862	.199984	.271443	.399768	.200696	.329475
2		1.000000	.196578	.418078	.341490	.154879	.381234
3			1.000000	.555717	.686782	.109626	.550097
4				1.000000	.756421	.144632	.784246
5					1.000000	.393748	.889412
6						1.000000	.687294
7							1.000000

CORE2 PROGRAM--CORRELATION AND/OR REGRESSION ANALYSIS

ID.7,21. CONTROL GROUP

SSCP(*(1)...*(7))*

(7XF1.0,5F2.0,F3.0)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO. 1

1 7.000000 2 25.000000 3 38.000000 4 66.000000 5 45.000000 6 44.000000
7 155.000000

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 21 OBSERVATIONS
1	7.000000	123.00000
2	25.000000	505.00000
3	38.000000	590.00000
4	66.000000	1069.00000
5	45.000000	643.00000
6	44.000000	572.00000
7	155.000000	2584.00000

TOTAL RAW OBSERVATIONS= 21
NUMBER OF OBSERVATIONS DROPPED= 0
NUMBER OF OBSERVATIONS IN PROBLEM= 21

STATISTICS ON VARIABLES IN PROBLEM

VAR.NO.	FIRST OBSERVATION	LAST OBSERVATION	MEANS	STANDARD DEVIATIONS
1	7.000000000	4.00000000	5.85714286	1.01418511
2	25.000000000	22.00000000	24.04761905	5.79203065
3	38.000000000	32.00000000	28.09523810	6.26022972
4	66.000000000	54.00000000	50.90476191	11.99960317
5	45.000000000	47.00000000	44.90476191	7.99315183
6	44.000000000	21.00000000	27.23809524	9.89257498
7	155.000000000	122.00000000	123.04761905	23.84004234

SIMPLE CORRELATIONS

	1	2	3	4	5	6	7
→ 1	1.000000	.375736	-.115878	.135648	-.118952	.431088	.190549
2		1.000000	.534932	.626669	.395380	.516727	.660459
3			1.000000	.693681	.517787	.354855	.668671
4				1.000000	.694789	.285426	.853651
5					1.000000	.408071	.852788
6						1.000000	.691666
7							1.000000

```
CORE2 PROGRAM--CORRELATION AND/OR REGRESSION ANALYSIS

ID,7,4. A EXPERIMENTAL

SSCP(X(1)...X(7))*

(7XF1.0,5F2.0,F3.0)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO.  1

   1     7.000000    2     30.000000     3     36.000000     4     63.000000     5     56.000000     6     37.000000
   7   156.000000

INPUT CHECK ON RAW OBSERVATIONS
    VARIABLE          FIRST OBSERVATION              SUM OF   4 OBSERVATIONS

        1                   7.00000                          28.00000
        2                  30.00000                          76.00000
        3                  36.00000                         126.00000
        4                  63.00000                         205.00000
        5                  56.00000                         194.00000
        6                  37.00000                         120.00000
        7                 156.00000                         519.00000

    TOTAL RAW OBSERVATIONS=              4
    NUMBER OF OBSERVATIONS DROPPED=      0
    NUMBER OF OBSERVATIONS IN PROBLEM=       4

STATISTICS ON VARIABLES IN PROBLEM
                          FIRST                   LAST                                            STANDARD
    VAR.NO.             OBSERVATION            OBSERVATION              MEANS                    DEVIATIONS

       1                 7.00000000             7.00000000             7.00000000                .00000000
       2                30.00000000            24.00000000            19.00000000              13.11487705
       3                36.00000000            33.00000000            31.50000000               4.20317340
       4                63.00000000            40.00000000            51.25000000              12.44655240
       5                56.00000000            42.00000000            48.50000000               5.97215762
       6                37.00000000            25.00000000            30.00000000              14.00000000
       7               156.00000000           107.00000000           129.75000000              21.14040365

SIMPLE CORRELATIONS

          1          2          3          4          5          6          7
  1    .000000    .000000    .000000    .000000    .000000    .000000    .000000
  2              1.000000    .302348    .606488    .059581   -.515590    .032461
  3                         1.000000   -.079646    .491328    .623112    .504557
  4                                    1.000000    .544847   -.346242    .513381
  5                                               1.000000    .598013    .999310
  6                                                          1.000000    .627325
  7                                                                     1.000000
```

CORE2 PROGRAM--CORRELATION AND/OR REGRESSION ANALYSIS

ID=7,5, B EXPERIMENTAL

SSCP(X(1)...X(7))*

(7XF1.0,3F2.,F3.0)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO. 1

1 6.000000 2 25.000000 3 35.000000 4 69.000000 5 61.000000 6 36.000000
7 166.000000

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 5 OBSERVATIONS
1	6.00000	30.00000
2	25.00000	141.00000
3	35.00000	147.00000
4	69.00000	266.00000
5	61.00000	246.00000
6	36.00000	167.00000
7	166.00000	679.00000

TOTAL RAW OBSERVATIONS= 5
NUMBER OF OBSERVATIONS DROPPED= 0
NUMBER OF OBSERVATIONS IN PROBLEM= 5

STATISTICS ON VARIABLES IN PROBLEM

VAR.NO.	FIRST OBSERVATION	LAST OBSERVATION	MEANS	STANDARD DEVIATIONS
1	6.00000000	6.00000000	6.00000000	.00000000
2	25.00000000	22.00000000	28.20000000	5.26307895
3	35.00000000	19.00000000	29.40000000	6.10737259
4	69.00000000	33.00000000	53.20000000	13.04607220
5	61.00000000	34.00000000	49.20000000	10.08464179
6	36.00000000	21.00000000	33.40000000	12.25969005
7	166.00000000	88.00000000	135.80000000	30.55650503

SIMPLE CORRELATIONS

	1	2	3	4	5	6	7
1	1.000000	.000000	.000000	.000000	.000000	.000000	.000000
2		1.000000	.502433	.388859	.168625	.463396	.407595
3			1.000000	.974557	.911664	.625046	.967742
4				1.000000	.906016	.574588	.956496
5					1.000000	.361145	.861752
6						1.000000	.765723
7							1.000000

CURE2 PROGRAM--CORRELATION AND/OR REGRESSION ANALYSIS

ID,7,3. C EXPERIMENTAL

SSCP(X(1)...X(7))*

(7XF1.0,5F2.0,F3.0)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO. 1

1	5.000000	2	25.000000	3	24.000000	4	55.000000	5	49.000000	6	49.000000		
7	153.000000												

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 3 OBSERVATIONS
1	5.00000	15.00000
2	25.00000	86.00000
3	24.00000	81.00000
4	55.00000	164.00000
5	49.00000	152.00000
6	49.00000	115.00000
7	153.00000	431.00000

TOTAL RAW OBSERVATIONS= 3
NUMBER OF OBSERVATIONS DROPPED= 0
NUMBER OF OBSERVATIONS IN PROBLEM= 3

STATISTICS ON VARIABLES IN PROBLEM

VAR.NO.	FIRST OBSERVATION	LAST OBSERVATION	MEANS	STANDARD DEVIATIONS
1	5.00000000	5.00000000	5.00000000	.00000000
2	25.00000000	31.00000000	28.66666667	3.21455026
3	24.00000000	26.00000000	27.00000000	3.60555128
4	55.00000000	55.00000000	54.66666667	.57735020
5	49.00000000	48.00000000	50.66666667	3.78593889
6	49.00000000	34.00000000	38.33333333	9.29157325
7	153.00000000	137.00000000	143.66666667	8.32666404

SIMPLE CORRELATIONS

	1	2	3	4	5	6	7
1	.000000	.000000	.000000	.000000	.000000	.000000	.000000
2		1.000000	.603957	-.359211	.232811	-.965351	-.996271
3			1.000000	-.960769	.915724	-.791015	-.532939
4				1.000000	-.991241	.590301	.277350
5					1.000000	-.478528	-.148034
6						1.000000	.939236
7							1.000000

CORE2 PROGRAM--CORRELATION AND/OR REGRESSION ANALYSIS

ID,7,7. D EXPERIMENTAL

SSCP(X(1)...X(7))*

(7XF1.0,5F2. ,F3.0)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO. 1

1	4.000000	2	25.000000	3	27.000000	4	52.000000	5	44.000000	6	34.000000
7	130.000000										

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 7 OBSERVATIONS
1	4.00000	28.00000
2	25.00000	142.00000
3	27.00000	201.00000
4	52.00000	328.00000
5	44.00000	283.00000
6	34.00000	176.00000
7	130.00000	788.00000

TOTAL RAW OBSERVATIONS= 7
NUMBER OF OBSERVATIONS DROPPED= 0
NUMBER OF OBSERVATIONS IN PROBLEM= 7

STATISTICS ON VARIABLES IN PROBLEM

VAR.NO.	FIRST OBSERVATION	LAST OBSERVATION	MEANS	STANDARD DEVIATIONS
1	4.00000000	4.00000000	4.00000000	.00000000
2	25.00000000	18.00000000	20.28571429	5.49891764
3	27.00000000	26.00000000	28.71428571	6.18369592
4	52.00000000	44.00000000	46.85714286	9.02641626
5	44.00000000	29.00000000	40.42857143	8.52168103
6	34.00000000	17.00000000	25.14285714	8.61062467
7	130.00000000	90.00000000	112.57142857	17.18387949

SIMPLE CORRELATIONS

	1	2	3	4	5	6	7
1	.000000	.000000	.000000	.000000	.000000	.000000	.000000
2		1.000000	.404719	.027822	.512672	.541067	.544763
3			1.000000	.712793	.815557	-.293340	.638596
4				1.000000	.724622	-.372813	.705495
5					1.000000	.058082	.917680
6						1.000000	.330518
7							1.000000

CORE2 PROGRAM--CORRELATION AND/OR REGRESSION ANALYSIS

ID,7,6. A CONTROL

SSCP(X(1)..X(7))*

(7XF1.0,5F2. ,F3.1)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO. 1

1	7.000000	2	25.000000	3	38.000000	4	66.000000	5	45.000000	6	44.000000
7	155.000000										

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 6 OBSERVATIONS
1	7.00000	42.00000
2	25.00000	160.00000
3	38.00000	173.00000
4	66.00000	328.00000
5	45.00000	268.00000
6	44.00000	195.00000
7	155.00000	791.00000

TOTAL RAW OBSERVATIONS= 6
NUMBER OF OBSERVATIONS DROPPED= 0
NUMBER OF OBSERVATIONS IN PROBLEM= 6

STATISTICS ON VARIABLES IN PROBLEM

VAR.NO.	FIRST OBSERVATION	LAST OBSERVATION	MEANS	STANDARD DEVIATIONS
1	7.00000000	7.00000000	7.00000000	.00000000
2	25.00000000	23.00000000	26.66666667	2.25092574
3	38.00000000	21.00000000	28.83333333	6.11282804
4	66.00000000	46.00000000	54.66666667	9.04802004
5	45.00000000	36.00000000	44.66666667	5.04645089
6	44.00000000	23.00000000	32.50000000	10.78424777
7	155.00000000	105.00000000	131.83333334	17.46329485

SIMPLE CORRELATIONS

	1	2	3	4	5	6	7
1	.000000	.000000	.000000	.000000	.000000	.000000	.000000
2		1.000000	.053396	.171215	.692538	.041195	.313757
3			1.000000	.559282	.620244	.687173	.893364
4				1.000000	.273030	-.020497	.584358
5					1.000000	.554921	.773121
6						1.000000	.767276
7							1.000000

```
CORE4 PROGRAM--CORRELATION AND/OR REGRESSION ANALYSIS

ID,7,9. B CONTROL

SSCP(X(1)...X(7))*

(7XF1.0,5F2. ,F3.0)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO.  1

    1      6.000000      2     30.000000      3     28.000000      4     61.000000      5     61.000000      6     45.000000
    7    167.000000
```

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 9 OBSERVATIONS
1	6.00000	54.00000
2	30.00000	216.00000
3	28.00000	236.00000
4	61.00000	444.00000
5	61.00000	393.00000
6	45.00000	249.00000
7	167.00000	1086.00000

TOTAL RAW OBSERVATIONS= 9
NUMBER OF OBSERVATIONS DROPPED= 0
NUMBER OF OBSERVATIONS IN PROBLEM= 9

STATISTICS ON VARIABLES IN PROBLEM

VAR.NO.	FIRST OBSERVATION	LAST OBSERVATION	MEANS	STANDARD DEVIATIONS
1	6.00000000	6.00000000	6.00000000	.00000000
2	30.00000000	21.00000000	24.00000000	6.44204936
3	28.00000000	18.00000000	26.22222222	6.72268134
4	61.00000000	28.00000000	49.33333333	12.67872233
5	61.00000000	28.00000000	43.66666667	10.58300525
6	45.00000000	20.00000000	27.66666667	9.92471662
7	167.00000000	76.00000000	120.66666667	28.84874347

SIMPLE CORRELATIONS

	1	2	3	4	5	6	7
1	.000000	.000000	.000000	.000000	.000000	.000000	.000000
2		1.000000	.695601	.573907	.295191	.641271	.581129
3			1.000000	.667762	.454463	.538938	.645600
4				1.000000	.862654	.467883	.916913
5					1.000000	.531974	.928985
6						1.000000	.744807
7							1.000000

CORE2 PROGRAM--CORRELATION AND/OR REGRESSION ANALYSIS

ID,7,3, C CONTROL

SSCP(X(1)...X(7))*

(7XF1.0,5F2. ,F3.)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO. 1

1 5.0000 2 33.0000 3 39.0000 4 70.0000 5 55.
7 149.0000

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 3 OBSERVATIONS
1	5.00000	15.00000
2	33.00000	70.00000
3	39.00000	90.00000
4	70.00000	139.00000
5	55.00000	142.00000
6	24.00000	65.00000
7	149.00000	346.00000

TOTAL RAW OBSERVATIONS= 3
NUMBER OF OBSERVATIONS DROPPED= 0
NUMBER OF OBSERVATIONS IN PROBLEM= 3

STATISTICS ON VARIABLES IN PROBLEM

VAR.NO.	FIRST OBSERVATION	LAST OBSERVATION	MEANS	STANDARD DEVIATIONS
1	5.00000000	5.00000000	5.00000000	.00000000
2	33.00000000	13.00000000	23.33333333	10.01665280
3	39.00000000	22.00000000	30.00000000	8.54400375
4	70.00000000	26.00000000	46.33333333	22.18858566
5	55.00000000	37.00000000	47.33333333	9.29157325
6	24.00000000	19.00000000	21.66666667	2.51661148
7	149.00000000	82.00000000	115.33333333	33.50124375

SIMPLE CORRELATIONS

	1	2	3	4	5	6	7
1	.0000 0	.00000	.000000	.000000	.000000	.000000	.000000
2		1.00000	.987353	.982354	.981335	.998359	.997804
3			1.000000	.999581	.938438	.976656	.995686
4				1.000000	.928051	.970033	.992585
5					1.000000	.990736	.966442
6						1.000000	.992374
7							1.000000

CORE2 PROGRAM--CORRELATION AND/OR REGRESSION ANALYSIS

ID,7,3, D CONTROL

SSCP(X(1)...X(7))*

(7XF1.0,5F2. ,F3.)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO. 1

1	4.0000	2	20.0000	3	26.000000	4	49.000000	5	51.000000	6	30.000000
7	130.00000										

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 3 OBSERVATIONS
1	4.00000	12.00000
2	20.00000	59.00000
3	26.00000	91.00000
4	49.00000	158.00000
5	51.00000	140.00000
6	30.00000	63.00000
7	130.00000	361.00000

TOTAL RAW OBSERVATIONS= 3
NUMBER OF OBSERVATIONS DROPPED= 0
NUMBER OF OBSERVATIONS IN PROBLEM= 3

STATISTICS ON VARIABLES IN PROBLEM

VAR.NO.	FIRST OBSERVATION	LAST OBSERVATION	MEANS	STANDARD DEVIATIONS
1	4.00000000	4.00000000	4.00000000	.00000000
2	20.00000000	22.00000000	19.66666667	2.51661148
3	26.00000000	32.00000000	30.33333333	3.78593889
4	49.00000000	54.00000000	52.66666667	3.21455024
5	51.00000000	47.00000000	46.66666667	4.50924974
6	30.00000000	21.00000000	21.00000000	9.00000000
7	130.00000000	122.00000000	120.33333334	10.59874205

SIMPLE CORRELATIONS

	1	2	3	4	5	6	7
1	.000000	.000000	.000000	.000000	.000000	.000000	.000000
2		1.000000	-.244899	-.267828	.646221	.596840	.699836
3			1.000000	.999719	-.898170	-.924473	-.863941
4				1.000000	-.908346	-.933257	-.875643
5					1.000000	.997949	.997370
6						1.000000	.999684
7							1.000000

MICHIGAN STATE UNIVERSITY EAST LANSING

COLLEGE OF EDUCATION

May 4, 1964

During a recent survey of NABTE (National Association of Business Teacher Educators) member institutions, your department was cited as one in which a shorthand tape (or other media) laboratory is used to teach shorthand.

Because we are conducting a series of experiments involving our own shorthand tape laboratory, we would appreciate hearing from you about your experiences in this area. Of course, if you have copies of research studies already completed, we would be very pleased to have one.

Our current study is being conducted under the direction of Dr. Helen H. Green. Although the final report is not as yet ready, we expect to complete it in the near future.

BRENDAN G. COLEMAN - 315 ERICKSON HALL
MICHIGAN STATE UNIVERSITY
EAST LANSING, MICHIGAN

NAME: _____

POSITION: _____

INSTITUTION: _____

STATE: _____

MICHIGAN STATE UNIVERSITY
EAST LANSING, MICHIGAN
MARCH, 1964

1. Does your institution have a tape laboratory designed and used for teaching shorthand? _____ _____

2. Does your institution have a language laboratory for teaching foreign languages? _____ _____

   If yes, do you also use it to teach shorthand: _____ _____

3. Has any research been conducted by your professional staff and/or graduate students involving the use of a tape laboratory? _____ _____

   A. If yes, how many were staff studies? _____ _____
   B. If yes, how many were master's studies? _____ _____
   C. If yes, how many were doctoral studies? _____ _____
   D. Others. _____ _____
   E. Please list the studies completed as of January, 1964: _____ _____

   Author's Name: _____
   Title: _____
   Year: _____
   Degree: _____
   Staff: _____
   On Microfilm: _____ Where: _____
   If not; how obtained: _____
   Author's Name: _____
   Title: _____
   Year: _____
   Degree: _____
   Staff: _____
   On Microfilm: _____ Where: _____
   If not; how obtained _____
   (Please place additional studies on the back of this sheet)

4. Do you personally know of any shorthand research being conducted which involves the use of a tape laboratory in your state? _____ _____

   If yes, please list the name and address of each such school or college. (other than your own)

   Institution: _____
   Address: _____

STUDY-HABIT QUESTIONNAIRE FIRST HALF OF TERM

LIO 201--Elementary Gregg Shorthand
Michigan State University
Winter Term, 1964

HOMEWORK ANALYSIS
First half of the term

NAME _____ SECTION _____

DIRECTIONS: To answer the following question, choose the fraction which most clearly approximates your actual expenditure of time. Consider your time allocation on a weekly basis. All questions pertaining to study relate to out-of-class homework.

1) How much time have you spent in studying shorthand each week since the beginning of this term? (weekly) _____ (hours)

2) What portion of this time have you spent studying alone?

(all-1/3-1/2-2/3)

3) What portion of this time have you spent studying in a room near but not with other students (who are not studying shorthand)?

(all-1/3-1/2-2/3)

4) What portion of this time have you spent studying in a room near but not with other students (who are neither studying nor sleeping)?

(all-1/3-1/2-2/3)

5) What portion of this time have you had others dictate to you?

(all-1/3-1/2-2/3)

6) What portion of this time (devoted to homework) have you used a tape or record to provide you with dictation?

(all-1/3-1/2-2/3)

7) Do you read your plate material twice before writing it?

(all-1/3-1/2-2/3)

8) What portion of this time have you spent writing from plate material?

(all-1/3-1/2-2/3)

9) Do you review your brief forms every day?

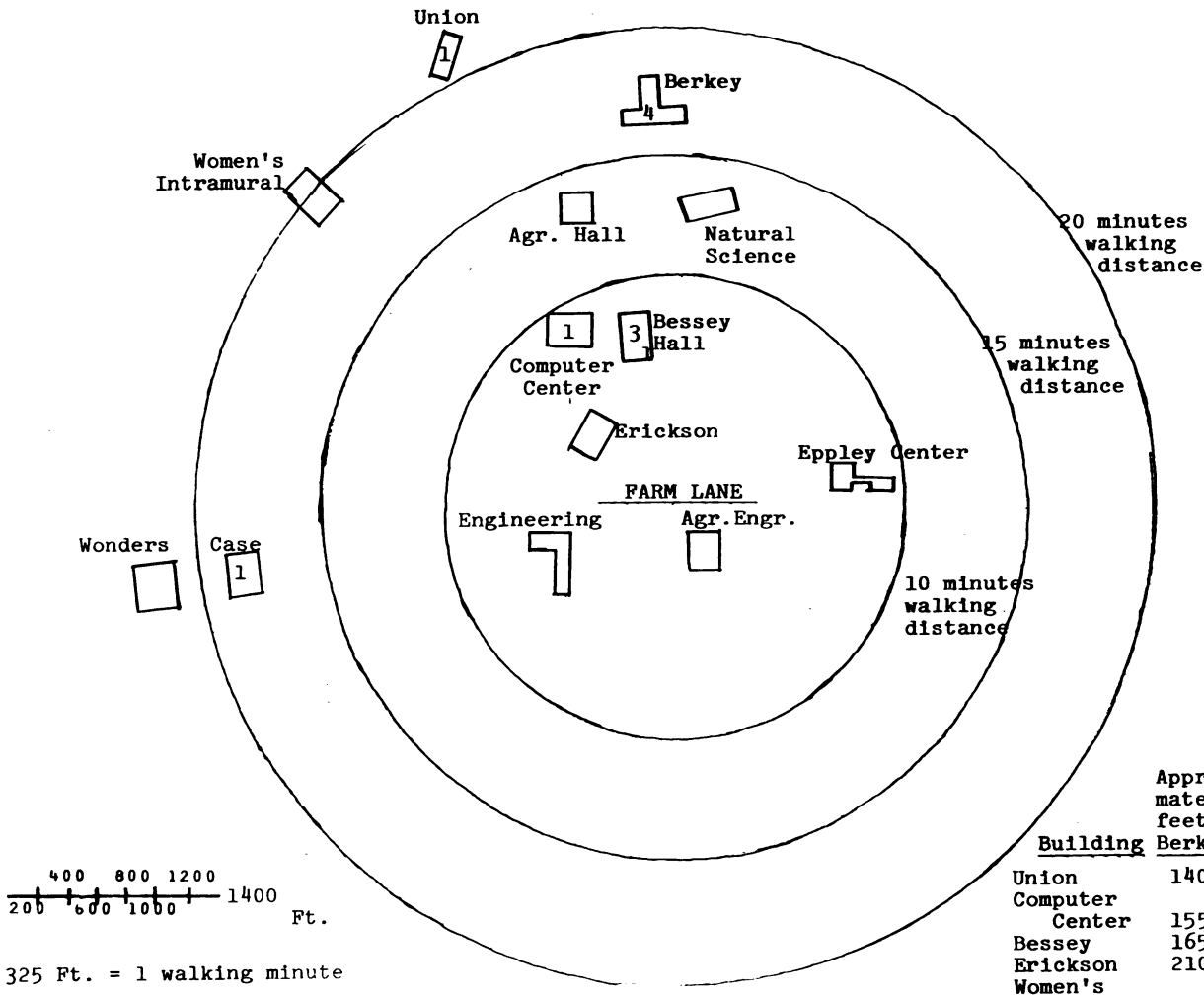
(all-1/3-1/2-2/3)

10) What do you think is the most beneficial thing you are doing in your homework? _____

11) Do you have a class immediately prior to your shorthand class?

12) What building do you come to this class from?

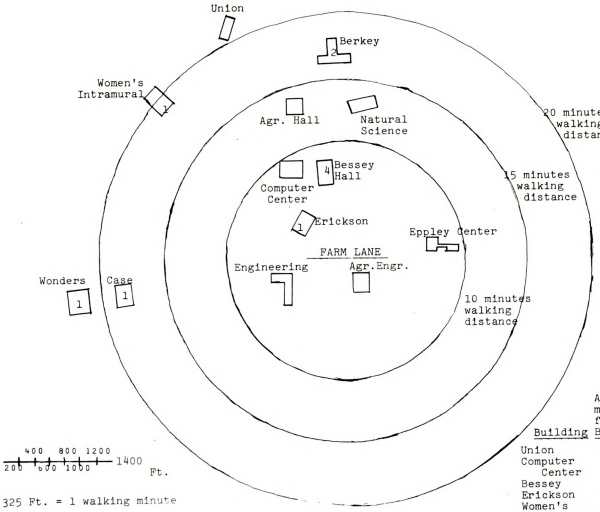
Day	Building	Day	Building
Monday	_____	Thursday	_____
Tuesday	_____	Friday	_____



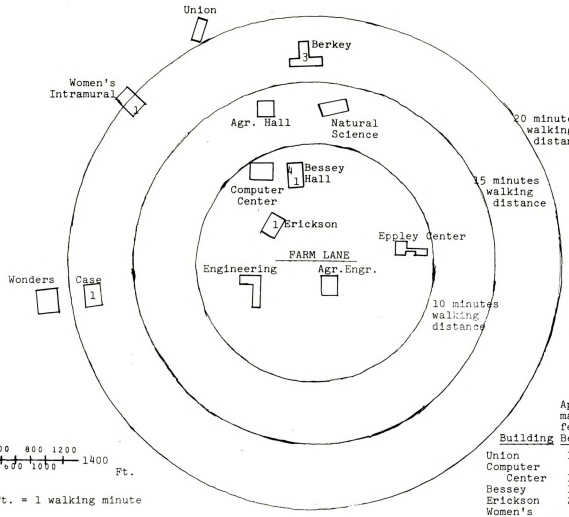
CONCENTRIC FIGURE DEPICTING THE DISTANCE FACTOR FOR BOTH EXPERIMENTAL AND CONTROL GROUP MEMBERS MONDAY

Building	Approximate feet to Berkey	Approximate Walking Minutes
Union	1400	4.31
Computer Center	1550	4.77
Bessey	1650	5.08
Erickson	2100	6.46
Women's Intermural	2200	6.76
Case	4200	12.92
Wonders	4500	13.85

CONCENTRIC FIGURE DEPICTING THE DISTANCE FACTOR FOR BOTH EXPERIMENTAL AND CONTROL GROUP MEMBERS TUESDAY



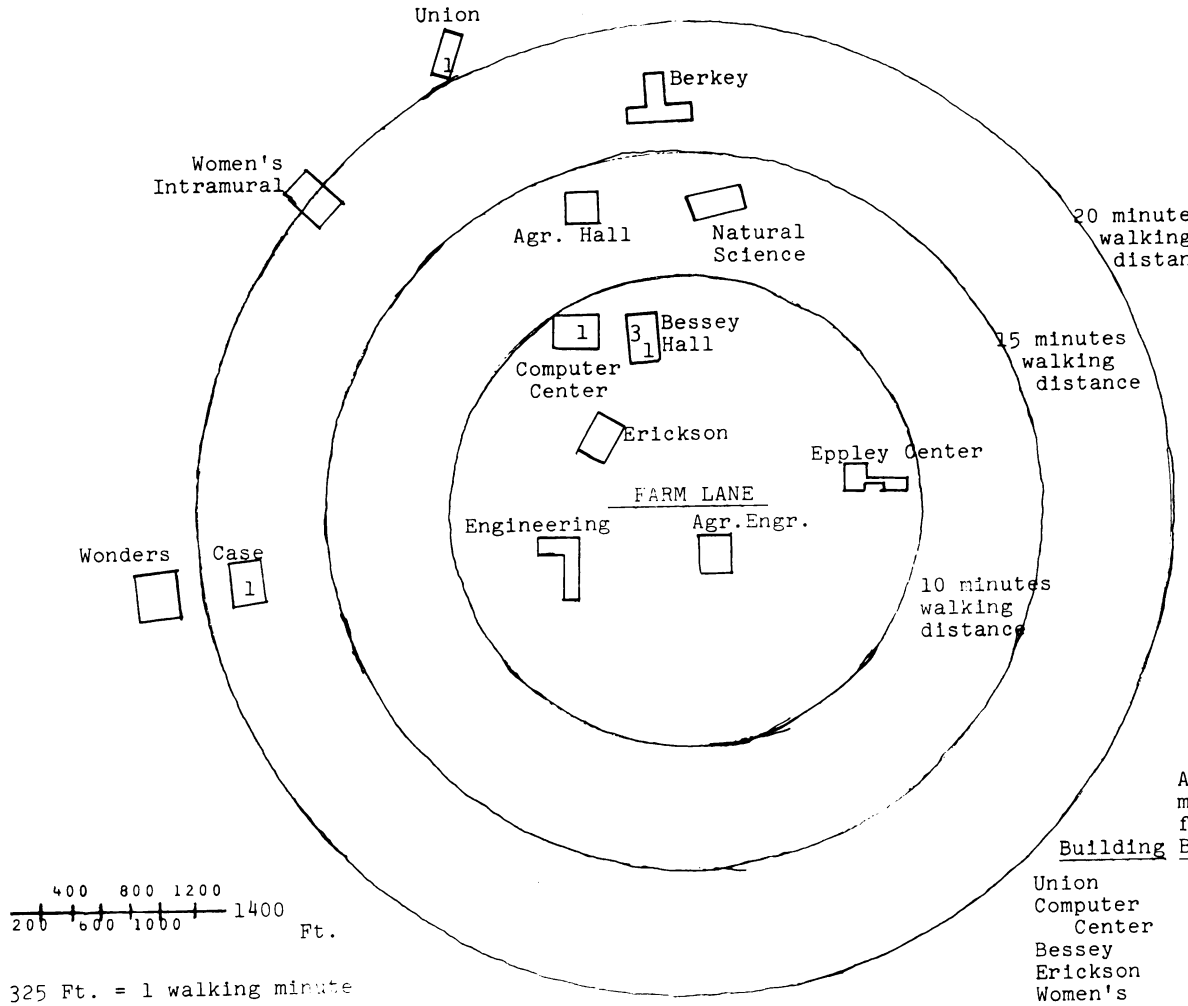
Building	Approximate feet to Berkey	Approximate Walking Minutes
Union	1400	4.31
Computer Center	1550	4.77
Bessey	1650	5.08
Erickson	2100	6.46
Women's Intermural	2200	6.76
Case	4200	12.92
Wonders	4500	13.85



CONCENTRIC FIGURE DEPICTING THE DISTANCE FACTOR FOR BOTH EXPERIMENTAL AND CONTROL GROUP MEMBERS THURSDAY.

Building	Approximate feet to Berkey	Approximate Walking Minutes
Union	1400	4.31
Computer Center	1550	4.77
Bessey	1650	5.08
Erickson	2100	6.46
Women's Intermural	2200	6.76
Case	4200	12.92
Wonders	4500	13.85

CONCENTRIC FIGURE DEPICTING THE DISTANCE FACTOR
FOR BOTH EXPERIMENTAL AND CONTROL GROUP MEMBERS
FRIDAY



Building	Approximate feet to Berkey	Approximate Walking Minutes
Union	1400	4.31
Computer Center	1550	4.77
Bessey	1650	5.08
Erickson	2100	6.46
Women's Intermural	2200	6.76
Case	4200	12.92
Wonders	4500	13.85

A SUBJECTIVE ANALYSIS CONCERNING THE ATYPICAL RESULTS AS EVIDENCED BY THE FINAL GRADE DISTRIBUTION

The unusually large percentage of D;s in the experimental section was an atypical outcome for several reasons:

(1) The typical results in research studies utilizing an experimental and a control group are that (a) there is little difference between the performance of the two groups or (b) the experimental group performs slightly better. The results of this study did not follow either such typical pattern.

(2) The tape laboratory apparently offers many advantages as a teaching aid and medium which are directly applicable to the actual classroom teaching-learning situation. (There are additional advantages applicable to homework, tutoring, and so forth, that were not utilized in this experiment which do not therefore apply.) Among such directly applicable advantages, however, are these: students may work at their own best speeds; the instructor may be freed from repetitive dictation and devote himself to more creative phases of teaching; more time is available for individual attention and teaching; varying speeds and types of dictation may be carried on simultaneoulsy; a variety of dictators may be used; review and advanced work may be carried on simultaneously. In short, the effectiveness

of the teacher and the time available to him for being effective may both be immeasurably multiplied through the utilization of the tape facilities. With such advantages present in the experimental teaching situation, it would be both reasonable and logical to expect higher achievement from the experimental group. Such was not the case.

(3) The experienced shorthand instructor who taught both sections has a long record of successful shorthand teaching with a pattern of terminal grades for her beginning classes skewed to the right, with many more A's and B's than C's, and only a sprinkling of D's and F's. It should be pointed out here that such an abnormal distribution curve is quite the "normal" distribution for many successful teachers of beginning shorthand.

Together the instructor and the researcher, both experienced shorthand teachers, searched for possible uncontrolled, hidden variables that might have contributed to the atypical results. Questions to which they sought answers were these:

1. Did the instructor's backlog of successful teaching in conventional classroom situations prepare her to be a much better teacher in the control class than she was in the experimental section? If so, the control class had a decided advantage in that they had a better teacher than the experimental group--even though both sections were taught by the same individual.

2. Did the familiarity of the students in the control group with the type of teaching and classroom situation to which they were being exposed cause them to perform better than did those students in the experimental group who were experiencing a new type of classroom situation and a new medium of instruction? The years of responding in similar situations that the control group had "working for them" might have given them a decided advantage as learners. Add this advantage to the better teacher advantage and the accrual might have influenced the results significantly.

3. Did the dynamics of working as a group for a great portion of the time in the control group furnish sufficiently intensive motivation to cause them to surpass the experimental group?

4. Did the listening to one another recite, which was a necessary part of the control group's learning situation, promote sufficient additional learning from one another to bring about the better performance of the control group?

5. Did the instructor's strict adherence to the pattern of procedures set up in the research project interfere with her making the most effective use of her own capabilities, of the equipment, and of the student's abilities? That the instructor felt restricted at times by adhering to the pattern prescribed was evidenced frequently in the anecdotal daily records. Had she been working with the tape facilities

under conditions which allowed alterations whenever and however she deemed it wisest to alter the teaching-learning situation, she might have been able to salvage most of those D's.

6. Did the greater utilization in the control class of many extremely short speed spurts account for the better performance of that group?

7. Did pacing the control class primarily to the top students, especially during the second half of the term, contribute measurably to the better performance of that group?

8. Were the students who made the D's in the experimental group essentially the type of individuals who need to identify with group endeavor in order to achieve well? Would these D students in the experimental group have fared better in the control group for that reason alone?

9. Has the widely accepted principle of skill building that "skill is best built when the individual works at a speed just below the point at which confusion sets in" been a valid one? Did the D students in the experimental group misjudge their individual points of confusion, underrate their abilities, and work primarily at too slow speeds for building skill?

10. Was the greater responsibility for his own learning, which the tape-laboratory situation placed upon the individual student, such a novel responsibility to

many of them that they did not perform as well in the tape laboratory as they would have performed in the conventional class? (This is not the same factor as the newness suggested in No. 2 above, necessarily, but a further ramification of it.)

11. Did the hour of the day have a bearing upon the quality of performance, either on the part of the students or of the teacher? The control class met directly after lunch; thus ordinarily students in the control class might have had both a physical and a mental break. The experimental class met at 3 p.m. Industry has noted mid-afternoon lags in energy and in work output. Where the students, and perhaps the instructor in the experimental group, experiencing such lags?

12. Is it possible to give too much individual attention to slow students? Do they feel singled out as "slow" and therefore change their self-images adversely, thereby inhibiting their learning? Will a student sub-consciously do poorly in order to receive attention?

13. Is it possible to allow a slow student to proceed at too comfortable a pace for the major portion of his time? The principle that "skill is gained best through short, intensive bursts of energy" may have been almost lacking in the practice patterns of the slower students in the experimental group.

14. Is the instructor in a tape laboratory in danger of becoming a slave to the console without realizing it? Has he traded his freedom from "being glued to a stopwatch and a text" for another routine utilization of his time?

15. Which of the above possible uncontrolled variables might have influenced the results more than others? What combination or combinations of these?

Hypotheses formulated by the researcher and the instructor: None of the findings in the study contributed direct answers to the questions just enumerated. Yet the consensus of the researcher and the instructor was that some combination of the possible hidden variables mentioned above may have been operating. Further research into such subleties is needed, but answers may not be forthcoming until much more is discovered about how and why people learn than is known now. Three hypotheses, based upon their combined experiences and judgment, were these:

It was hypothesized that:

(1) As students become more adapt at taking greater responsibility for their own learning through greater classroom and out-of-class opportunities for so doing, they will tend to give better performances in learning situations such as those obtaining in the experimental section in the tape laboratory teaching of shorthand.

(2) As teachers become more familiar with working with new media of instruction, such as tape laboratories,

they will utilize such teaching aids and facilities with greater expertise. This increased expertise, in turn, will result in increased learning upon the part of the students being taught with such media.

(3) A comparable study undertaken at a later date (assuming that both students and teachers will have developed to a greater degree the competencies mentioned in hypotheses one and two) would produce significantly different findings from those of this study--findings in which the experimental group would surpass the control group in performance.

(4) Tape students may do better when they get to the more advanced levels of shorthand learning.

(5) Tape students may have performed better had they been given time and direction in an orientation to the use of the tape-laboratory facilities.

(6) The tape students may have performed better had they been asked to do all of their homework in the tape lab in place of completing that homework in the same fashion as the control group.

A final possible explanation of what happened.--In final subjective analysis, an oversimplified analogy may point up what probably happened. A tape laboratory is a tool. As with all tools, it is only as effective as the use

made of it. Furthermore, a tape laboratory is a highly complex tool, capable of many uses. As with complex tools, its utilization requires extremely expert handling--handling that is not learned without much practice and experimentation involving adaptations of both the handler and the machine. Until teachers become experts in the utilization of the many adaptations and uses of the tape laboratory as a teaching tool, they may continue to get better results with their traditional and familiar "hand" tools--those devices, principles, and practices that have served them well in traditional classroom situations, than they do in tape laboratory teaching situations.

The atypical results of this one study should not be construed to imply that the tape laboratory will not be capable of helping produce better results in greater quantities and in shorter periods of time than are now produced by conventional shorthand teaching methods. When both teachers and students have grown familiar with both the newer, complicated tool and their roles in connection therewith, the tape laboratory as a medium for teaching beginning shorthand should help produce results startlingly different from those obtained in this study. Such studies as this point to the need for increased experimentation. And to the truism that "What we don't find is frequently as insightful as what we do."

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