

A UTILIZATION STUDY OF PROGRAMMED SHORTHAND

by

Frances Norton Hamlett

Thesis submitted to the Graduate Faculty of the

Virginia Polytechnic Institute

in candidacy for the degree of

MASTER OF SCIENCE

in

Business Education

August, 1965

Blacksburg, Virginia

**ACKNOWLEDGEMENTS**

The writer wishes to express her appreciation to those whose helpful assistance and guidance made this research study possible.

Special appreciation is expressed to Dr. Harry Huffman for his ideas and suggestions, guidance, and patience during the time of this study. Other members of the writer's graduate committee were also most helpful.

The writer also wishes to thank her husband, \_\_\_\_\_, for his understanding and consideration while the study was being made.

## TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	2
LIST OF TABLES	5
CHAPTER	
I. INTRODUCTION . . . . .	6
Purposes of the Study . . . . .	9
Hypotheses . . . . .	9
Need for the Study . . . . .	10
Delimitation of the Study . . . . .	10
Definition of Terms . . . . .	11
II. REVIEW OF LITERATURE . . . . .	13
Shorthand Methodology . . . . .	13
Programmed Instruction . . . . .	17
Two Studies in Programmed Shorthand Instruction . . . . .	20
III. PROCEDURES . . . . .	23
Design for Presentation of Program . . . . .	23
Testing Method A and Method B . . . . .	25
Testing for Retention of Theory during the Second Semester . . . . .	26
Collecting Additional Related Data . . . . .	27
IV. ANALYSIS OF DATA . . . . .	29
Comparison of Method A and Method B . . . . .	29
Analyzing Retention of Theory . . . . .	34

	Page
High School Grades, IQ's, and Time Spent . . . . .	37
V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS . . . . .	39
Summary . . . . .	39
Conclusions . . . . .	41
Recommendations . . . . .	41
BIBLIOGRAPHY . . . . .	42
VITA . . . . .	45
APPENDIX . . . . .	46

## LIST OF TABLES

TABLE	Page
1. Scores on Theory Tests by Numerical Grade (Based on 100 Per Cent) on Lessons Presented by Method A . . . . .	30
2. Scores on Theory Tests by Numerical Grade (Based on 100 Per Cent) on Lessons Presented by Method B . . . . .	31
3. Standard Error of Difference and $\bar{z}$ -Scores in 16 Comparisons . . . . .	33
4. Mean Shorthand Test Grades . . . . .	35
5. Results of Two End-of-Semester Tests Showing Number of Items Missed out of 100 . . . . .	36
6. Results of Five Second-Semester Theory Tests Showing Number of Items Missed out of 100 . . . . .	38
7. IQ and High School Averages for the 16 Students . . . . .	49
8. Total Time in Hours Spent in and out of Class on Programmed Shorthand . . . . .	50

## CHAPTER I

## INTRODUCTION

"Shorthand is a tool of communication and today's shorthand teacher is obligated to teach in a way that will prove the most effective."<sup>1</sup> Proponents of excellence in education insist that teachers must teach more and better in a shorter length of time than has been the case in the past. This insistence demands better methods of teaching and faster ways of learning.

The learning of shorthand is an arduous task--a task many students of shorthand never complete satisfactorily. One author has stated the magnitude of the problem in this way:

In general, the achievement of stenographic graduates is considered low, and the findings of research tend to substantiate such a belief. Of those completing one year of instruction in the secondary school, from 11 to 20 per cent are reported capable of producing mailable transcripts from material dictated at 60 words a minute; of those completing two years, less than 50 per cent are reported capable of producing mailable transcripts from material dictated at 80 words a minute.<sup>2</sup>

Shorthand is a mental skill and not a manual one. It is not physical handicaps which keep a student from becoming a rapid shorthand writer, but rather it is the inability of the student to form rapid mental images and communicate these to the hand.<sup>3</sup>

---

<sup>1</sup>G. Jay Christensen, "How to Teach More in Less Time in Shorthand," Business Education World, Vol. XLIV (September, 1963), p. 26.

<sup>2</sup>Inez Frink, "Shorthand and Transcription: Some Research Findings and Observations," Business Education Forum, Vol. XVI (October, 1961), p. 13.

<sup>3</sup>Elsie Leffingwell, "Four Ways to Help Your Students Build Shorthand Skill," Balance Sheet, Vol. XLV (September, 1963), p. 5.

Much work has been done on better ways to teach shorthand in the classroom. Now, studies are being made on ways to improve the quality of homework as well as classroom instruction. One new feature in the teaching of shorthand has been the limited introduction of programmed shorthand.

Programmed instruction is teaching and learning through means of a teaching machine or through programmed textbooks containing the program.

A program is ". . . a series of items, questions, or statements to each of which, in order, the student is asked to make a response. His response may be to fill in a word left blank, to answer a question, to select one of a series of multiple-choice answers, to indicate agreement or disagreement, or to solve a problem and record the answer. As soon as he has responded to the item, he is permitted to see the correct response so that he can tell immediately whether his response has been the right one."<sup>4</sup>

Immediate knowledge of whether or not a response is correct is one feature that is believed to make programmed learning effective. Wrong responses are detected immediately, and the student has the opportunity to see what the correct response is. Thus, even if the student responds incorrectly, learning takes place because he knows the exact nature of his mistake. This adds strength to the student's knowledge and is referred to as reinforcement.

Because a program is self-administered in that a teacher does not have to be present, it is evident that the program could be used for homework.

---

<sup>4</sup>Wilbur Schramm, Programed Instruction, The Fund for the Advancement of Education, 1962, pp. 1-2.

Some students consider shorthand homework a writing exercise; they reserve the reading assignment until last and often never get to it.<sup>5</sup> Through the use of programmed instruction, however, students would do the reading, which includes the theory, and writing together as one unit. Thus, they would study theory at the same time that they work to construct outlines of their own.

The learning of shorthand does not take place with a final effort near the time of an examination period. It is a continuous process that demands daily preparation.<sup>6</sup> Here, again, programmed instruction might prove to be an effective aid in the learning process. With programmed lessons each day for classroom use and for homework, and with definite, clear homework assignments, the student would know exactly how far he needs to go in the program and in his knowledge of shorthand to keep up with his class.

A programmed unit for presenting shorthand theory to first-year shorthand students has recently been developed.<sup>7</sup> It is correlated with the first 48 lessons in a current shorthand high-school textbook. In this study, the writer used the programmed unit in the place of a textbook in a Shorthand I class at Cumberland High School, Cumberland,

---

<sup>5</sup>Christensen, op. cit.

<sup>6</sup>Leffingwell, op. cit.

<sup>7</sup>Programmed Gregg Shorthand prepared experimentally by Russell J. Hosler, University of Wisconsin; Arthur Condon, Illinois State Normal University; Robert Grubbs, University of Pittsburgh; and Harry Huffman, Virginia Polytechnic Institute, as a cooperative research project for experimentation by graduate students in business education.

Virginia, during the 1964-1965 school year. She sought to discover whether or not shorthand theory could be learned without the use of any traditional textbook, exactly when the best time is to use the program (that is, before or after presentation of the theory in class), and to what extent students retained shorthand theory during the second semester when theory was not being formally taught.

### Purposes of the Study

The study was centered around these three main purposes:

1. To try out a shorthand theory program in a high school first-year shorthand class to determine whether it could be used successfully in place of a textbook.
2. To determine whether theory is learned better if programs are completed before class instruction is given, or if class instruction should precede individual work with the program.
3. To determine the extent to which theory was retained during the second semester when no theory was being formally taught.

### Hypotheses

The following hypotheses were tested in this study:

Hypothesis I - Programmed shorthand can be used successfully in the first semester of first-year shorthand in place of a textbook for the learning of theory.

Hypothesis II - There will be no significant difference in theory test scores when programmed lessons are completed before class instruction

is given and when programmed lessons are completed after class instruction is given.

Hypothesis III - Theory will be retained during the second semester when no theory is being formally taught.

### Need for the Study

Programs for shorthand are in the very early stages of development. Some studies have been conducted on the high school level, but those reported thus far have been very limited in number.<sup>8</sup>

Any new method of teaching and learning should be tested in actual classroom situations before it is accepted as a good method. The possibilities for programmed shorthand may be very great, and the subject needs to be studied objectively to determine whether this new method will prove better than existing methods. It would be beneficial to know, also, when is the best time for using the program in relation to classroom presentation.

### Delimitation of the Study

Programmed Gregg Shorthand, Experimental Edition, prepared by Hosler, Condon, Grubbs, and Huffman was the basis for all instruction in shorthand theory. After all theory had been presented, Gregg

---

<sup>8</sup> One such study was the topic for a doctor's dissertation by Oleen Majors Henson at Temple University in 1964. It is entitled "The Development, Utilization, and Effectiveness of Programmed Materials in Gregg Shorthand."

Shorthand and Gregg Dictation, Diamond Jubilee Series, were used for the remainder of the school year.

The study was conducted intensively while students were learning new material from programmed lessons, which was during the first semester of the school year, 1964-1965. During the second semester, theory tests were given at two- to four-week intervals to attempt to measure the extent to which students retained theory.

The study was conducted at Cumberland High School, Cumberland, Virginia, in the Shorthand I class, which was made up of 16 high school juniors and seniors.

#### Definition of Terms

Programmed instruction is a method of teaching whereby information is broken down into many small steps, to each of which the student must make an active response. Each step requires that the student give an answer, and this prepares him for the next step.

A program refers to the physical form containing the subject matter to be taught, such as a book or slides, or auditory material to be used on a tape recorder.<sup>9</sup>

A frame is one small step in the program, to which the student responds. After the question or statement has been acted upon, the answer is revealed so that the student has immediate reinforcement.

---

<sup>9</sup>Edward J. Green, The Learning Process and Programmed Instruction (New York: Holt, Rinehart and Winston, Inc., 1962), p. 117.

Transcription is the process of reading shorthand notes and reproducing them in longhand or typewritten form, using correct English, spelling, punctuation, and typewriting.

Reinforcement means giving added strength to that already known.

## CHAPTER II

## REVIEW OF LITERATURE

Three types of literature were reviewed for this study. The first section is a review of writings on shorthand methodology. The second section deals with programmed instruction. The last section is a review of two studies that have been made in the area of shorthand programs on the college level.

Shorthand Methodology

Generally speaking, shorthand principles are taught by most high school teachers during the first semester of the shorthand course. Various methods of theory presentation are used and are considered the most effective methods by their users. It is evident, however, that there must be some procedures for teaching shorthand that consistently produce the best results.

It is necessary for the shorthand teacher to constantly ask himself whether a particular procedure is the best possible one that might be used. Good procedures should be abandoned in favor of ones that present even better and more efficient use of class time.<sup>10</sup>

In brief, there are three approaches to presenting shorthand theory.

---

<sup>10</sup>Louis A. Leslie, Methods of Teaching Gregg Shorthand (New York: Gregg Publishing Division, McGraw-Hill Book Company, Inc., 1953), p. 73.

1. The synthetic approach (or the manual method). This approach teaches by an explanation of parts which make up the whole. The routine in this shorthand method is as follows:

- a. Present the consonants.
- b. Present the vowels and sounds of the vowels,
- c. Present the rules for combining the consonants and vowels.
- d. Build words using the rules, or memorize words that apply

the rules.

- e. Read and write material that contains these words.

2. The deductive approach (or the reading approach). Attention is focused on the thought, or the whole, with later attention to individual parts. This is the routine:

a. The teacher dictates to himself and writes the sentence on the blackboard so that the students can watch him.

- b. He reads it again to them.
- c. They read it in unison.
- d. He points to random words.
- e. They read from the shorthand plate in their books.
- f. Writing is postponed until much later in the course.

3. The combination approach. Both the synthetic and deductive methods are used in the shorthand class as the situation demands.

"The approach used in introducing shorthand depends to a large extent upon the skill, ingenuity, and enthusiasm of the teacher."<sup>11</sup>

---

<sup>11</sup>Hazel A. Flood, Brass Tacks of Skill Building in Shorthand (New York: Prentice-Hall, 1951), pp. 17-21.

There is some disagreement as to whether shorthand is learned best by giving word lists and theory tests or by using the connected matter approach. Crank states that theory tests should be simple in the beginning and gradually increase in difficulty. Testing might begin by having students give sounds and longhand of a list of shorthand outlines. They might be asked to indicate which of the longhand letters are silent and hence not written in shorthand. Later, they may omit the sounds and give just the longhand. After this type of testing, students eventually will be given tests which require them to write shorthand from dictated lists.<sup>12</sup>

Automatization of outlines is necessary for competency in shorthand. Used along with some connected matter dictation, word lists and theory tests have the following advantages:

1. Word lists based on a particular point in shorthand theory give repetitive practice on that particular point, helping to automatize that point. Word lists facilitate spelling by sound and forming mental images of strokes.
2. Word lists are meaningful previews for connected matter reading and dictation. The lists aid in vocabulary development.
3. An entire vocabulary of automatized outlines is built up by repetitively studying word lists.

---

<sup>12</sup>Doris Crank, "How Can Facility with the Shorthand System be Developed Best? The Case for Word Lists and Theory Tests," Business Education Forum, Vol. XIX (October, 1964), p. 22.

4. Word lists encourage accurate writing of shorthand outlines, because the student repeatedly sees the same proportion and same theory.<sup>13</sup>

Shorthand demands a student's strict attention. Hosler recommends the connected matter approach because it enforces strict attention. The material is meaningful and the student must concentrate as he writes outlines. It is said that it is better to write an outline ten times in context than to isolate an outline and write it ten times.<sup>14</sup>

Some authorities recommend early transcription training, while others believe that transcription should be postponed until at least the second semester. Forkner has stated that all elements of transcription should be taught from the first day in shorthand class. Students of shorthand are actually learning a new language; the sooner they learn to use shorthand in the manner in which they will use it as transcribers, the better they will learn it.<sup>15</sup> However, Lamb says this:

Since transcription is a complex skill made up of several basic skills in themselves complex, it is profitable in time and effort to have each of the component skills developed independently.

It is suggested that some transcription be done toward the end of the second semester and continued during the third and fourth semesters. Pretranscription drill is important. This includes timed reading of

<sup>13</sup>Ibid., p. 12.

<sup>14</sup>Russell Hosler, "How Can Facility with the Shorthand System be Developed Best? The Case for the Connected Matter Approach," Business Education Forum, Vol. XIX (October, 1964), p. 13.

<sup>15</sup>Hamden L. Forkner, "When Should Transcription be Taught? The Case for Early Transcription," Business Education Forum, Vol. XIX (October, 1964), p. 14.

notes, of shorthand plates, of handwritten transcription, of copying notes from textbooks, and of transcription of timed dictation.<sup>16</sup>

### Programmed Instruction

Programmed instruction is by no means a new teaching method, but its mass acceptance in schools throughout the country is a recent educational development. B. F. Skinner, a leading figure in the field of programming, made this statement about the acceptance of programmed instruction:

Nothing stands in the way but cultural inertia. But what is more characteristic of America than an unwillingness to accept the traditional as inevitable? We are on the threshold of an exciting and revolutionary period, in which the scientific study of man will be put to work in man's best interests. Education must play its part.<sup>17</sup>

Programmed instruction refers to presenting information to the student in small steps so that mastery is obtained with each step. Two types of reinforcement take place through programmed instruction: each correct response is immediately reinforced, leading to the learning of subject matter; and the act of paying attention is reinforced with every correct response so that the student's interest is maintained.<sup>18</sup> Responding to each frame is as easy with a program as is "cheating,"

---

<sup>16</sup>Marion M. Lamb, "When Should Transcription be Taught? The Case for Deferred Transcription," Business Education Forum, Vol. XIX (October, 1964), p. 15.

<sup>17</sup>B. F. Skinner, "The Science of Learning and the Art of Teaching," Programmed Learning: Theory and Research (Princeton: D. Van Nostrand Company, Inc., 1962), p. 33.

<sup>18</sup>William A. Deterline, An Introduction to Programed Instruction (Englewood Cliffs: Prentice-Hall, Inc., 1962), pp. 28-29.

or looking at the answer before attempting to make the required response, so that the temptation to cheat is not strong.<sup>19</sup>

Programmed shorthand involves the writing approach to the introduction of shorthand. Students write from the very beginning. The writing approach seems to have two advantages over the reading approach (in which writing is postponed for about a month): (1) students enter a shorthand class with the expectation of writing shorthand and are eager to begin, and (2) all skills performed on the job level should be performed from the beginning by the student, and writing shorthand is one of these skills.<sup>20</sup>

Many reports are now being made on the results of some of the experiments with programmed instruction in schools throughout the United States. The following paragraphs are some characteristic statements and observations made concerning these experiments. Although most of these comments seem to be on the negative side, programmed instruction is, for the most part, looked upon as an effective teaching and learning method.

In a study made in Provo, Utah, one teacher stated that students found it difficult to study for tests because it was difficult to

---

<sup>19</sup>Ibid., p. 38.

<sup>20</sup>Arthur Condon, "How Can Shorthand be Introduced Most Effectively? The Case for the Writing Approach," Business Education Forum, Vol. XIX (October, 1964), p. 10.

go back and spot a particular rule or important point. There seemed to be no fast way to locate the important items to study for tests.<sup>21</sup>

In Chicago, boredom seemed to be a major problem. Schools that planned to continue to use programs felt this problem also. Exceptionally intelligent students were often bored by easy material. Boredom depended upon "the nature of programs and the conditions under which they are used." Students became bored most with programs used without any other activities for course enrichment.<sup>22</sup>

It was found in a study made in Denver that, contrary to what had been believed, programmed materials did not work as well for homework as in class. Two possible reasons were suggested: (1) students did not work carefully at home, or (2) students got ahead or behind at home, resulting in inefficient use of class time because students were at different places in the program. Short daily quizzes proved helpful to keep students at approximately the same place in the program.<sup>23</sup>

Several reports have emphasized the importance of the teacher's role in the success of programmed instruction. Wilbur Schramm made the following statement concerning an experiment in Denver:

There is obviously an important relationship between teacher and program. One of the most interesting findings

---

<sup>21</sup>Jack Edling, "Programed Instruction in a 'Continuous Progress' School," Four Case Studies in Programmed Instruction, The Fund for the Advancement of Education, June, 1964, p. 83.

<sup>22</sup>Herbert Thelen and John R. Ginther, "Experiences with Programed Materials in the Chicago Area," Four Case Studies in Programmed Instruction, The Fund for the Advancement of Education, June, 1964, p. 45.

<sup>23</sup>Wilbur Schramm, "Programed Instruction in Denver," Four Case Studies in Programmed Instruction, The Fund for the Advancement of Education, June, 1964, p. 36.

of the experiment was that the more interested, the more highly motivated, the teacher, the better work the students did on the program even though they worked privately. The interest and inspiration of the teacher carried over to the individual and private work done by the student!<sup>24</sup>

Another writer said that the teacher is the guiding director in the classroom. It is up to him to use such skills as he has to adapt the program to his ends; the teacher dominates, not the program. This emphasizes the importance of a good teacher-student relationship.<sup>25</sup>

### Two Studies in Programmed Shorthand Instruction

Helen Taylor's study was done at the University of Tennessee with college classes. She used one control and one experimental class during fall quarter; one experimental class was used in the winter quarter. Class periods were 50 minutes in length, and there were 50 periods. Forty-six students participated. This study aimed to determine the significance of certain background factors on achievement in beginning shorthand classes. This experiment involved the construction as well as the testing of the program.<sup>26</sup>

Findings in the Taylor study which are pertinent to this study are as follows:

1. No significant difference existed between the control (traditional method) and the combined experimental

---

<sup>24</sup>Ibid., p. 35.

<sup>25</sup>Herbert Thelen and John R. Ginther, op. cit., p. 56.

<sup>26</sup>Helen W. Taylor and Elise D. Palmer, "Development and Evaluation of Programmed Materials and Multiple-Channel Dictation Tapes in Beginning Shorthand," National Business Education Quarterly, Vol. XXXII (March, 1964), pp. 28-37.

classes (programmed material) on vocabulary and dictation achievement measures. A significant difference was found between the control and experimental class II (where the teacher was the same for both classes) on both vocabulary achievement measures. This difference was favorable to the experimental class.

2. Four of the six intermediate achievement measures showed a significant difference at .05 level between the control and combined experimental classes. The difference was favorable to the experimental class.

3. No significant relationship was found between the time required for completion of programmed lessons and the achievement measures at the close of the lessons. The correlation range was from  $-.02$  to  $.24$ .<sup>27</sup>

Taylor recommended an experiment on the high school level. She thought that the first program should not be introduced until about the second week; traditional classroom instruction should be given until that time. When programmed instruction was begun, some of the material should be completed in the classroom and some at home. After dictation was introduced, programmed material should be used for homework only.<sup>28</sup>

Mary Katherine Ricketts also conducted a study at the University of Tennessee to ". . . test the effectiveness of the orientation lessons with programmed instructional materials."<sup>29</sup> The study used a total of 104 students, most of whom had had no previous shorthand.

<sup>27</sup> Ibid.

<sup>28</sup> Helen W. Taylor, "Development and Evaluation of Programmed Materials in the Presentation of Theory in Beginning Shorthand Classes" (unpublished Doctor's thesis, The University of Tennessee, 1963), pp. 244-245.

<sup>29</sup> Mary Katherine Ricketts, "Preparation and Evaluation of Programmed Materials for Introductory Lessons in Beginning Shorthand" (unpublished Master's thesis, The University of Tennessee, 1962), p. 15.

The study covered only the first five lessons of Gregg shorthand, for which programs were written and tested. A complete analysis was made of only the first two lessons.<sup>30</sup>

The findings of the Ricketts study are not significant to this writer's study. Because Ricketts was concerned with preparing and evaluating programmed materials, the emphasis of the study was not on student performance, but rather on testing, analyzing, and revising the programmed materials developed.

Ricketts recommended that further study be done using the teaching machine instead of programmed texts to eliminate cheating. She also recommended that a study be done using programs for all of shorthand theory.<sup>31</sup>

---

<sup>30</sup>Ibid., pp. 14-15.

<sup>31</sup>Ibid., p. 99.

## CHAPTER III

## PROCEDURES

This chapter deals with the specific procedures employed in collecting data about programmed shorthand. The study covered the period of the 1964-1965 academic year and was conducted at Cumberland High School, Cumberland, Virginia. An intensive study was made during the first semester when the program was being used, and related studies in retention of theory were made during the second semester by the use of tests on theory.

Sixteen students completed the program, and this chapter contains the procedures used in gathering data about the experiences of these 16 students with programmed shorthand.

Design for Presentation of Program

Students used the programmed shorthand lessons for one semester-- from the beginning of the school year until the end of the first semester. The class met five times each week for 18 weeks, making a total of 90 class periods, each 55 minutes long. Half-hour homework assignments were made daily. All homework assignments consisted entirely of working with the program. No additional reading or writing assignments were made other than from the program itself except in two or three instances when students were instructed to read a selection from the textbook to get additional practice in connected material. The textbook was used to such a limited extent that it was felt it did not influence the first purpose of the study.

All class instruction was based on the program. Class time was used for group instruction and individual assistance by the instructor.

Although the textbook, Gregg Shorthand, Diamond Jubilee Series, was purchased on the first day of school, students were instructed not to use the text except in the few instances when the instructor felt that drill was needed on connected material.

The students began programmed shorthand the second day of class. Instruction was given on the first five lessons in class before each lesson was completed by the student individually. Most of the individual work on the program was done as homework, although some class time was allowed for this so that the teacher could observe the students' work habits, uniformity in following instructions, and the use of a "mask" or cover sheet to hide the answers.

For the second group of five lessons, students completed the lessons individually before the theory was taught in class. This procedure was used for the entire set of programmed shorthand lessons, alternating between prior instruction before individual completion of five lessons (designated as Method A) and no prior instruction for the next five lessons (designated as Method B). This prior instruction-no prior instruction pattern was repeated four times, as there were five lessons in each group or chapter and a total of 40 programmed lessons. (Every sixth lesson in the textbook is a review lesson for which no separate program was written.)

Review lessons seemed unnecessary because each lesson contains several pages of review. Therefore, the 40 programmed lessons correspond to the first 48 lessons in the textbook. Thus, Lesson 5/6 is one assignment. This designation kept the programmed material perfectly correlated lesson by lesson with the textbook.) In graphic form, the design was that shown below. Following each group of lessons, it is indicated whether those five lessons were completed by the students with prior instruction in class or with no prior instruction.

1. Lessons 1-5/6: prior instruction in class. Method A.
2. Lessons 7-11/12: no prior instruction in class. Method B.
3. Lessons 13-17/18: prior instruction in class. Method A.
4. Lessons 19-23/24: no prior instruction in class. Method B.
5. Lessons 25-29/30: prior instruction in class. Method A.
6. Lessons 31-35/36: no prior instruction in class. Method B.
7. Lessons 37-41/42: prior instruction in class. Method A.
8. Lessons 43-47/48: no prior instruction in class. Method B.

As can be observed from the foregoing outline, prior instruction was given on Lessons 1-5/6, 13-17/18, 25-29/30, and 37-41/42 before students attempted them on their own (Method A). Lessons 7-11/12, 19-23/24, 31-35/36, and 43-47/48 were completed by the students without prior instruction (Method B).

#### Testing Method A and Method B

A theory test was given after every fifth lesson covering specifically those principles presented in the five lessons. These

tests were administered as follows and contained the specified number of items:

1. After Lessons 1-5/6: 100 items; counted 1 point each.
2. After Lessons 7-11/12: 100 items; counted 1 point each.
3. After Lessons 13-17/18: 100 items; counted 1 point each.
4. After Lessons 19-23/24: 150 items; counted 2/3 point each.
5. After Lessons 25-29/30: 100 items; counted 1 point each.
6. After Lessons 31-35/36: 100 items; counted 1 point each.
7. After Lessons 37-41/42: 100 items; counted 1 point each.
8. After Lessons 43-47/48: 50 items; counted 2 points each.

Thus, there were four tests under Method A--those on Lessons 1-5/6, 13-17/18, 25-29/30, and 37-41/42. There were likewise four tests under Method B--those on Lessons 7-11/12, 19-23/24, 31-35/36, and 43-47/48. These tests were prepared by the instructor.

At the end of the first semester, a 100-word dictated test was given which contained theory principles from all 48 lessons. The test was 10 minutes in length, and the results were tabulated on the basis of words missed out of 100.

#### Testing for Retention of Theory during the Second Semester

Five tests, each containing 100 words, were given at approximately two- to four-week intervals during the second semester, beginning six weeks after the end of the first semester. At the end of the second semester, the same test was given that was given at the end of the first semester. These tests consisted of 100

words dictated by the instructor at the rate of 10 per minute. Therefore, each test was 10 minutes in length. The tests were designed to measure the retention of theory. During this time, no theory was being formally taught, although when specific problems arose, these were discussed and solved. These five tests were taken from the 1963-1964 issues of the Business Teacher.<sup>32</sup> Results of these tests were tabulated, based on the number of items missed out of 100.

The two end-of-semester tests, plus the five tests given at intervals throughout the second semester, were tabulated to show how well students retained the shorthand theory when no formal instruction was being given in it.

#### Collecting Additional Related Data

The three major questions this paper seeks to answer are as follows:

1. Could programmed shorthand be used successfully for learning theory during the first semester of first-year shorthand?
2. Did Methods A and B produce different achievement results?
3. How well was theory retained as measured by tests during the second semester when no theory was formally taught?

In addition to information related specifically to these three questions, two other types of data were collected to serve as

---

<sup>32</sup>Business Teacher is a bi-monthly publication made available to business teachers by the Gregg Publishing Company, division of McGraw-Hill Book Company, Inc., New York, New York.

supporting evidence of the kind of students these 16 students were.

They are as follows:

1. Past high school grades were obtained and averaged. Grades considered were year averages before the year in which this experiment was conducted, excluding physical, health, and driver education.

2. IQ scores were obtained. These were the results as shown by the California Test of Mental Maturity taken by the students in 1960. No score was available for Student No. 6, who was a transfer from another school.

A record of the time spent in completing the program was kept. Students kept an accurate record of the time they spent individually on each lesson. The instructor kept a record of the time spent in the classroom on the program, so that a total time for completing the entire program for each student was obtained.

## CHAPTER IV

## ANALYSIS OF DATA

The types of data presented in this study are as follows:

(1) Scores on four theory tests under Method A; (2) Scores on four theory tests under Method B; and (3) Scores on five theory tests given at intervals during the second semester, plus scores of a theory test given twice--once at the end of the first semester and again at the end of the second semester. Three types of supporting background data are also presented: IQ scores of the 16 participating students, high school averages of the students, and total time spent in completing the program.

Comparison of Method A and Method B

Table 1 shows the results by numerical grade of Method A in which the four tests were based on the lessons for which prior instruction was given in class before students completed the lessons individually. Table 2 contains similar information about Method B in which no prior instruction was given before the students did the program on their own. The numerical grades are based on 100 per cent. A sample of one of these theory tests is shown in the Appendix. The means and standard deviations for each of these eight tests are shown in Tables 1 and 2. The statistical formula used for standard deviations was that shown in Wert's Educational Statistics.<sup>33</sup> Under Method A,

---

<sup>33</sup>James E. Wert, Educational Statistics (New York: McGraw-Hill Book Company, Inc., 1938), pp. 119-122.

TABLE 1

SCORES ON THEORY TESTS BY NUMERICAL GRADE (BASED ON 100 PER CENT)  
ON LESSONS PRESENTED BY METHOD A

Student Number	Test 1-5/6 100 Items	Test 13-17/18 100 Items	Test 25-29/30 100 Items	Test 37-41/42 100 Items
1	80	77	91	84
2	97	95	94	98
3	85	89	80	82
4	97	98	98	99
5	89	85	79	46
6	95	89	77	70
7	65	91	91	93
8	92	92	80	84
9	84	90	85	96
10	93	94	89	83
11	77	70	89	77
12	96	86	88	94
13	93	94	88	96
14	97	95	98	96
15	75	89	81	74
16	88	90	86	88
Mean	87.69	89.00	87.13	85.00
Standard Deviation	9.42	7.06	6.51	13.73

TABLE 2

SCORES ON THEORY TESTS BY NUMERICAL GRADE (BASED ON 100 PER CENT)  
ON LESSONS PRESENTED BY METHOD B

Student Number	Test 7-11/12 100 Items	Test 19-23/24 150 Items	Test 31-35/36 100 Items	Test 43-47/48 50 Items
1	86	81	92	76
2	97	99	99	100
3	88	81	93	80
4	97	97	100	92
5	92	87	85	48
6	92	83	80	52
7	93	99	91	78
8	90	91	90	74
9	88	91	85	96
10	93	99	91	100
11	70	57	78	70
12	91	91	93	92
13	86	97	96	86
14	97	97	100	100
15	91	91	79	66
16	84	76	88	88
Mean	89.69	88.56	89.94	81.13
Standard Deviation	6.58	11.15	7.03	16.30

the means ranged from 85.00 to 89.00. The standard deviations varied from 6.51 to 13.73. With Method B, the means ranged from 81.13 to 89.94. Standard deviations ranged from 6.58 to 16.30.

The four tests under Method A were compared with each of the four tests under Method B, resulting in 16 comparisons. Each of the four tests based on lessons with prior instruction were compared to each of the four tests based on lessons on which no prior instruction was given. Thus, Test 1-5/6 was compared with Test 7-11/12, Test 19-23/24, Test 31-35/36, and Test 43-47/48. Test 13-17/18 was compared with Test 7-11/12, Test 19-23/24, Test 31-35/36, and Test 43-47/48. Test 25-29/30 was compared with Test 7-11/12, Test 19-23/24, Test 31-35/36, and Test 43-47/48. Test 37-41/42 was likewise compared with Test 7-11/12, Test 19-23/24, Test 31-35/36, and Test 43-47/48.

As an example, Test 1-5/6 had a mean of 87.69 and a standard deviation of 9.42. This test was compared with Test 7-11/12, with a mean of 89.69 and a standard deviation of 6.58. The standard error of difference was 2.88, and the  $\tilde{z}$ -score was .69. The formula for  $\tilde{z}$ -scores was obtained from Downie and Heath's Basic Statistical Methods.<sup>34</sup>

The level of significance was set at five per cent. Thus, any  $\tilde{z}$ -score over 1.96 would be significant at the five per cent level.

Table 3 contains the standard error of difference and  $\tilde{z}$ -scores in each of the 16 comparisons. The 16  $\tilde{z}$ -scores ranged from .13 to

---

<sup>34</sup>N. M. Downie and R. W. Heath, Basic Statistical Methods (New York: Harper and Brothers, 1959), pp. 123-127.

TABLE 3

STANDARD ERROR OF DIFFERENCE AND  $\bar{z}$ -SCORES  
IN 16 COMPARISONS

Test No.		7-11/12	19-23/24	31-35/36	43-47/48
1-5/6	$S_{D_{\bar{x}}}$	2.88	3.65	2.94	4.71
	$\bar{z}$ -scores	.69	.24	.77	1.39
13-17/18	$S_{D_{\bar{x}}}$	2.42	3.30	2.50	4.45
	$\bar{z}$ -scores	.29	.13	.38	1.77
25-29/30	$S_{D_{\bar{x}}}$	2.32	3.23	2.40	4.39
	$\bar{z}$ -scores	1.10	.44	1.17	1.37
37-41/42	$S_{D_{\bar{x}}}$	3.81	4.42	3.86	5.33
	$\bar{z}$ -scores	1.23	.81	1.28	.73

1.77. None of the  $\bar{z}$ -scores was larger than 1.96, the five per cent level of significance.

In the 16 comparisons used in this experiment, the null hypothesis is accepted. The conclusion is that lessons taught by Method A and Method B do not apparently yield different achievement scores on the tests. Thus, Hypothesis II, which stated that there would be no significant difference in theory test scores when programmed lessons were completed before class instruction was given and when lessons were completed after class instruction was given, is accepted.

Table 4 presents the mean shorthand test grades of the 16 students. The mean shown is that of the eight tests given in Table 1 and Table 2. It will be observed that the over-all mean was 87.31. According to the grading scale used at Cumberland High School, this would represent a letter grade of "C." Three of the students had a letter grade of "A," five had a "B," five received a "C," two earned a "D," and one failed. Thus, Hypothesis I is accepted. Programmed shorthand was used successfully, if the criteria of passing or failing can be judged an adequate measure.

#### Analyzing Retention of Theory

Table 5 presents scores in terms of items missed out of 100 dictated words on the last day of the first semester and the identical test at the end of the second semester, with the means of items missed.

TABLE 4.

## MEAN SHORTHAND TEST GRADES\*

Student Number	Mean Grade	Letter Grade**
1	86	C
2	97	A
3	85	C
4	97	A
5	76	D
6	80	D
7	88	B
8	87	C
9	89	B
10	93	B
11	74	F
12	91	B
13	92	B
14	97	A
15	81	C
16	86	C
Mean	87.31	C

\*Based on eight tests shown in Table 1 and Table 2.

\*\*Using the grading scale at Cumberland High School, that is, 95-100=A; 88-94=B; 81-87=C; and 75-80=D.

TABLE 5

RESULTS OF TWO END-OF-SEMESTER TESTS SHOWING  
NUMBER OF ITEMS MISSED OUT OF 100

Student Number	End of First Semester	End of Second Semester	Increase or Decrease
1	25	9	-16
2	7	2	-5
3	37	13	-24
4	9	0	-9
5	40	38	-2
6	48	19	-29
7	9	4	-5
8	25	6	-19
9	25	21	-4
10	44	40	-4
11	32	17	-15
12	15	7	-8
13	8	3	-5
14	8	5	-3
15	31	33	+2
16	21	7	-14
Mean	24	14	-10

Table 6 shows results of similar 100-word dictated tests given at intervals during the second semester, beginning six weeks after the completion of the program. Tests were given thereafter at two- to four-week intervals. The first test shows a mean of 24.00; and, in the order in which the tests were taken, succeeding means were 19.94, 22.19, 19.00, 21.56, 13.63, and 14.00.

The two tests in Table 5 make an interesting comparison because this was the same test given a semester apart. It will be noticed that 15 students missed less words at the end of the second semester than at the end of the first, and only 1 student missed more words.

It is possible to generalize that these 16 students did retain theory over a period of one semester when no theory was being formally taught. Hypothesis III is therefore accepted.

#### High School Grades, IQ's, and Time Spent

Further data about the high school grades and IQ's of the students and the time they spent on programmed shorthand may be found in Table 7 and Table 8 in the Appendix.

TABLE 6

RESULTS OF FIVE SECOND-SEMESTER THEORY TESTS SHOWING  
NUMBER OF ITEMS MISSED OUT OF 100\*

Student Number	Weeks After Completion of Program				
	6	8	10	12	16
1	5	18	9	15	11
2	5	6	5	2	1
3	29	24	21	22	10
4	8	6	4	4	6
5	36	35	34	36	31
6	36	33	34	34	18
7	4	13	13	7	3
8	10	15	15	18	5
9	22	31	20	23	21
10	49	49	46	51	38
11	36	45	30	36	23
12	18	18	18	20	10
13	2	4	3	6	3
14	17	13	12	15	11
15	31	33	31	42	23
16	11	12	9	14	4
Mean	19.94	22.19	19.00	21.56	13.63

\*Tests taken from the Business Teacher.

## CHAPTER V

## SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

To fulfill the purposes of this study, programmed shorthand was used in place of a textbook during the entire first semester of the school year, 1964-1965. Sixteen students in Shorthand I at Cumberland High School, Cumberland, Virginia, participated in the study. The purposes were to discover whether shorthand theory could be learned from programmed shorthand in place of the traditional textbook; if it was better to give classroom instruction before the students attempted the program on their own or whether students performed better if they worked through the program first and then were given classroom instruction; and to determine the extent to which theory was retained during the second semester when theory was not being formally taught.

The following hypotheses were tested:

Hypothesis I - Programmed shorthand can be used successfully in the first semester of first-year shorthand in place of a textbook.

Hypothesis II - There will be no significant difference in theory test scores when programmed lessons are completed before class instruction is given and when programmed lessons are completed after class instruction is given.

Hypothesis III - Theory will be retained during the second semester when no theory is being formally taught.

All three of these hypotheses were accepted. Fifteen of the 16 students received a mean grade of 75 or above, which denotes a passing mark, on the eight theory tests given during the first semester. The over-all mean was 87.31. Thus, Hypothesis I, which states that programmed shorthand could be used successfully, was accepted.

Hypothesis II stated that Method A and Method B would produce no significant differences at the five per cent level. The two methods did not apparently yield different achievement scores on the tests. The 16  $\bar{z}$ -scores ranged from .13 to 1.77. None of the  $\bar{z}$ -scores was larger than 1.96, the five per cent level of significance. Thus, Hypothesis II was accepted.

Based on the means of seven theory tests, one given at the end of the first semester and one at the end of the second semester, and five tests given at two- to four-week intervals during the second semester beginning six weeks after the end of the first semester, there was no loss in knowledge of theory during the second semester when theory was not being taught. The first test showed a mean of 24.00 items missed out of 100. In the order in which the tests were taken, succeeding means were 19.94, 22.19, 19.00, 21.56, 13.63, and 14.00. Hypothesis III was accepted.

Students participating in the study had a mean IQ of 98.53. Their mean high school average was 85.75. They spent an average of 97 hours on programmed shorthand, including time spent both in class and at home.

### Conclusions

The following conclusions were drawn as a result of this research study:

1. The 16 students were able to learn shorthand theory from programmed shorthand.
2. It made no difference in the case of the 16 students whether they did the programmed lessons with or without prior instruction in the classroom.
3. Knowledge of theory was not lost during the second semester when theory was not being formally taught.

### Recommendations

On the basis of information gained from this study, the writer recommends the following action with reference to programmed shorthand.

1. The value of programmed shorthand as homework for the first semester should be determined. Since programmed shorthand involves both the reading and writing approach, it may be that this would prove very effective as shorthand homework.
2. Further studies should be made to find if programmed shorthand has any special benefits to offer the slow learner or the academically talented student.
3. A study would be helpful in determining if the length of the programmed lesson has any effect on how well a student learns that lesson.

## BIBLIOGRAPHY

- Angus, Marion. "Sound Teaching Methods for Shorthand," Business Education Forum, Vol. XVI (October, 1961), pp. 17-18.
- Garr, W. J. "A Review of the Literature on Certain Aspects of Automated Instruction," Programmed Learning: Theory and Research. Princeton: D. Van Nostrand Company, Inc., 1962.
- Christensen, G. Jay. "How to Teach More in Less Time in Shorthand," Business Education World, Vol. XLIV (September, 1963), pp. 25-27.
- Condon, Arthur. "How Can Shorthand be Introduced Most Effectively? The Case for the Writing Approach," Business Education Forum, Vol. XIX (October, 1964), pp. 10, 22.
- Crank, Doris. "How Can Facility with the Shorthand System be Developed Best? The Case for Word Lists and Theory Tests," Business Education Forum, Vol. XIX (October, 1964), pp. 12, 22.
- Crank, Floyd L. "Basic Considerations for First-Year Shorthand," Secretarial Education with a Future, The American Business Education Yearbook. Published by the Eastern Business Teachers Association and the National Business Teachers Association. Somerville: Somerset Press, 1962.
- Deterline, William A. An Introduction to Programed Instruction. Englewood Cliffs: Prentice-Hall, Inc., 1962.
- Edling, Jack. "Programed Instruction in a 'Continuous Progress' School," Four Case Studies in Programed Instruction, The Fund for the Advancement of Education, June, 1964.
- Flood, Hazel A. Brass Tacks of Skill Building in Shorthand. New York: Prentice-Hall, Inc., 1951.
- Forkner, Hamden L. "When Should Transcription be Taught? The Case for Early Transcription," Business Education Forum, Vol. XIX (October, 1964), pp. 14, 16.
- Four Case Studies in Programed Instruction. The Fund for the Advancement of Education, June, 1964.
- Frink, Inez. "Shorthand and Transcription: Some Research Findings and Observations," Business Education Forum, Vol. XVI (October, 1961), pp. 13-15.

- Fry, Edward. "Teaching Machine Dichotomy: Skinner vs. Pressey," Programmed Learning: Theory and Research. Princeton: D. Van Nostrand Company, Inc., 1962.
- Green, Edward J. The Learning Process and Programmed Instruction. New York: Holt, Rinehart and Winston, 1962.
- Harper, W. T. "More Programing or Status Quo for Business Education," Journal of Business Education, Vol. XXXVII (December, 1961), pp. 109-110.
- Hillestad, Mildred. "Learning Difficulties in Shorthand," Business Education Forum, Vol. XVI (October, 1961), pp. 15-17.
- Hosler, Russell. "How Can Facility with the Shorthand System be Developed Best? The Case for the Connected Matter Approach," Business Education Forum, Vol. XIX (October, 1964), p. 13.
- Huffman, Harry. "Putting the Teaching Machine on Paper," Business Education World, Vol. XLI (April, 1961), pp. 13-18.
- Kane, Eleanor. "Shorthand Learning Time Must be Shortened," Journal of Business Education, Vol. XXXVIII (December, 1962), pp. 98-99.
- Klaus, David J. "The Art of Auto-Instructional Programming," Programmed Learning: Theory and Research. Princeton: D. Van Nostrand Company, Inc., 1962.
- Lamb, Marion M. "When Should Transcription be Taught? The Case for Deferred Transcription," Business Education Forum, Vol. XIX (October, 1964), pp. 15-16.
- Lamb, Marion M. Your First Year of Teaching Shorthand and Transcription. Cincinnati: South-Western Publishing Company, 1950.
- Leffingwell, Elsie. "Four Ways to Help Your Students Build Shorthand Skill," Balance Sheet, Vol. XLV (September, 1963), pp. 4-6, 44.
- Leslie, Louis A. Methods of Teaching Gregg Shorthand. New York: Gregg Publishing Division, McGraw-Hill Book Company, 1953.
- Liles, Parker. "Issues in Teaching Shorthand," Balance Sheet, Vol. XLV (October, 1963), pp. 52-57.
- Lumsdaine, Arthur L. and Robert Glaser, editors. Teaching Machines and Programmed Learning. Washington, D. C.: NEA, Division of Audio-Visual Instruction, 1960.

- Ricketts, Mary Katherine. "Preparation and Evaluation of Programmed Materials for Introductory Lessons in Beginning Shorthand." Master's thesis. (Unpublished). Tennessee: The University of Tennessee, 1962.
- Schramm, Wilbur. Programed Instruction. The Fund for the Advancement of Education, 1962.
- Schramm, Wilbur. "Programed Instruction in Denver," Four Case Studies in Programmed Instruction. The Fund for the Advancement of Education, June, 1964.
- Skinner, B. F. "The Science of Learning and the Art of Teaching," Programmed Learning: Theory and Research. Princeton: D. Van Nostrand Company, Inc., 1962.
- Smith, Wendell F. and J. William Moore, editors. Programmed Learning: Theory and Research. Princeton: D. Van Nostrand Company, Inc., 1962.
- Stewart, Jane. "On These Things We Agree in the Teaching of Shorthand and Transcription," Business Education Forum, Vol. XIX (October, 1964), pp. 7-9.
- Taylor, Helen W. "Development and Evaluation of Programmed Materials in the Presentation of Theory in Beginning Shorthand Classes." Doctor's thesis. (Unpublished). Tennessee: The University of Tennessee, 1963.
- Taylor, Helen W. and Elise D. Palmer. "Development and Evaluation of Programmed Materials and Multiple-Channel Dictation Tapes in Beginning Shorthand," National Business Education Quarterly, Vol. XXXII (March, 1964), pp. 28-37.
- Thelen, Herbert and John R. Ginther. "Experiences with Programmed Materials in the Chicago Area," Four Case Studies in Programmed Instruction. The Fund for the Advancement of Education, June, 1964.
- Van Hook, Victor. "How Can Shorthand be Introduced Most Effectively? The Case for the Reading Approach," Business Education Forum, Vol. XIX (October, 1964), pp. 11, 16.

**The vita has been removed from  
the scanned document**

APPENDIX

## SAMPLE THEORY TEST

This is one of the eight theory tests, the results of which are shown in Table 1 and Table 2.

SHORTHAND TEST  
Lessons 31-35/36

## I. Write the following brief forms:

- |                      |                     |
|----------------------|---------------------|
| 1. quantity _____    | 6. throughout _____ |
| 2. merchandise _____ | 7. situation _____  |
| 3. experience _____  | 8. recognize _____  |
| 4. govern _____      | 9. never _____      |
| 5. character _____   | 10. railroad _____  |

## II. Write the following words and phrases:

- |                   |                          |
|-------------------|--------------------------|
| 1. failure _____  | 12. misplace _____       |
| 2. nature _____   | 13. discuss _____        |
| 3. eventual _____ | 14. discouragement _____ |
| 4. annual _____   | 15. despite _____        |
| 5. gradual _____  | 16. forget _____         |
| 6. steadily _____ | 17. forever _____        |
| 7. family _____   | 18. force _____          |
| 8. also _____     | 19. furniture _____      |
| 9. although _____ | 20. days ago _____       |
| 10. alter _____   | 21. months ago _____     |
| 11. mistake _____ | 22. if you want _____    |

- |                 |       |                 |       |
|-----------------|-------|-----------------|-------|
| 23. I wanted    | _____ | 30. articles    | _____ |
| 24. quarter     | _____ | 31. interest    | _____ |
| 25. report      | _____ | 32. introduces  | _____ |
| 26. thermometer | _____ | 33. entertained | _____ |
| 27. turn        | _____ | 34. meetings    | _____ |
| 28. term        | _____ | 35. openings    | _____ |
| 29. critical    | _____ |                 |       |

III. Write the following sentences in shorthand, phrasing when possible:

1. Will you please introduce Mr. Cummings at the meetings? \_\_\_\_\_

\_\_\_\_\_

2. He wanted to forgive and forget past mistakes. \_\_\_\_\_

\_\_\_\_\_

3. Put forth the necessary effort to stay well informed. \_\_\_\_\_

\_\_\_\_\_

4. The apartment was already furnished when the family secured it. \_\_\_\_\_

\_\_\_\_\_

5. Do you want to move to a southern or eastern state? \_\_\_\_\_

\_\_\_\_\_

IV. Transcribe the following sentence:

(This sentence would be written in shorthand: "The world objects to a government determined by a dictator.")

\_\_\_\_\_

\_\_\_\_\_

TABLE 7

IQ AND HIGH SCHOOL AVERAGES  
FOR THE 16 STUDENTS

Student Number	IQ	High School Average*
1	91	82
2	112	91
3	112	90
4	89	87
5	91	75
6	**	88
7	113	85
8	95	82
9	99	88
10	84	86
11	92	84
12	74	86
13	102	87
14	119	95
15	102	85
16	103	81
Mean	98.53	85.75

\*Based on yearly averages before present school year excluding physical and driver education.

\*\*Information not available.

TABLE 8

TOTAL TIME IN HOURS SPENT IN AND OUT OF CLASS  
ON PROGRAMMED SHORTHAND

Student Number	Hours
1	98
2	96
3	99
4	97
5	76
6	93
7	100
8	97
9	87
10	102
11	103
12	94
13	91
14	106
15	100
16	118
Mean	97

## ABSTRACT

FRANCES NORTON HAMLETT. A UTILIZATION STUDY OF PROGRAMMED SHORTHAND. M. S. THESIS. AUGUST, 1965. VIRGINIA POLYTECHNIC INSTITUTE, BLACKSBURG, VIRGINIA.

PURPOSES: The purposes of this study were (1) to try out a shorthand theory program in a high school first-year shorthand class to determine if it could be used successfully in place of a textbook; (2) to determine whether theory is learned better if programs are completed before class instruction is given, or if class instruction should precede individual work with the program; and (3) to determine if theory was retained during the second semester when no theory was being formally taught.

PROCEDURES: Sixteen students in the first-year shorthand class at Cumberland High School, Cumberland, Virginia, used programmed shorthand instead of a traditional shorthand book for the entire first semester of the 1964-1965 school year. Instruction was given on the first five lessons in class before the students attempted them on their own. For the next five lessons, the procedure was reversed and students worked the programmed lessons alone before they were presented in class. A theory test was given after every five lessons, yielding eight tests on the 40 lessons. Thus, there were four tests

on lessons with prior class instruction and four tests on lessons without prior class instruction.

A theory test was given at the end of the first semester covering all theory. Six tests were given at two- to four-week intervals during the second semester, beginning six weeks after the end of the first semester. These tests were designed to measure retention of theory during the second semester when no theory was being formally taught.

**CONCLUSIONS:** The following conclusions were drawn from this research study:

1. Students are able to learn shorthand theory from programmed shorthand.
2. It made no difference in the case of the 16 students whether they did the programmed lessons with or without prior instruction in the classroom as evidenced by test grades.
3. Knowledge of theory was not lost during the second semester when theory was not being formally taught.