A STUDY COMPARING THE EFFECTIVENESS OF RUSSON'S EARLY-NEW-MATTER APPROACH WITH THE CURRENT GREGG MANUAL APPROACH ON SPEED DEVELOPMENT IN FIRST-YEAR SHORTHAND

by

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A professional paper submitted to the Graduate Faculty
in partial fulfillment of the requirements for the degree

of

MASTER OF SCIENCE

in

Business Education

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MONTANA STATE UNIVERSITY
Bozeman, Montana

August, 1972

ACKNOWLEDGMENTS

I wish to express my gratitude to the members of my graduate committee, Dr. Harvey Larson, Mr. Dan Hertz, and Mr. Floyd Frost, for their encouragement and friendship during the summers of graduate work.

A special thanks is extended to Dr. Allien R. Russon for her assistance in the initial planning of this study and also to the administrators and counseling personnel of Billings West High School for their cooperation.

Finally, my warmest appreciation must be expressed to my husband and sons for their unfailing patience and understanding during the summers when it was necessary for me to be away from home.

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Chapter 1

INTRODUCTION

Teaching methodology has long been of prime concern to educators in all fields. With the current emphasis on "accountability" in education, this concern must now result in stronger action and less casual contemplation. Students, parents, school boards, and taxpayers are demanding more return for their investment in time and money in the way of improved performance in less time. Better teaching procedures and materials must be developed and utilized if these goals are to be met.

Teachers of skill subjects, as opposed to teachers of some academic courses, are in the unique and enviable position of being able to measure growth and achievement precisely. The problem of how best to increase that growth and achievement remains.

Too often in the past, shorthand methodology has been founded on opinion and steeped in tradition rather than on valid research. It is likely shorthand teachers throughout the country are experimenting in their classrooms with methods which best meet their individual purposes, but too little information on their successes and failures is reaching their colleagues. This study was undertaken as an attempt to add to the results of previous studies in which findings were contradictory. The balance of this chapter considers the problem and terms.

THE PROBLEM

The purpose of this study was to compare, by means of a controlled classroom experiment, the effectiveness of Russon's early-new-matter approach and the current Gregg manual approach in developing dictation speed of first-year shorthand students. This study was an attempt to accomplish the following: (1) define two different methods of teaching first-year shorthand; (2) apply, in a shorthand classroom situation, a series of teaching devices and techniques developed by Allien R. Russon; and (3) compare the results obtained by Russon's method with the results obtained by the use of the more traditional method developed by the Gregg authors.

The investigator first became interested in the early-new-matter approach prior to the beginning of the 1970-1971 school year. This approach was used on an informal basis with first-year shorthand classes during that year. Enthusiasm and performance of the students seemed exceptionally high. The method used in previous years had been the Gregg authors' manual approach with some modification. After reading extracts of several research studies that involved the early use of new-matter dictation, it was learned that findings of the various studies did not fully agree. In nearly all these studies, it was recommended that teachers continue to experiment with the early introduction of new-matter dictation. Then, too, most of the earlier studies had not utilized the several complementary devices developed

by Russon to be used in conjunction with the early dictation of new matter.

Statement of the Problem

The problem to be considered was: Would the use of Russon's early-new-matter approach in a beginning shorthand class significantly influence the achievement of the students in that class? Because the ultimate goal of shorthand is the ability to take new-matter dictation and transcribe that material in accurate form, it seemed reasonable to assume that, if students had early experience in these activities, their skills would be higher at the end of the period of instruction than if they had no such experience until midway through the course.

This study was undertaken in order to find answers to the following questions:

1. Would the application of methods as delineated in Russon's early-new-matter approach significantly affect the achievement (as measured by 5-minute new-matter dictation tests) of first-year shorthand students at the end of the first year of instruction?

2. How would the level of achievement (as measured by 5-minute new-matter dictation tests) of two groups of shorthand students taught by two different methods for the first semester compare at the end of the first year of instruction?

Delimitations

This study involved two classes of students enrolled in first-year shorthand for the 1971-1972 school year at Billings West High School, Billings, Montana.

Each class met for an instructional period of 60 minutes, five days a week, for the entire school year. Both classes were taught by the same teacher, who had had twelve years' experience teaching beginning and advanced shorthand at the high school level. The teacher made every effort to maintain the same high degree of enthusiasm with both classes. Both classes received an equal amount of drill and of in-class dictation given by the teacher and from recorded tapes.

The review of literature was primarily restricted to the Montana State University Library, Bozeman, Montana.

Limitations

The results of the study may have been affected by one or more of the following factors.

Number of students involved. There were thirty-seven students involved in this study, a number admittedly too small for any broad generalizations.

Student absences. Although absences due to illness, vacations, extracurricular activities, and other causes were not a serious problem, it was felt that, in a few instances, excessive absences may have

influenced some students' progress. This was particularly true in the case of less-capable students. However, absences in the two classes were, on the average, almost identical.

Class interruptions. One class met during the fourth period of the school day; the other class met during the sixth period, the final period of the school day. Because the fourth period was designated as the "lunch hour," a series of four bells were rung each day during this period to dismiss groups of students throughout the building for lunch and to signal other groups to return to classes. The interruption caused by the ringing of these bells created a certain amount of discontinuity in classroom procedure, but sustained test dictations of three minutes and five minutes were carefully planned to avoid the interruption of the bells.

Because the fourth period was set aside for the staggered lunch periods, it was never shortened or eliminated for programs, assemblies, or other activities. It was felt that this fact helped to offset the disruptive influence of the lunch bells. Sixth period, the time at which the other class met, lost a portion of class time on three occasions and was eliminated entirely on one day because of special activities.

Longhand transcription. Ideally, students should transcribe dictated material in typewritten form. However, due to overcrowded

conditions in typing rooms at Billings West High School, no typewriters were available to the first-year shorthand students for purposes of transcribing. Therefore, it was necessary for the students to do all transcribing in longhand.

Miscellaneous factors. Other factors may have affected the outcome of this study; for example, the different time of day during which classes met; the influence of the teacher's personality on individual students; and the motivation and objectives, both personal and educational, of each student.

Enrollment and Scheduling

Students register for courses that they plan to take during a given year soon after the end of the first semester of the preceding year. They discuss their course selection with counselors prior to formal registration. The only prerequisite of first-year shorthand is a final grade of "C" or better in English the previous year. Occasionally, a counselor may recommend that a student with a record of below-average grades not enroll in shorthand. However, if the student and his parents insist, and if the student meets the single prerequisite described above, it is the policy of the school to allow the below-average student to enroll in first-year shorthand. The scheduling of students into the various classes is handled by the principal and the assistant-principals and is performed in a random manner, except in

a few cases of conflict with some special course or cocurricular activity that is scheduled just once a day. For example, students who are members of the Acappella Choir, which meets during the fourth period, cannot take any other course during that period. Likewise, students who participate in athletics, such as gymnastics, tennis, or golf, which are scheduled during the sixth period, are programmed into classes that meet the preceding five periods.

The two classes of students used in this study were designated as Class A and Class B.

Class A. This group consisted of twenty students who were assigned to the class that met during the fourth period of the school day. With this class the teacher used the current Gregg manual approach, which will be described later in this paper. No new-matter dictation was given until the last two weeks of the first semester. There was no testing of new-matter dictation until the second semester. Before the first class meeting, this group was randomly designated as the control group.

Class B. This group consisted of seventeen students who were assigned to the class that met during the sixth period. The teacher utilized Russon's early-new-matter approach with this group. This approach, which includes the dictation of new material very early in the course, will be described in detail in a later section of this

paper. Before the first class meeting, this group was randomly designated as the experimental group.

Importance of the Study

Improved methods of instruction have taken on greater importance with the recent emphasis on "accountability" in education. Any method, device, or technique, alone or in combination, which will aid students in reaching objectives in a faster, more efficient manner is beneficial not only to students but to all teachers of that subject as well. Improved performance of students can be brought about by improved methods of instruction, as determined through research.

DEFINITIONS OF TERMS USED

The following definitions of terms and other information pertinent to this study are given to assist the reader in gaining a clearer understanding of the data that are presented.

Five-minute takes. A 5-minute take is a term used to describe a procedure that involves sustained dictation, by the teacher or by recorded tape, of material at a measured speed for a period of five minutes. The material is usually in letter form, and the rate per minute of the dictation is determined by the skill level of the students. The takes are generally given once each week; in order to provide for individual differences toward the end of the year, it may

be necessary to dictate weekly takes at four or five different speed levels. Each take consists of different material, and no single take is used more than once during the year.

After the dictation is given, students are allowed the remainder of the class period to transcribe the material in longhand. Because of the time required for dictation of several takes at different speeds and subsequent longhand transcription by the students, it may be necessary to utilize two or even three days each week for dictation and transcription of takes as the speed range among the students broadens. Generally, after warmup and preview, a maximum of two 5-minute takes can be dictated during a one-hour period if there is to be sufficient time allowed for longhand transcription.

Each student is encouraged to transcribe the highest take for which he has readable notes. He works independently as he transcribes, but dictionaries are available for reference to spelling, word division, capitalization, and proper word usage. In order for the take to be considered passing, the material must be transcribed at an accuracy level of 95 percent or better. A take which has less than 95 percent accuracy is considered "not passing," but no penalty is charged against the student who fails to achieve the minimum accuracy level on his transcript. Instead, the student is encouraged to try again the following week. In this study, the dictation of 5-minute takes was deferred until the fourth quarter (latter half of the second semester).

In Russon's early-new-matter approach, takes are referred to as chances to pass rather than tests.[1]

Three-minute takes. A 3-minute take consists of sustained dictation at a measured speed for a period of three minutes. It is like a 5-minute take in all respects except in length. It must be transcribed with accuracy of 95 percent or better. With Russon's approach, the first 3-minute takes are given to beginning students at a rate as slow as 20 words a minute. With all approaches, as the students' skills increase toward the end of the first year, the rate may exceed 100 words a minute. In this study, 3-minute takes were used in both classes throughout the third quarter. However, analysis of achievement on these shorter takes was not included in this study.

Ninety-five percent accuracy. A student must transcribe 3-minute and 5-minute takes with an error allowance not exceeding 5 percent (or must achieve at least 95 percent accuracy). The error limits for 3-minute and 5-minute takes of various speeds are shown in Tables I and II, page 75, of the Appendix. The number of errors is determined by multiplying the total number of words in the take by 5 percent (.05). The total number of words in the take is found by multiplying the rate per minute by the number of minutes of dictation.

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[1]Allien R. Russon, Methods of Teaching Shorthand (Monograph No. 119. Cincinnati: South-Western Publishing Co., 1968) p. 32.

For example, in a 3-minute take dictated at 60 words a minute, there are 180 total words (60 x 3 = 180). By multiplying the 180 words by .05, the total number of errors on the take is found to be 9. A five-minute take dictated at 90 words a minute would contain 450 words (90 x 5 = 450), and the 5 percent error limit would be 23 (450 x .05 = 22.5 or, rounded off, 23).

Errors. On a transcript of a 3-minute or a 5-minute take, the following items are considered as errors:

1. each omitted word
2. each additional word inserted that was not dictated
3. each word incorrectly transcribed
4. each spelling error
5. each punctuation error
6. each omission or misuse of an apostrophe
7. each transposed word or group of words
8. each improperly used word (our, hour; to, too)
9. each incorrect hyphenation or word division
10. each incorrect expression of a number in context

Brief forms. Shorthand brief forms are special shortened outlines representing certain high-frequency words. A brief form may be compared to an abbreviation in longhand. There are 129 brief forms in Gregg Shorthand, Diamond Jubilee Series, Second Edition.

New-matter material. Any dictated material that students have not previously practiced is considered new-matter material. It is usually in letter form and, in first-year shorthand classes, is generally previewed. For purposes of testing progress, a new-matter take is three minutes or five minutes in length.

Preview. A preview is a teaching device in shorthand. The teacher selects certain words from material to be dictated and writes them on the chalkboard so that the students may observe or practice them. The purpose of the preview is to eliminate hesitation in writing during the dictation. Although the Gregg authors do not recommend previewing test takes, all 3-minute and 5-minute takes were previewed when testing the groups in this study.

Current Gregg manual approach (traditional). The approach used with the control group (Class A) of this study was the reading approach recommended by the Gregg authors for use with Gregg Shorthand, Diamond Jubilee Series, Second Edition.[2] A choice of methods is given to the instructor--a reading approach or a writing approach. However, this "reading" approach should not be confused with Leslie's "Functional

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[2]John R. Gregg, Louis A. Leslie, and Charles E. Zoubek, Instructor's Handbook for Gregg Shorthand, Diamond Jubilee Series (second edition; New York: Gregg Division/McGraw-Hill Book Company, 1971), p. 11.

Method."[3] The manual "reading" approach is characterized by the following specific procedures:

1. Theory lessons are presented, one at a time, on the chalkboard. Sutdents participate in rapid, repetitive spelling and reading of the chalkboard outlines as a group and individually.

2. During the study of the first five lessons, students read and spell only.

3. Writing of shorthand is introduced in class with Lesson 6.

4. The entire assigned lesson is read for homework. Writing for homework (copying from shorthand plates of the lesson) is gradually increased over a three-day period from Lessons 7 through 9.

5. Homework for the balance of the first year consists of reading and copying the assigned lesson once.

6. For extra practice, specified columns of the grief form chart on the inside back cover of the text may be assigned occasionally for homework.

7. Rules, or generalizations, governing the joinings of shorthand outlines are explained and demonstrated; however, students are not required to memorize the rules.

8. Short penmanship drills, seldom exceeding ten minutes, may be given with Lessons 24, 30, 36, 42, and 48.

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[3]Louis A. Leslie, Methods of Teaching Gregg Shorthand (New York: Gregg Publishing Division, McGraw-Hill Book Co., Inc., 1953), pp. 83-84.

9. Dictation begins when writing begins and is given from material practiced for homework until all theory has been covered.

10. During dictation in the first semester, textbooks are left open on the desks so that students may refer to the shorthand plates.

11. New-matter dictation, liberally previewed, is introduced after all theory lessons have been presented to and practiced by the students. However, new-matter dictation may be delayed until the end of the first semester.

12. After new-matter dictation has been introduced, speed progress is tested weekly by 3-minute and 5-minute takes published in books and other materials by the Gregg Division, McGraw-Hill Book Company.

Russon's early-new-matter approach. The approach used with the experimental group (Class B) of this study was Russon's early-new-matter approach. Although several of the techniques in the traditional approach described above are incorporated in Russon's approach, the following methods and devices are unique to it:[4]

1. Writing, by means of tracing the lesson on onionskin paper, begins with the presentation of Lesson 3. (Lessons 1 and 2 are presented in the traditional way.)

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[4]Russon, op. cit., pp. 13-16.

2. As a classroom activity, writing in notebooks from dictation begins with Lesson 4.

3. Each two groups of brief forms are automatized by the "folded paper" device. In this method the brief form outlines are written, one below the other, in the first column of a piece of paper folded into eight columns. Then each outline is transcribed in longhand in the second column. Next, the column of outlines is folded back under the paper and the outlines are rewritten, reading from the longhand. The procedure is continued until eight columns have been written, with the list of shorthand brief forms alternating with the list of corresponding longhand words.

4. New-matter dictation practice is begun the day Lesson 6 is presented (the day after the first brief-form folded paper has been completed). All words that are not brief forms are previewed. Each day from this time on, a new-matter letter is dictated. As the students progress, the preview is gradually reduced to fewer words--those less common or unfamiliar.

5. New-matter 3-minute takes are begun by the end of the fourth week and are given each week thereafter. They are called chances to pass. In the absence of typewriters, the students transcribe the takes in longhand. These test takes are also previewed by the teacher on the chalkboard. In this study, previews did not exceed 10 percent of the total word count in a test dictation take.

6. A formal review of earlier lessons begins with Lesson 21. As the students study Lesson 21 as a new lesson, they also review Lesson 1. With Lesson 22, they review Lesson 2. The formal review of earlier lessons continues for the balance of the first semester, with the review lesson always twenty lessons back from the new lesson. The formal review consists of two steps: (a) writing the theory words of the review lesson several times to develop facility and (b) practicing the last full page of the lesson by writing it three times by the skipping-the-lines method. This method entails copying the material on every third line of the notebook, then writing the material on the first blank line below the shorthand while reading it aloud, and finally writing it a third time while reading aloud from the second copy.

7. Reading for speed is an activity assigned with every sixth lesson. Instead of tracing or copying that lesson, the student is instructed to practice reading the material several times. The next day in class, the students are timed for one minute as they read in pairs, one reading from shorthand in the book or from homework, the other checking with the transcript.

8. In the second semester, each homework lesson is written three times by the skipping-the-lines method.

Textbooks and materials. Both groups in this study used the textbook, Gregg Shorthand, Diamond Jubilee Series, Second Edition, during the first semester. In addition, each student was issued a copy

of Student's Transcript of Gregg Shorthand to accompany the textbook. During the second semester, both groups used the textbook, Gregg Dictation, Diamond Jubilee Series, Second Edition. No transcripts were used with this book. Recorded tapes obtained from the Gregg Publishing Division/McGraw-Hill Book Company were used occasionally with both groups during the second and fourth quarter when the dictation laboratory facilities were available.

Chapter 2

REVIEW OF THE LITERATURE

For many years teachers of shorthand have used one of the two teaching methods developed by the Gregg authors--the science approach or the language-art approach, or perhaps a combination of these.

The science type, or manual method, stresses early writing, accurate outline construction, vocabulary building, verbalized generalizations, and repetitive homework practice. It is often referred to as the writing approach. The language-art, or reading, approach emphasizes delay of writing for four weeks, fluency of outlines, accurate transcription, unverbalized generalizations, and extensive nonrepetitive homework practice of connected matter.[5] The pure language-art approach in Gregg shorthand is embodied in Leslie's "Functional Method," introduced in 1934.[6] Through the years, these "pure" methods have been somewhat modified, with each taking on some of the characteristics of the other. Both methods, however, emphasize the delay of new-matter dictation until the completion of the first book.[7]

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[5]Louis A. Leslie, Methods of Teaching Gregg Shorthand (New York: Gregg Publishing Division, McGraw-Hill Book Co., Inc., 1953), p. 4.

[6]Ibid., pp. 83-84.

[7]John R. Gregg, Louis A. Leslie, and Charles E. Zoubek, Instructor's Handbook for Gregg Shorthand, Diamond Jubilee Series (second edition; New York: Gregg Div./McGraw-Hill Book Co., 1971), p. 11.

Within the past decade, teachers and researchers have begun to question the traditional methods. Often research findings were made that appear to be in disagreement with practices currently recommended by the Gregg shorthand authors.[8]

A study of the literature pertaining to Gregg shorthand methods indicated that the trend toward developing innovative, effective methods is increasing. This review of literature will consider the following areas:

1. Literature Pertaining to Shorthand Methodology
2. Literature Pertaining to Traditional and New-Matter Shorthand Methods

LITERATURE PERTAINING TO SHORTHAND METHODOLOGY

An experiment conducted by Fennell was designed to test a new approach to learning beginning Gregg shorthand in which teacher-dictation practice was replaced by visual presentation of dictation practice material. The newly developed visual presentation machine presented moving shorthand plates at forcing speeds. An analysis of the findings at the end of two college quarters revealed that shorthand students using the machine generally required fewer trials in achieving

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[8]Joe M. Pullis, "Implications of Research For Shorthand Pedagogy," Business Education Forum, XXV (February, 1971), 24.

speed level goals in dictation-transcription but did not attain higher speed levels on 3-minute takes than did the control group given teacher-directed dictation practice. However, the visual-presentation group achieved at a higher level in writing theoretically correct outlines and in transcribing them in theory tests.[9]

The results of Fennell's study, in which theory (vocabulary) knowledge did not correlate with ability in dictation-transcription, would seem to conflict with the findings of Danielson, who concluded that "during the learning period, continuous growth in shorthand vocabulary is a factor of prime importance in the development of acceptable shorthand dictation rates."[10]

Although Russon's early-new-matter approach stresses automatization of brief forms, the device of formal review provides for additional theory practice to build shorthand vocabulary.

One study that would seem to corroborate the desirability of automatizing brief forms through early-new-matter dictation material was attempted by Patrick in 1965. He determined that the Gregg textbook materials in the first edition of the Diamond Jubilee Series do

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[9]Jay Lloyd Fennell, "A Study to Determine the Effects of the Moving, Visual Presentation of Shorthand Practice Material at Forcing Speeds on Theory Mastery and Dictation-Taking Ability," Dissertation Abstracts, XXXI (February, 1971), 4053-A - 4054-A.

[10]Harriet Ann Danielson, "The Relationship Between Competency in Shorthand Vocabulary and Achievement in Shorthand Dictation," Dissertation Abstracts, XX (March, 1960), 3662-A.

not make sufficient use of selected brief forms and applications of some principles in contextual material. To develop student mastery, he recommended that teachers construct supplementary dictation material which

> . . . might consist of isolated sentences which are "packed" with the words in question; it might be material from the textbook which is rearranged; it might be new material constructed to include the appropriate brief forms and principles.[11]

In 1971, Dye experimented with two matched groups of college students to determine whether practice dictation rates of 0 to 20 words a minute, as opposed to rates of 20 to 40 words a minute, above the 3-minute dictation rate would affect the level of achievement in writing Gregg shorthand and whether the different dictation rate patterns would affect the students' attitudes toward learning shorthand. Although findings determined that the rate patterns had no overall effect on achievement level or students' attitudes, it was found that the attitudes of students may affect achievement in writing shorthand. However, Dye concluded that it may be "that the level of achievement affects the attitudes and accounts for the significant relationship which existed between attitudes and the level of achievement."[12]

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[11]Alfred Patrick, "An Appraisal of Diamond Jubilee Textbook Materials," Business Education Forum, XXV (February, 1971), 28-29.

[12]Jimmie Lee Dye, "A Comparison of Two Practice Patterns Used for the Development of Skill in Writing Shorthand Dictation," Dissertation Abstracts, XXXII (July, 1971), 304-A.

It was felt by the investigator that this study was significant because the very foundation of Russon's early-new-matter approach is the development of positive student attitudes through the early use of easy dictation material. Thus, every student may experience success. This success and the process of growth is encouraged by frequent and generous praise by the teacher to further student motivation.

Another principle of learning that seems to operate in Russon's early-new-matter approach is that of increasing learning through the addition of extra "senses." The sense of seeing operates as the student reads shorthand; when he reads aloud, the sense of hearing is added; finally, the kinesthetic or movement (feeling) sense is added as he traces or writes from the very early stages of instruction--while he reads aloud.

A study by Osborn attempted to determine the effectiveness of three different methods of reading shorthand on the ability to transcribe notes taken during dictation. The three groups were designated as traditional reading, reading-listening, and reading-listening-scribble-writing. Tests in reading and tests in dictation-transcription revealed that the relationship between reading ability and transcription ability was statistically significant as a "sense" was added to the reading treatment. The method of reading-listening-scribble-writing showed the highest correlations, with the reading-listening group showing the next highest correlations and the traditional reading group

showing the lowest correlations. Mean scores on four of the six dictation tests, although not statistically significant, were highest for the reading-listening-scribble-writing group.[13]

LITERATURE PERTAINING TO TRADITIONAL AND NEW-MATTER SHORTHAND METHODS

As described in an earlier section of this study, Russon's early-new-matter approach includes the device of tracing homework lessons during the early stages of learning as well as the dictation of new, unpracticed material.

A pertinent study conducted by Anderson, using the micromolar approach, compared four treatment combinations in beginning college shorthand: The use of word preview lists with textbook material dictation, preview lists with vocabulary-controlled (new matter) dictation, tracing with textbook dictation, and tracing with vocabulary-controlled dictation. Although the differences were not statistically significant, the groups receiving vocabulary-controlled dictation practice achieved slightly higher mean scores on seven of the nine terminal tests. Also, students who traced tended to achieve slightly higher mean scores than those who used preview lists, although the differences were not

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[13]Dolores Jean Osborn, "Methods of Teaching Shorthand Symbol Reading and the Effect of Shorthand Reading Skill on Recording Dictation," Dissertation Abstracts, XXXI (November, 1970), 2274-A.

significant. In part, it was recommended that tracing be used in the early weeks of instruction. Anderson made the following conclusions:

> Either type of dictation material may be used equally effectively in dictation skill building. However, the use of vocabulary-controlled materials may enable a student to achieve more during the first year of shorthand.
>
> Tracing seems to make a slight contribution to the development of writing fluency and skill development in the initial stages of shorthand instruction.[14]

A similar study, utilizing four treatment combinations, was done by Gallion to determine which combination produced the best results in beginning shorthand. Her treatment combinations were identical to those of Anderson; but the conventional, rather than the micromolar, approach was utilized. Like Anderson, Gallion found that students who received the vocabulary-controlled (new matter) dictation achieved slightly higher means on five of the six dictation tests than did those who received textbook-material dictation. Although no significant difference existed between the mean scores of students who traced or those who received preview words, she concluded that "using tracing in the early stages of shorthand development may tend to cut down on the discouragement frequently felt by beginners."[15]

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[14]Alberta Ray Anderson, "A Comparison of Dictation-Speed Development Materials and Methods in Beginning Shorthand Using the Micromolar Approach," Dissertation Abstracts, XXX (April, 1970), 4065-A.

[15]Leona May Gallion, "A Comparison of Dictation Speed Development Materials and Methods in Beginning Shorthand," Dissertation Abstracts, XXIX (February, 1969), 2415-A.

In a study completed in 1966, McKenna compared two groups of beginning shorthand students. One group was taught by the traditional language-art approach; the other group was taught by a science-type approach with new-matter dictation introduced in the eighth class period. In analyzing the findings, she concluded that the early introduction of new-matter dictation did not result in increased dictation-transcription ability. However, contrary to the opinions of the Gregg authors, neither did it retard students in dictation-transcription ability.[16]

Another classroom investigator who utilized new-matter dictation arrived at conclusions similar to those of McKenna. Persing conducted her experiment for three semesters in beginning shorthand classes at Central State College in Edmond, Oklahoma. The groups were taught and tested in the same manner except one group received early and continued training in new-matter dictation. In comparing the groups for the semesters considered singly and in combination, it was found that there was no significant difference in achievement in theory, familiar-matter dictation, and new-matter dictation. Persing stated:

> Therefore, because there was found no definitive conclusion, the recommendation is that each shorthand teacher should be aware of the merits of the arguments [on the question of when

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[16]Margaret Ann McKenna, "An Experiment to Determine the Effect of the Early Introduction of New-Matter Dictation in the Teaching of Beginning Shorthand to College Students," Dissertation Abstracts, XXVII (January-February, 1967), 2447-A - 2448-A.

to introduce new-matter dictation] and employ in optimum fashion those precedures which prove pragmatically best for him.[17]

Baird also experimented with the early use of new-matter dictation with eight high school classes of beginning shorthand. Four high schools, each with two classes, participated in the study. His major hypothesis was that the use of regular and frequent dictation of new-matter dictation, beginning with the twenty-fifth lesson, would result in reaching a dictation speed of 60 words a minute with at least 95 percent accuracy in less time than if new-matter dictation were delayed until all 53 lessons of the textbook, Gregg Shorthand Simplified, Second Edition, had been presented. After the difference between the means was tested for statistical significance by computing t-scores, it was found that the t-scores were statistically significant at the .05 level for only one of the four schools that had participated. Therefore, he was forced to reject his hypothesis. Baird concluded that there was no evidence to justify the introduction of unpracticed material before completion of the theory.[18]

Of the several studies reviewed prior to beginning this experiment, the investigator found that one completed by Ward in 1966

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[17]Bobbye Sorrels Persing, "A Classroom Investigation of When to Begin New-Matter Dictation in Gregg Shorthand," Dissertation Abstracts, XXVII (November-December, 1966), 1718-A - 1719-A.

[18]Stanley Jack Baird, "The Effectiveness of Introducing Regular Dictation of Unpracticed Material Before the Completion of Gregg Shorthand Theory," Dissertation Abstracts, XXVIII (July-Aug., 1967), 529-A.

was most useful. While other studies applied one or more of the devices and techniques included in Russon's early-new-matter approach, Ward utilized all of Russon's procedures with his experimental groups.

His study involved four high school classes, of which two were randomly designated as the control group and two as the experimental group. A second experimental group, consisting of a college-level class of beginning shorthand students was added to further validate the findings. Teachers of the control group used the reading approach, while teachers of the experimental groups used Russon's early-new-matter approach. The high school groups were equated statistically through intelligence quotient scores and average English grades. The final criterion was the dictation speed achieved on 5-minute takes with accuracy of 95 percent or better (average of best three takes within the accuracy limits).

After statistical analysis, there was found to be a significant positive difference in the achievement of the high school students taught with the early-new-matter approach. Further analysis revealed that there were no significant differences between the experimental group of college students and either the control or experimental groups of high school students. However, it was noted that the following factors may have affected the reliability of the comparison of the college group with the high school groups:

1. Length of instruction (two college quarters, or 20 weeks, as compared to two high school semesters, or 36 weeks)

2. Inability to obtain intelligence quotient scores and average English grades for the college group to compare ability

3. Chronological age (with the average age of the college students exceeding the average age of the high school students by at least two years)

Ward concluded that students taught by the early-new-matter approach reached, on the average, significantly higher levels of achievement than those taught by the reading approach. In addition, lower achievers seemed to do better under the early-new-matter approach.[19]

Although the personal experience of the investigator in the 1970-1971 school year had indicated that students responded well in both attitude and skill development when Russon's early-new-matter approach was used on a casual basis, there were no specific data to indicate that the students' performance was not due to chance. The review of literature revealed that most previous studies had not produced significant difference when unpracticed (new-matter) dictation material was used relatively early in first-year shorthand classes. On the basis of limited personal experience and the review of literature, the investigator reasoned that any observed differences in achievement by the students would probably be the result of chance factors.

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[19]William C. Ward, Jr., "An Investigation Indicating the Effect of Early Use of New-Matter Dictation on the Achievement of First-Year Shorthand Students" (unpublished Master's thesis, University of Utah, 1966).

Therefore, the following hypothesis, stated in the null form evolved: There will be no significant differences in average speed development between students taught by Russon's early-new-matter approach and those taught by the more traditional Gregg manual method.

The experiment was conducted during the 1971-1972 school year. The next chapter discusses the procedures that were used.

Chapter 3

THE EXPERIMENTAL DESIGN

On August 30, students reported to Billings West High School, Billings, Montana, to begin the 1971-1972 school year. There were seven beginning shorthand classes scheduled. Two of these classes, taught by the same teacher, were selected for the study involving two different teaching methods. At West High School, the school day is divided into six 60-minute periods. One class, which met after lunch during the fourth period, was selected as the control group. A sixth period class was designated the experimental class.

CLASS SCHEDULING

Students who had registered for beginning shorthand several months earlier were scheduled into the various classes by the principal and the assistant principals. An attempt was made to keep the enrollment fairly even in the various classes, but there was no effort made to group students according to previous achievement in school, aptitude test scores, or any other psychological or achievement test score. Each student was placed in the shorthand class which best fit his overall class program.

Initially, there were twenty-seven students enrolled in the fourth period class, which was randomly designated as the control group

(Class A). Seven of these students withdrew from the course within the first semester, in all cases because of failing or near-failing shorthand grades. In addition, one student transferred into the class at the beginning of the second semester because of an overall change of schedule.

At the beginning of the year, there were twenty-one students assigned to the sixth period experimental class (Class B). Of these students, four withdrew from the course. Two students dropped the class because of failing work in shorthand; one student, although doing above-average work in shorthand, dropped the course because her work in other required courses was not satisfactory. One student moved from the Billings area. There were five students who transferred into the class during the second semester.

For purposes of this study, only those students who were in the class from the beginning and who remained until the end of the year in either Class A or Class B were included in the statistical analysis. Therefore, Class A (the control group) consisted of twenty students. This class was taught by the method recommended by the Gregg authors. Class B (the experimental group) consisted of seventeen students. They received instruction according to Russon's early-new-matter approach.

Both classes selected for this study during the 1971-1972 school year were taught by the same teacher. This teacher had taught shorthand to both beginning and advanced shorthand students for the

preceding twelve years. Both methods of teaching had been successfully utilized in prior years, but there had been no specific data analysis to determine whether one method was superior to the other in terms of student achievement.

Before any analysis of final achievement, as measured by speed of taking dictation and accuracy of transcription, could be conducted, it was necessary to determine whether Class A and Class B were equal in ability.

EQUATING THE GROUPS

It was felt by the investigator that there should be an analysis of at least two factors to compare the ability of the two groups. Consultation with testing and counseling personnel at Billings West High School revealed that no single psychological or achievement test available to the local school district had proved completely reliable for predicting achievement in shorthand. However, the choice was narrowed to four reasonably reliable factors from which two were to be selected for use in this study.

Selection of Comparison Factors

Four factors that were felt might successfully determine whether the two groups were approximately equal in ability were singled out for further study. These factors were (1) intelligence quotient scores, (2) English grades, (3) previous scholastic achievement as

determined through grade point averages, and (4) one or more scores from the Differential Aptitude Test.

Because first-year shorthand students must meet a prerequisite of a grade of "C" or better in English for the preceding semester, a certain amount of screening had already occurred on that factor. For that reason, the factor of English grades was eliminated. It was felt by the guidance counselors that previous scholastic achievement would be a more reliable factor than intelligence quotient scores. Therefore, it was decided that previous scholastic achievement, as determined by grade point averages (GPA) for the high school years, would be used as one means of comparing the ability of the students in the two groups.

The investigator learned that the battery of Differential Aptitude Tests (DAT) had been administered to all of the students during their freshman year. Further study of DAT materials revealed that the spelling score of that test battery is one of the best predictors of the ease and speed with which the student can learn typing and shorthand.[20] Thus, the spelling score of the DAT was selected as a second basis for determining whether the two groups were equal. These data were available from the permanent record files in the main office of West High School.

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[20]G. K. Bennett, H. G. Seashore, and A. G. Wesman, Differential Aptitude Tests, Forms L and M, Individual Report Form (New York: The Psychological Corporation, 1963).

Statistical Analysis

As indicated above, the grade point averages for the students were obtained from the permanent record files. Grade points are earned by each student on the grades for each semester. Listed below in Table III is a schedule of grade points that may be earned for each semester grade. A grade of "A" for one semester of an accelerated "honors" course earns five grade points, whereas a grade of "A" in a standard course has a value of four. A failing grade merits no grade points for that course.

TABLE III

SCHEDULE OF GRADE POINTS FOR EACH SEMESTER GRADE

Type of Course	Grade	Grade Points
Accelerated Honors Course	A	5
Accelerated Honors Course	B	4
Standard Course	A	4
Standard Course	B	3
Standard or Honors Course	C	2
Standard or Honors Course	D	1
Standard or Honors Course	F	0

The GPA is calculated by adding the grade points for all grades the student has received during his high school semesters. This sum is then divided by the total number of semester grades for courses in which the student has been enrolled; the final quotient is rounded to two decimal places.

In an attempt to determine if a significant difference existed between the two classes, the investigator calculated the difference between the two means of the grade point averages. Then the null hypothesis and the *t* test were applied to the data. The null hypothesis assumes that any observed difference between the groups is due to sampling variability and does not represent a significant difference. If the critical ratio, or *t* score, is equal to or greater than 2.042 (for small samples of the size used in this study), it indicates that the deviation is significant at the 5 percent level of confidence.[21]

The students' spelling scores on the Differential Aptitude Test were also obtained from the permanent record files, and the *t* test was also applied to these data as an additional means of determining whether there was a significant difference between the two classes.

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[21] T. G. Connolly and W. Sluckin, An Introduction to Statistics for the Social Sciences (New York: Hafner Publishing Company, 1953), pp. 91-99.

FIRST-SEMESTER INSTRUCTION

During the first semester, two different teaching methods were used in the two classes of beginning shorthand.

Teaching Method--Class A

All instruction given to Class A during the first semester was based on the methods and devices recommended by the Gregg authors in Instructor's Handbook for Gregg Shorthand, Diamond Jubilee Series, Second Edition.

Each new theory lesson was presented on the chalkboard; and rapid, repetitive spelling and reading from the outlines was a daily activity. Homework preparation of the first six lessons consisted of reading only. Following the home study of Lesson 6, writing was introduced in class. Writing for homework began with Lesson 7 and consisted of copying from the shorthand plates in the book. The writing assignment was gradually increased until, beginning with Lesson 10, the entire lesson was copied once. Students were urged to read each lesson thoroughly, with the help of the Student's Transcript if necessary, before doing any writing and then to reread the lesson once or twice from their own notes.

There was much in-class drill on brief forms, and from time to time written lists of brief forms were required as homework. Occasionally, there were short penmanship drills in class; and rules governing

the joinings of outlines were explained and demonstrated by the teacher. Some individual oral reading of shorthand was included each day in class, either from the textbook or from the students' homework notes.

The principal classroom activity was dictation, which began as soon as the students started to write shorthand. The material was taken from the current homework, and certain procedures were generally followed: (1) The material was read from the book or homework notes. (2) The preview words were written on the chalkboard by the teacher and spelled by the students. (3) The material was dictated several times in short segments of one minute or less at ever-increasing speeds; books were left open on the students' desks for reference during dictation if necessary. (4) Occasionally, individuals were asked to read a portion of the dictation. (5) Several short segments were dictated together to provide practice in sustained dictation. (6) So that all of the students might experience success and take the dictation with good control, at least part of the material was dictated quite slowly. To provide variety, other methods of speed building were also used now and then.

Introduction of new-matter dictation was delayed until the final two weeks of the semester. It was liberally previewed and used only for practice.

Scholastic grades for the students of Group A were based on evaluation of shorthand reading, homework preparation, theory and brief

form quizzes, and timed longhand transcriptions from the textbook. During the second quarter, the most important testing device was the longhand transcription of dictation for two-minute intervals from practiced material. The speed range was from 50 words a minute to 80 words a minute, and 95 percent accuracy was required on the transcriptions. There was no testing of new-matter dictation during the first semester.

Teaching Method--Class B

Russon's early-new-matter approach was used with the experimental group, disignated Class B.

The first two lessons were presented the same way as with Class A. With Lesson 3, students were introduced to tracing of homework assignments with transparent onionskin paper. The tracing of homework continued through Lesson 20. Writing in notebooks during class commenced with Lesson 4. Following the presentation of Lessons 4 and 5, the students practiced the first two groups of brief forms with the "folded paper" device. Subsequently, each two groups of brief forms were automatized by means of this device.

New-matter dictation in class was initiated the day Lesson 6 was presented and continued as the principal daily activity throughout the first semester. The new-matter dictation material was taken from Shorthand Dictation ABC's, by Allien R. Russon. The very easy material in this book consisted mainly of brief forms; all words other than

brief forms were previewed for the first few takes. Although reduced somewhat as the students' theory knowledge increased, the use of the preview was continued throughout the semester. Speed-building dictation methods were the same as those used with Class A.

The formal review device was introduced with the assignment of Lesson 21; at this time students were instructed to review Lesson 1. The review lesson, always twenty lessons back from the new lesson, continued as part of the daily homework assignment for the balance of the first semester.

Students received something of a respite from daily written homework with every sixth lesson, which was assigned to be read only. The following day in class, each student had an opportunity to demonstrate rapid, accurate reading from a selected portion of the lesson.

As a testing device, 3-minute new-matter takes (called chances to pass) were begun the fourth week and were given almost every week for the rest of the semester. The takes, provided in Shorthand Dictation ABC's, by Russon, consisted primarily of brief forms; a limited number of words, other than brief forms, were previewed. The first new-matter takes were dictated at 20 words a minute. The dictation rate was increased by ten-word-per-minute intervals as the students' skills increased. By the end of the semester, 3-minute takes at speeds up to 80 words a minute had been dictated. Additional quizzes and a number of other evaluative measures, similar to those utilized with

Class A, were employed in part for scholastic grading of the students in Class B. However, 50 percent of the grade was dependent upon achievement on the 3-minute takes.

SECOND-SEMESTER INSTRUCTION

During the second semester, methods of teaching the two classes were almost identical. The same textbooks and testing materials were used, and classroom procedures varied little.

Daily Classroom Procedure

Classroom activity included much dictation and speedbuilding from both new and practiced material. New and less familiar words were previewed; and after the first dictation, students were encouraged to ask for any additional outlines that may have caused hesitation. Both Class A and Class B received an equivalent amount of dictation practice from the same material and at the same speeds. During the fourth quarter, while the dictation laboratory was in the shorthand room, some tape-recorded dictation was given each week.

Other activities included occasional reading from homework notes, chalkboard theory and brief form drills, punctuation exercises, spelling drills, and instruction in grammar and other related learnings.

Both classes used the same textbook, Gregg Dictation, Diamond Jubilee Series, Second Edition, by Leslie, Zoubek, and Strony, published in 1971.

Homework

The single variation of methods used in the two classes existed in preparation of homework. Class A continued to write assigned lessons just once, as recommended by the Gregg authors. Class B, which received instruction according to Russon's early-new-matter approach during the preceding semester, copied each lesson twice. Russon recommends that students write each lesson three times by the skipping-the-lines method. However, the Class B students soon learned that their friends in Class A were required to write homework lessons just once. The Class B students openly expressed displeasure over the additional assignment, so the teacher decided a compromise was in order to quell the feelings of resentment. The students willingly accepted the compromise and wrote each lesson twice. This was the single deviation from Russon's approach in the teaching of Class B.

Dictation records were available for the students in both classes to check out for optional practice at home.

Administration of Tests

The most important tests used during the first half of the semester (third quarter) were 3-minute new-matter takes. Almost every week students in both classes were given the dictation tests, which were transcribed in longhand. For a test to be considered passing, 95 percent accuracy was required. At the beginning of the second semester, the first 3-minute takes were dictated at 50 and 60 words a

minute. Additional higher speeds were added as the students passed the takes at lower speeds. Previews were placed on the chalkboard but did not exceed 10 percent of the total words in a take. The same materials were used in both classes each week and were dictated at the same speeds. Extreme care was exercised to be sure that students in Class A, which met fourth period, did not pass any information to the sixth period students (Class B). After dictation of the takes, all notes that the students did not plan to transcribe were collected by the teacher. Careful monitoring while the students transcribed assured that no additional copies of notes or transcripts were made that might be taken from the room. When the students finished transcribing, all notes and transcripts, both complete and incomplete, were turned in to the teacher.

At the beginning of the fourth quarter, the 3-minute takes were replaced by 5-minute new-matter takes. It was the achievement on these 5-minute takes that would be analyzed by the investigator at the close of the school year for the purposes of this study.

Because of the increased length and difficulty of the 5-minute takes, the first ones were dictated at 50 and 60 words a minute, even though many students had passed 3-minute takes at higher speeds the preceding quarter. Additional speeds were added as the students' skills increased. Table IV shows which 5-minute takes were dictated each week during the final quarter of the school year. As the table

shows, there was a total of six takes dictated at 50 words a minute, nine takes each at 60 and 70 words a minute, seven takes at 80 words a minute, five takes at 90 words a minute, and three takes at 100 words a minute.

TABLE IV

FIVE-MINUTE TAKES DICTATED
FOURTH QUARTER

Week of Quarter	Speed of Takes					
	50	60	70	80	90	100
1st Week	1	1				
2nd Week	1	1	1			
3rd Week	1	1	1	1		
4th Week	1	1	1	1		
5th Week	1	1	1			
6th Week		1	1	1	1	
7th Week		1	1	1	1	
8th Week	1	1	1	1	1	1
9th Week		1	1	1	1	1
10th Week			1	1	1	1
TOTALS	6	9	9	7	5	3

As with the 3-minute takes the preceding quarter, the same material was used in both classes; it was previewed, and 95 percent accuracy of transcription was required. Due care was taken to be sure that students worked independently and that no information concerning the tests was removed from the classroom.

The dictation material used for speed-building practice and for 3-minute and 5-minute takes during the second semester was taken from the following publications of the Gregg Division of McGraw-Hill Book Company:

1. Speed Dictation with Previews in Gregg Shorthand, Charles E. Zoubek, 1963
2. Gregg Tests and Awards, 1969-70, 1970-71, 1971-72
3. Dictation tests published in the Business Teacher, 1965-69, (publication discontinued in 1969)
4. Instructor's Handbook for Gregg Dictation, Diamond Jubilee Series, Second Edition, Leslie, Zoubek, and Strony (supplementary dictation material used for speed-building practice only)

In addition to the 3-minute and 5-minute takes that were used for testing purposes, there was a variety of other tests and quizzes, similar to those used during the first semester, administered to both classes. Also, punctuation and spelling quizzes were given.

COLLECTION OF THE DATA

At the beginning of the 1971-1972 school year, master sheets were prepared for Class A and Class B. These sheets contained an

alphabetical listing of the students in each class, their grade levels, and additional columns for entering grade point averages, Differential Aptitude Test spelling scores, highest dictation speed passed by the end of the year, and the average dictation speed of each student's three highest passing 5-minute takes.

The next step taken by the investigator was to obtain the grade point averages and DAT spelling scores from the permanent record files in the main office of Billings West High School. This information was recorded in the respective columns of the master sheets.

It should be pointed out that very careful records were maintained on the progress of the students involved in the study. The records included the dates on which 5-minute takes were given, the speed of the dictation, the number of errors on each transcription, and whether or not it was passing within the 95 percent accuracy limit. At the close of the school year, the highest speed passed on the 5-minute takes and the average of the three highest takes passed were entered on the master sheets opposite each student's name. Finally, in order to render the students anonymous, each one was designated with the letter "A" or "B," representing the class in which he had been enrolled, and a number corresponding to the position in the alphabetical listing of names. Reproductions of the master sheets for Class A and Class B are shown in the Appendix in Tables V and VI, pages 76 and 77.

SUMMARY

The purpose of this study was to compare the speed development of two classes of first-year shorthand students taught by two different approaches. The two classes used in the study were taught by the same teacher at Billings West High School during the 1971-1972 school year.

The control group, designated Class A, was taught according to the more traditional current Gregg manual approach. The experimental group, designated Class B, received instruction according to Russon's early-new-matter approach.

As a means of comparing the ability of the two groups, grade point averages and spelling scores on the DAT were obtained from the permanent record files of the high school office.

At the end of the year, the records of the students on 5-minute new-matter dictation tests were also obtained. The information contained in these records was then used as the means of comparing the achievement of the first-year shorthand students who had been taught by two different approaches. These comparisons will be discussed in Chapter 4 of this paper.

Chapter 4

FINDINGS AND COMPARISON OF THE DATA

The purpose of this chapter was to compare the various types of data that had been collected. The comparisons were then to be used to determine whether two different methods of teaching shorthand affected the terminal achievement in speed of dictation of the students in Class A and Class B. The hypothesis, which evolved after a thorough review of earlier research, was stated in the null form. Therefore, the comparisons of the compiled data were developed to aid in support or rejection of the hypothesis.

The control group was designated as Class A. It consisted of twenty students who met for shorthand instruction during the fourth period of a six-period day. This class received instruction according to the traditional Gregg manual approach.

The experimental group was designated as Class B. It consisted of seventeen students who were taught according to Russon's early-new-matter approach. This shorthand class met during the final period of the school day.

These designations were made at random by the investigator before the first classes convened for the 1971-1972 school year. The investigator had no control over the assignment of the students to the two classes. Both classes were taught by the same teacher.

ABILITY COMPARISONS OF CLASSES A AND B

It was felt by the investigator that, if the final evaluation of shorthand achievement was to be valid, it would first be necessary to determine whether Class A and Class B were of equal ability. Two factors were selected for analysis: previous scholastic achievement, as determined by grade point averages, and the spelling scores on the Differential Aptitude Test.

Comparison of Grade Point Averages

The grade point averages for the students were obtained by the investigator from the permanent record files in the high school office. Tables were then constructed for Class A (see Table VII, page 51) and for Class B (see Table VIII, page 52), showing each student's assigned number and his grade point average. In order to make the comparison, it was first necessary to calculate the mean scores for the two groups.

The mean score of 2.62 for Class A was obtained by totaling all of the individual grade point averages and then dividing by twenty, the number of students in the class. This computation is shown in Figure 1.

Figure 2 shows the computation of the mean score for Class B. The mean score of 2.55 was found by dividing the total of the grade point averages by seventeen, the number of students enrolled in Class B.

Sum of grade point averages: 52.33
Number of students, Class A: 20

```
    2.616
20)52.330
   40
   123
   120
    33
    20
    130
    120
```

GPA mean (rounded), Class A: 2.62

FIGURE 1

COMPUTATION OF GPA MEAN
CLASS A

Sum of grade point averages: 43.43
Number of students, Class B: 17

```
    2.554
17)43.430
   34
    94
    85
    93
    85
     80
     68
```

GPA mean (rounded), Class B: 2.55

FIGURE 2

COMPUTATION OF GPA MEAN
CLASS B

After calculating the mean scores for both classes, the standard deviations and standard error of the means were figured. These calculations are also shown in Tables VII and VIII for Class A and Class B, respectively.

The standard deviation for Class A was found to be .453 (rounded from .4525), and the standard error of the mean was found to be .104. For Class B, the standard deviation was found to be .568 (rounded from .5678), and the standard error of the mean was found to be .142.

It was then necessary to calculate the standard error of the difference between the two means and the critical ratio, or _t_ ratio, to determine if the observed difference in grade point averages represented a significant difference. The standard error of the difference between the two means of Class A and Class B was found to be .176, as may be seen in Figure 3. Figure 4 shows that the _t_ ratio for the difference between the two means was .398 (rounded from .3977).

Reference to a table of the _t_ distribution revealed that, for samples of this size, a _t_ ratio would need to be equal to or greater than 2.042 in order to show a significant difference at the 5 percent level of confidence.[22] Since the data shown in Tables VII and VIII and Figures 3 and 4 revealed a _t_ ratio of only .398, it was concluded

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[22]Donald L. Meyer, Educational Statistics (New York: The Center for Applied Research in Education, Inc., 1967), p. 70.

TABLE VII

STANDARD DEVIATION AND STANDARD ERROR OF THE MEAN
GRADE POINT AVERAGES - CLASS A

Student	Grade Point Average	Deviation from M	Deviation Squared
A-1	2.71	.09	.0081
A-2	1.94	-.68	.4624
A-3	3.26	.64	.4096
A-4	2.25	-.37	.1369
A-5	2.19	-.43	.1849
A-6	3.33	.71	.5041
A-7	2.72	.10	.0100
A-8	2.38	-.24	.0576
A-9	2.50	-.12	.0144
A-10	2.11	-.51	.2601
A-11	2.94	.32	.1024
A-12	1.94	-.68	.4624
A-13	2.50	-.12	.0144
A-14	2.94	.32	.1024
A-15	2.11	-.51	.2601
A-16	2.88	.26	.0676
A-17	3.05	.43	.1849
A-18	2.94	.32	.1024
A-19	3.40	.78	.6084
A-20	2.24	-.38	.1444
	52.33	-.07	4.0975

Standard Deviation (S.D.)

$$S.D. = \sqrt{\frac{\Sigma x^2}{N}}$$

$$= \sqrt{\frac{4.0975}{20}}$$

$$= \sqrt{.2048}$$

$$= .453$$

Standard Error of the Mean (S.E.M.)

$$S.E.M. = \frac{S.D.}{\sqrt{N-1}}$$

$$= \frac{.453}{\sqrt{19}}$$

$$= \frac{.453}{4.359}$$

$$= .104$$

TABLE VIII

STANDARD DEVIATION AND STANDARD ERROR OF THE MEAN
GRADE POINT AVERAGES - CLASS B

Student	Grade Point Average	Deviation from M	Deviation Squared
B-1	2.69	.14	.0196
B-2	2.17	-.38	.1444
B-3	3.25	.70	.4900
B-4	2.75	.20	.0400
B-5	2.56	.01	.0001
B-6	2.44	-.11	.0121
B-7	2.06	-.49	.2401
B-8	2.56	.01	.0001
B-9	2.25	-.30	.0900
B-10	1.79	-.76	.5776
B-11	1.75	-.80	.6400
B-12	2.63	.08	.0064
B-13	4.13	1.58	2.4964
B-14	2.38	-.17	.0289
B-15	3.33	.78	.6084
B-16	2.31	-.24	.0576
B-17	2.38	-.17	.0289
	43.43	.08	5.4806

Standard Deviation (S.D.)

$$S.D. = \sqrt{\frac{\Sigma x^2}{N}}$$

$$= \sqrt{\frac{5.4806}{17}}$$

$$= \sqrt{.3223}$$

$$= .568$$

Standard Error of the Mean (S.E.M.)

$$S.E.M. = \frac{S.D.}{\sqrt{N-1}}$$

$$= \frac{.568}{\sqrt{16}}$$

$$= \frac{.568}{4}$$

$$= .142$$

that Class A and Class B were equal in ability as measured by grade point averages.

$$
\begin{aligned}
S.E.M._d &= \sqrt{S.E.M._A^2 + S.E.M._B^2} \\
&= \sqrt{.104^2 + .142^2} \\
&= \sqrt{.010816 + .020164} \\
&= \sqrt{.030980} \\
&= .176
\end{aligned}
$$

FIGURE 3

STANDARD ERROR OF A DIFFERENCE BETWEEN TWO MEANS ($S.E.M._d$)
GRADE POINT AVERAGES - CLASSES A AND B

$$
\begin{aligned}
\underline{t} &= \frac{M_A - M_B}{S.E.M._d} \\
&\doteq \frac{2.62 - 2.55}{.176} \\
&= \frac{.07}{.176} \\
&= .398
\end{aligned}
$$

FIGURE 4

$\underline{t}$ RATIO FOR A DIFFERENCE BETWEEN TWO MEANS
GRADE POINT AVERAGES - CLASSES A AND B

Comparison of DAT Spelling Scores

The next comparison to be made was that of the Differential Aptitude Test spelling scores for Class A and Class B. These scores were also obtained from the permanent record files in the high school office. The scores, which are shown in Table IX for Class A and in Table X for Class B, represented each student's percentile rank in spelling ability. A percentile rank of 50 is considered average.

The mean spelling score of 52 for Class A was calculated by adding together all of the individual scores and dividing the total by the number of students in that class. This computation is shown in Figure 5.

Sum of DAT spelling scores: 1040
Number of students, Class A: 20

$$20\overline{)1040} = 52$$

$$\begin{array}{r} 100 \\ \hline 40 \\ 40 \end{array}$$

DAT spelling mean, Class A: 52

FIGURE 5

COMPUTATION OF DAT SPELLING MEAN
CLASS A

By following the same procedure, the mean score for Class B was found to be 57.06. This computation may be seen in Figure 6.

Sum of DAT spelling scores: 970
Number of students, Class B: 17

$$
\begin{array}{r}
57.058 \\
17\overline{)970.000} \\
85 \\
\hline
120 \\
119 \\
\hline
100 \\
85 \\
\hline
150 \\
136
\end{array}
$$

DAT spelling mean (rounded), Class B: 57.06

FIGURE 6

COMPUTATION OF DAT SPELLING MEAN
CLASS B

As the analysis of DAT spelling scores was continued, it was determined that, for Class A, the standard deviation was 20.396 and the standard error of the mean was 4.679. This calculation is included in Table IX. For Class B, the standard deviation was 26.902; the standard error of the mean was 6.726. This calculation is shown in Table X.

In an effort to find whether the difference in means on the DAT spelling scores for the two classes represented a significant difference, the standard error of the difference between the means was computed. Figure 7 shows that it was found to be 8.193.

The t ratio, as shown in Figure 8, was found to be .618. Since the t ratio for samples of this size would need to be at least 2.042 to

TABLE IX

STANDARD DEVIATION AND STANDARD ERROR OF THE MEAN
DAT SPELLING SCORES - CLASS A

Student	DAT Spelling Score	Deviation from M	Deviation Squared
A-1	60	8.0	64.00
A-2	15	-37.0	1369.00
A-3	55	3.0	9.00
A-4	80	28.0	784.00
A-5	40	-12.0	144.00
A-6	35	-17.0	289.00
A-7	30	-22.0	484.00
A-8	55	3.0	9.00
A-9	35	-17.0	289.00
A-10	85	33.0	1089.00
A-11	45	- 7.0	49.00
A-12	35	-17.0	289.00
A-13	85	33.0	1089.00
A-14	55	3.0	9.00
A-15	50	- 2.0	4.00
A-16	70	18.0	324.00
A-17	60	8.0	64.00
A-18	25	-27.0	729.00
A-19	85	33.0	1089.00
A-20	40	-12.0	144.00
	1040	0.0	8320.00

Standard Deviation (S.D.)

$$S.D. = \sqrt{\frac{\Sigma x^2}{N}}$$

$$= \sqrt{\frac{8320}{20}}$$

$$= \sqrt{416}$$

$$= 20.396$$

Standard Error of the Mean (S.E.M.)

$$S.E.M. = \frac{S.D.}{\sqrt{N-1}}$$

$$= \frac{20.396}{\sqrt{19}}$$

$$= \frac{20.396}{4.359}$$

$$= 4.679$$

TABLE X

STANDARD DEVIATION AND STANDARD ERROR OF THE MEAN
DAT SPELLING SCORES - CLASS B

Student	DAT Spelling Score	Deviation from M	Deviation Squared
B-1	95	37.94	1439.4436
B-2	30	-27.06	732.2436
B-3	95	37.94	1439.4436
B-4	95	37.94	1439.4436
B-5	65	7.94	63.0436
B-6	50	- 7.06	49.8436
B-7	55	- 2.06	4.2436
B-8	85	27.94	780.6436
B-9	15	-42.06	1769.0436
B-10	40	-17.06	291.0436
B-11	30	-27.06	732.2436
B-12	95	37.94	1439.4436
B-13	70	12.94	167.4436
B-14	30	-27.06	732.2436
B-15	45	-12.06	145.4436
B-16	25	-32.06	1027.8436
B-17	50	- 7.06	49.8436
	970	- 0.02	12302.9412

Standard Deviation (S.D.)

$$S.D. = \sqrt{\frac{\Sigma x^2}{N}}$$

$$= \sqrt{\frac{12302.9412}{17}}$$

$$= \sqrt{723.7024}$$

$$= 26.902$$

Standard Error of the Mean (S.E.M.)

$$S.E.M. = \frac{S.D.}{\sqrt{N-1}}$$

$$= \frac{26.902}{\sqrt{16}}$$

$$= \frac{26.902}{4}$$

$$= 6.726$$

represent a significant difference at the 5 percent level of confidence, it was concluded that Class A and Class B were of equal ability as measured by performance on the spelling portion of the Differential Aptitude Test.

$$
\begin{aligned}
S.E.M._d &= \sqrt{S.E.M._A^2 + S.E.M._B^2} \\
&= \sqrt{4.679^2 + 6.726^2} \\
&= \sqrt{21.893041 + 45.239076} \\
&= \sqrt{67.132117} \\
&= 8.193
\end{aligned}
$$

FIGURE 7

STANDARD ERROR OF A DIFFERENCE BETWEEN TWO MEANS ($S.E.M._d$)
DAT SPELLING SCORES - CLASSES A AND B

$$
\begin{aligned}
\underline{t} &= \frac{M_B - M_A}{S.E.M._d} \\
&= \frac{57.06 - 52.00}{8.193} \\
&= \frac{5.06}{8.193} \\
&= .618
\end{aligned}
$$

FIGURE 8

$\underline{t}$ RATIO FOR A DIFFERENCE BETWEEN TWO MEANS
DAT SPELLING SCORES - CLASSES A AND B

ACHIEVEMENT ON 5-MINUTE NEW-MATTER TAKES

The final analysis of this study was concerned with the evaluation of the students' achievement on the 5-minute new-matter takes that were dictated during the final quarter of the 1971-1972 school year. Records maintained by the teacher were used to determine the single highest speed attained by each of the students in Class A and Class B and also the students' average high speed.

Comparison of Single High Speeds

As a preliminary means of examining and comparing the highest speeds attained by the students in the two classes, a simple-frequency distribution was prepared, as shown in Table XI. This breakdown revealed that none of the students in Class A reached a speed of 100 words a minute, although 29 percent of the students in Class B did so. The largest percentage (45 percent) of the students in Class A achieved the speed of 80 words a minute, while the largest percentage (41 percent) of Class B achieved the terminal speed of 70 words a minute. All of the students in both classes passed at least one take at 60 words a minute, although there were about twice as many students in Class A at this level at the end of the year as there were in Class B.

Further grouping of the data in a summary-frequency distribution indicated that 10 percent of Class A students reached high-level speeds of 90 or 100 words a minute, whereas 35 percent of those in

Class B fell in this category. The middle speed interval of 70 or 80 words a minute included 65 percent of Class A and 53 percent of Class B.

TABLE XI

SIMPLE-FREQUENCY DISTRIBUTION
HIGH SPEED - 5-MIN. TAKES

Speed of 5-Min. Takes	Class A		Class B	
	Number of Students	Percent of Class	Number of Students	Percent of Class
100 . . .	0	0%	5	29%
90 . . .	2	10%	1	6%
80 . . .	9	45%	2	12%
70 . . .	4	20%	7	41%
60 . . .	5	25%	2	12%
50 . . .	0	0%	0	0%
Total . .	20	100%	17	100%

The low speed interval of 50 or 60 words a minute remained the same as in the simple-frequency distribution, since all of the students passed one or more takes of at least 60 words a minute. Table XII shows the summary-frequency distribution.

The next step in comparing achievement on 5-minute takes involved an analysis of the students' average high speeds.

TABLE XII

SUMMARY-FREQUENCY DISTRIBUTION
HIGH SPEED - 5-MIN. TAKES

Speed of 5-Min. Takes	Class A		Class B	
	Number of Students	Percent of Class	Number of Students	Percent of Class
90-100 . .	2	10%	6	35%
70-80 . .	13	65%	9	53%
50-60 . .	5	25%	2	12%
Total . .	20	100%	17	100%

Comparison of Average High Speeds

Instead of using the single highest speed takes as the measure of final achievement in speed of dictation, it was decided that the average of the three highest 5-minute takes passed by each student would be a more realistic measurement of actual skill. It was noted that all of the students had passed at least three 5-minute takes.

The end-of-year records were examined, and the average speed for each student was calculated. For example, student A-1 had passed one 5-minute take at 70 words a minute and two takes at 80 words a minute. These speeds were added together (70 + 80 + 80 = 230). The total was divided by three and rounded to the nearest whole number

(230 ÷ 3 = 76 2/3 = 77). Therefore, for purposes of this study, student A-1 had achieved an average high dictation speed of 77 words a minute on 5-minute new-matter takes. This procedure of calculating average speeds was followed for all of the students in Class A and Class B. These speed averages are shown in Tables XIII and XIV.

In order to determine if there existed any significant difference between the classes in speed of dictation, it was necessary to calculate the mean speed of each class.

The mean shorthand dictation speed of Class A was 69.55, which was computed by totaling the average speeds of all the students in Class A and dividing the sum by the number of students in the class. Figure 9 shows this calculation.

Sum of ave. dictation speeds: 1391
Number of students, Class A: 20

```
      69.55
20)1391.00
   120
    191
    180
     110
     100
      100
      100
```

Mean dictation speed, Class A: 69.55

FIGURE 9

COMPUTATION OF MEAN DICTATION SPEED
CLASS A

By using the same method, the mean shorthand dictation speed for Class B was calculated. It was found to be 76.41 and is shown in Figure 10.

Sum of ave. dictation speeds: 1299
Number of students, Class B: 17

```
     76.411
17)1299.000
  119
   109
   102
     70
     68
      20
      17
       30
       17
```

Mean dictation speed, Class B: 76.41

FIGURE 10

COMPUTATION OF MEAN DICTATION SPEED
CLASS B

As outlined by the statistical null hypothesis, the continuing analysis of shorthand dictation speeds required the calculation of the standard deviation and the standard error of the mean for each class.

From Table XIII, it may be seen that the standard deviation for Class A was 8.273 and the standard error of the mean was 1.898. Table XIV shows that the standard deviation for Class B was 14.833 and the standard error of the mean was 3.708.

TABLE XIII

STANDARD DEVIATION AND STANDARD ERROR OF THE MEAN
AVERAGE SHORTHAND DICTATION SPEED - CLASS A

Student	Ave. Shorthand Speed	Deviation from M	Deviation Squared
A-1	77	7.45	55.5025
A-2	67	- 2.55	6.5025
A-3	63	- 6.55	42.9025
A-4	83	13.45	180.9025
A-5	67	- 2.55	6.5025
A-6	77	7.45	55.5025
A-7	77	7.45	55.5025
A-8	57	-12.55	157.5025
A-9	73	3.45	11.9025
A-10	67	- 2.55	6.5025
A-11	73	3.45	11.9025
A-12	60	- 9.55	91.2025
A-13	77	7.45	55.5025
A-14	73	3.45	11.9025
A-15	60	- 9.55	91.2025
A-16	83	13.45	180.9025
A-17	63	- 6.55	42.9025
A-18	60	- 9.55	91.2025
A-19	77	7.45	55.5025
A-20	57	-12.55	157.5025
	1391	0.00	1368.9500

Standard Deviation (S.D.)

$$S.D. = \sqrt{\frac{\Sigma x^2}{N}}$$

$$= \sqrt{\frac{1368.95}{20}}$$

$$= \sqrt{68.4475}$$

$$= 8.273$$

Standard Error of the Mean (S.E.M.)

$$S.E.M. = \frac{S.D.}{\sqrt{N-1}}$$

$$= \frac{8.273}{\sqrt{19}}$$

$$= \frac{8.273}{4.359}$$

$$= 1.898$$

TABLE XIV

STANDARD DEVIATION AND STANDARD ERROR OF THE MEAN
AVERAGE SHORTHAND DICTATION SPEED - CLASS B

Student	Ave. Shorthand Speed	Deviation from M	Deviation Squared
B-1	100	23.59	556.4881
B-2	60	-16.41	269.2881
B-3	93	16.59	275.2281
B-4	80	3.59	12.8881
B-5	83	6.59	43.4281
B-6	93	16.59	275.2281
B-7	63	-13.41	179.8281
B-8	80	3.59	12.8881
B-9	67	- 9.41	88.5481
B-10	63	-13.41	179.8281
B-11	63	-13.41	179.8281
B-12	97	20.59	423.9481
B-13	100	23.59	556.4881
B-14	63	-13.41	179.8281
B-15	67	- 9.41	88.5481
B-16	70	- 6.41	41.0881
B-17	57	-19.41	376.7481
	1299	0.03	3740.1177

Standard Deviation (S.D.)

$$S.D. = \sqrt{\frac{\Sigma x^2}{N}}$$

$$= \sqrt{\frac{3740.1177}{17}}$$

$$= \sqrt{220.0069}$$

$$= 14.833$$

Standard Error of the Mean (S.E.M.)

$$S.E.M. = \frac{S.D.}{\sqrt{N-1}}$$

$$= \frac{14.833}{\sqrt{16}}$$

$$= \frac{14.833}{4}$$

$$= 3.708$$

Continuation of the analysis in Figure 11 shows that the standard error of the difference between the two means of Class A and Class B was found to be 4.166. Figure 12 shows that the $\underline{t}$ ratio for the difference between the two means was 1.647.

$$
\begin{aligned}
S.E.M._d &= \sqrt{S.E.M._A^2 + S.E.M._B^2} \\
&= \sqrt{1.898^2 + 3.708^2} \\
&= \sqrt{3.602404 + 13.749264} \\
&= \sqrt{17.351668} \\
&= 4.166
\end{aligned}
$$

FIGURE 11

STANDARD ERROR OF A DIFFERENCE BETWEEN TWO MEANS ($S.E.M._d$)
AVERAGE SHORTHAND DICTATION SPEEDS - CLASSES A AND B

$$
\begin{aligned}
\underline{t} &= \frac{M_B - M_A}{S.E.M._d} \\
&= \frac{76.41 - 69.55}{4.166} \\
&= \frac{6.86}{4.166} \\
&= 1.647
\end{aligned}
$$

FIGURE 12

$\underline{t}$ RATIO FOR A DIFFERENCE BETWEEN TWO MEANS
DICTATION SPEEDS - CLASSES A AND B

To be significant at the 5 percent level, a t ratio for samples of this size must have a value of at least 2.042. As seen in the data of Tables XIII and XIV and Figures 11 and 12, the t ratio for the difference in shorthand achievement between Class A and Class B was 1.647. Therefore, it was concluded that the observed difference in mean dictation speeds, as measured by 5-minute new-matter takes, was not a significant difference.

The research hypothesis in the null form stated that there would be no significant differences in average speed development between students taught by Russon's early-new-matter approach and the current Gregg manual approach. Therefore, the results of the study and the statistical analysis supported the hypothesis.

SUMMARY

In this chapter, findings were discussed and comparisons of the various data were made.

The ability of Class A and Class B was compared on the basis of previous scholastic achievement and Differential Aptitude Test spelling scores. The use of t ratio values and the statistical null hypothesis were utilized in making these comparisons. It was found that there were no significant differences in ability between the classes, as measured by these two factors. Minor observed differences were attributed to chance factors or sampling variability.

The final comparisons of the two classes included an analysis of end-of-year achievement in shorthand dictation speed, as measured by results on 5-minute new-matter takes dictated during the final quarter of instruction. The *t* ratio value and statistical procedures outlined by the null hypothesis revealed that there was no significant difference between the classes in speed development.

Conclusions and recommendations drawn from the results of this study are summarized in Chapter 5.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This study was undertaken in an effort to compare the results obtained through the use of two different methods of teaching first-year shorthand. Two classes at Billings West High School, Billings, Montana, participated in the experiment. The final criterion was speed development, as measured by 5-minute new-matter takes dictated during the final quarter of the 1971-1972 school year.

The investigator attempted to find answers to the following questions:

1. Would methods and devices encompassed in Russon's early-new-matter approach significantly influence the dictation speed of first-year shorthand students?

2. How would the achievement of shorthand students taught by the current Gregg manual approach compare with that of students taught by Russon's early-new-matter approach?

SUMMARY

At the beginning of the year, the two classes were found to have equal ability, as measured by grade point averages (see Tables VII and VIII, pages 51 and 52, and Figures 3 and 4, page 53) and by Differential Aptitude Test spelling scores (see Tables IX and X, pages 56 and

57, and Figures 7 and 8, page 58). Throughout the first semester, teaching methods and materials used varied in the two classes, dependent upon the techniques incorporated in the two different approaches. Classroom instruction in the two classes was identical during the second semester.

At the close of the school year, shorthand dictation achievement records were analyzed.

Russon's Approach and Student Achievement

The data on Class B, the experimental group taught by Russon's early-new-matter approach (see Table VI, page 77, and Table XIV, page 65), revealed the following points:

1. In Class B, there were seventeen students who completed the entire year's course and who were taught by Russon's early-new-matter approach.

2. In addition to the students noted above, there were two students who withdrew from the course during the first semester because of failing or near-failing grades in shorthand. Data on these two students were not included in the statistical analysis of this study.

3. The mean shorthand dictation speed, based on the average of each student's three highest takes, was 76.41 words a minute.

4. Of the seventeen students, eight achieved average dictation speeds higher than the mean dictation speed of 76.41 words a minute.

5. The highest dictation speed passed was at 100 words a minute, and five students in this class passed one or more takes at that speed.

6. Every student in Class B passed at least three 5-minute takes. The lowest achiever passed one take at 50 words a minute and two takes at 60 words a minute, equivalent to an average speed of 57 words a minute.

7. The statistical analysis and resultant t score indicated that the differences in achievement between Class B and Class A were not significant at the 5 percent level of confidence.

The Gregg Manual Approach and Student Achievement

The data pertaining to Class A, the control group that was taught according to methods recommended by the Gregg authors in the newest edition of the manual (see Table V, page 76, and Table XIII, page 64), disclosed the following points:

1. In Class A, there were twenty students who completed the entire one-year course and who were taught by the current Gregg manual approach.

2. In addition to those noted above, there were seven students who withdrew from the class during the first semester because of failing or near-failing grades in shorthand. Data on these students were not included in the statistical analysis of this study.

3. The mean shorthand dictation speed, based on the average of the three highest takes successfully passed by each student, was 69.55 words a minute.

4. Of the twenty students, ten achieved average dictation speeds higher than the class mean of 69.55 words a minute. It was also noted that seven students in Class A achieved average speeds exceeding the higher mean dictation speed of Class B.

5. The highest dictation speed passed was at 90 words a minute, and two students passed one take at that speed.

6. Every student in Class A passed at least three 5-minute takes. The two lowest achievers each passed one take at 50 words a minute and two takes at 60 words a minute, equivalent to average speeds of 57 words a minute.

CONCLUSIONS

On the basis of the findings of the study, as summarized above, the following conclusions were drawn:

1. Even though small-sample statistical methods were employed in this study, the limitation of the small number of students must be noted. Consequently, the validity of the results must be questioned as applied to the population as a whole.

2. Insofar as the classes in this study can be assumed to be typical of the population, either approach may be successfully used.

Students taught by Russon's early-new-matter approach may achieve somewhat higher mean dictation speeds than those taught by the more traditional Gregg method. However, the differences probably will not be significant and may be the result of chance factors.

3. Students taught by Russon's early-new-matter approach may be less easily discouraged during the early months of instruction than those taught by the more traditional Gregg method, as evidenced by the lower attrition rate. Only two students withdrew from the experimental class, while seven students withdrew from the control class. Perhaps low achievers are better able to experience at least moderate success under Russon's approach.

RECOMMENDATIONS

Teachers of shorthand should test and adapt the various devices, separately and in combination, that are incorporated in Russons' early-new-matter approach. However, a method that is successful in one situation may prove much less so in another if teacher enthusiasm is lacking.

It is strongly recommended that research in shorthand methodology continue. The results of studies should be published so that all teachers of the subject may test new devices in their own classrooms. Thus, each teacher can develop a composite approach which proves pragmatically best for his particular instructional environment.

APPENDIX

TABLE I

TRANSCRIPTION ERROR ALLOWANCE
ON THREE-MINUTE TAKES
95 PERCENT ACCURACY

Dictation Rate Words Per Minute	Errors Allowed
20 w.p.m.	3
30 w.p.m.	5
40 w.p.m.	6
50 w.p.m.	8
60 w.p.m.	9
70 w.p.m.	11
80 w.p.m.	12
90 w.p.m.	14
100 w.p.m.	15

TABLE II

TRANSCRIPTION ERROR ALLOWANCE
ON FIVE-MINUTE TAKES
95 PERCENT ACCURACY

Dictation Rate Words Per Minute	Errors Allowed
50 w.p.m.	13
60 w.p.m.	15
70 w.p.m.	18
80 w.p.m.	20
90 w.p.m.	23
100 w.p.m.	25

TABLE V

MASTER SHEET - CLASS A

Student	Grade Level	GPA	DAT Spelling	High Speed 5-Min. Takes	Ave. Speed 5-Min. Takes
A-1	11	2.71	60	80	77
A-2	11	1.94	15	80	67
A-3	11	3.26	55	70	63
A-4	11	2.25	80	90	83
A-5	11	2.19	40	70	67
A-6	11	3.33	35	80	77
A-7	11	2.72	30	80	77
A-8	11	2.38	55	60	57
A-9	11	2.50	35	80	73
A-10	11	2.11	85	70	67
A-11	11	2.94	45	80	73
A-12	11	1.94	35	60	60
A-13	11	2.50	85	80	77
A-14	12	2.94	55	80	73
A-15	11	2.11	50	60	60
A-16	11	2.88	70	90	83
A-17	11	3.05	60	70	63
A-18	11	2.94	25	60	60
A-19	11	3.40	85	80	77
A-20	11	2.24	40	60	57

TABLE VI

MASTER SHEET - CLASS B

Student	Grade Level	GPA	DAT Spelling	High Speed 5-Min. Takes	Ave. Speed 5-Min. Takes
B-1	11	2.69	95	100	100
B-2	11	2.17	30	60	60
B-3	11	3.25	95	100	93
B-4	11	2.75	95	80	80
B-5	11	2.56	65	90	83
B-6	12	2.44	50	100	93
B-7	11	2.06	55	70	63
B-8	11	2.56	85	80	80
B-9	11	2.25	15	70	67
B-10	11	1.79	40	70	63
B-11	11	1.75	30	70	63
B-12	11	2.63	95	100	97
B-13	11	4.13	70	100	100
B-14	11	2.38	30	70	63
B-15	11	3.33	45	70	67
B-16	11	2.31	25	70	70
B-17	11	2.38	50	60	57

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