AN ABSTRACT OF THESIS OF

Shirley Gomerdinger for the Master of Science

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Title: TAPED VERSUS TRADITIONAL INSTRUCTION IN PRESENTING THE KEYBOARD TO SEVENTH GRADE JUNIOR HIGH SCHOOL PERSONAL TYPEWRITING STUDENTS

Abstract approved: George K. Walters

The purpose of this study was to compare the achievement of seventh grade beginning typewriting students who used the professionally prepared taped instructions in learning the keyboard with the achievement of students who received "traditional" instruction at the Oregon Trail Junior High School during the 1978-79 school year.

Eight classes of seventh grade personal typewriting students were used for the study. The experimental groups consisted of four classes, with a total enrollment of 88 students.

The control groups consisted of four classes, with a total enrollment of 74 students.

Two methods of presenting the keyboard in typewriting were used in this study. The experimental groups received taped instruction while the control groups received traditional method of instruction.

Students in the experimental and control groups were tested at the conclusion of the presentation of the keyboard. The test consisted of three, three-minute timed writings. The gross words per minute and the number of errors made were computed for each student. Statistical significance was evaluated through the use of a single classification analysis of variance.

The analysis of the data revealed that there was no significant difference in mean gross words a minute between the experimental and control groups.

The data also indicate there was no significant difference in mean errors made between the experimental and control groups. Therefore, the null hypothesis was accepted.

# TAPED VERSUS TRADITIONAL INSTRUCTION IN PRESENTING THE KEYBOARD TO SEVENTH GRADE JUNIOR HIGH SCHOOL PERSONAL TYPEWRITING STUDENTS

Shirley Gomerdinger

Emporia State University

The purpose of this study was to compare the achievement of seventh grade beginning typewriting students who used professionally prepared taped instructions in learning the keyboard with the achievement of students who received "traditional" instruction.

## Statement of Hypotheses

There is no significant difference between the mean gross words per minute on three-minute timed writings of the experimental group when compared with the control group.

There is no significant difference in the mean number of typewriting errors on three-minute writings of the experimental group when compared with the control group.

## Methods of Procedure

Eight classes of seventh grade personal typewriting students were used for the study. The same teacher taught the eight classes. For research purposes, the typewriting students were classified in the following manner: the experimental groups were taught with the aid of instructional tapes; the control groups were taught by traditional methods. Classes met daily for 50 minutes.

The experimental groups consisted of four classes. Class size varied from 19-25 students, with a total enrollment of 88 students.

The control groups consisted of four classes. Class size varied from 14-24 students, with a total enrollment of 74 students.

The experimental groups were introduced to the typewriter keyboard with the tapes--Personal Typewriting for Junior High Schools, by Wanous and Haggblade, prepared by South-Western Publishing Company in correlation with the text. There were 30 tapes in the series that were approximately 30 minutes in length. One tape was used each day to present the lesson. Approximately six weeks were devoted to the keyboard presentation.

The control group's class work was conducted identically to that of the experimental group except no taped instructions were used. All classes followed an established routine in which one lesson was covered daily. Both groups used the same textbook and keyboard chart.

Students in the experimental and control groups were tested at the conclusion of the presentation of the keyboard. The test consisted of three, three-minute timed writings. The gross words per minute and the number of errors made were computed for each student. Statistical significance was evaluated through the use of a single classification analysis of variance.

## Conclusions

Analysis of the data indicated there was no significant difference in mean gross words a minute and mean errors made on three-minute timed writings between students receiving taped instruction and students receiving traditional teaching method of keyboard presentation. However, the researcher found several advantages that justify the use of tapes in presenting the keyboard to seventh grade junior high school students.

1. The teacher was able to observe the students more carefully.

2. The teacher was free to assist the individual student without detaining the rest of the class.

3. The instruction was presented on the tapes only once; therefore, the students learned to listen more carefully.

4. Technique cues and reminders encouraged proper typewriting habits and techniques.

5. Students absent were able to make up their lessons without interfering with other class members.

6. The use of the tapes reduced discipline problems.

7. The tapes were uninterruptable; therefore, the students got maximum directed practice.

8. The tapes provided professionally-prepared lessons.

9. The tapes relieved the teacher from constant dictation.

Recommendations

1. In teaching typewriting to supplement the traditional method of instruction, it is recommended that the teacher should use tapes and other innovative teaching devices.

2. Further studies on the use of tapes in the typewriting classroom should be done on the senior high school level.

3. It is recommended that tapes should be used to assist, but not replace, the teacher.

# TAPED VERSUS TRADITIONAL INSTRUCTION IN PRESENTING THE KEYBOARD TO SEVENTH GRADE JUNIOR HIGH SCHOOL PERSONAL TYPEWRITING STUDENTS

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A Thesis

Presented to

the Division of Business and Business Education

Emporia State University

Emporia, Kansas

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In Partial Fulfillment

of the Requirements for the Degree

Master of Science

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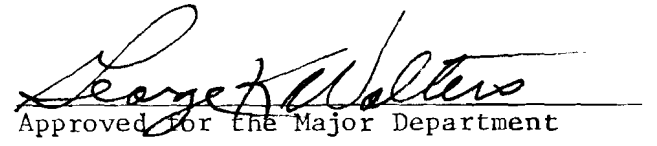
by

Shirley Gomerdinger

August, 1979



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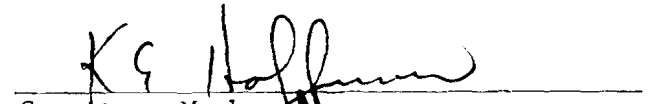

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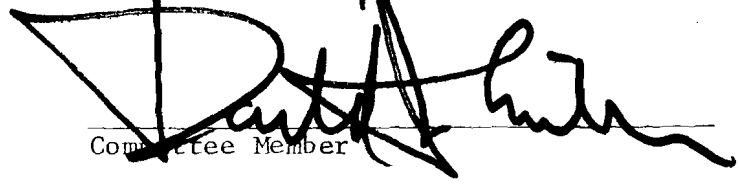

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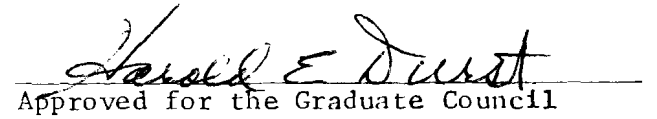

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S. J. G.

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## INTRODUCTION

Many typewriting teachers are not satisfied with the results they are getting in their beginning typewriting classes. They would like to see a definite improvement in student performance.

> Mastery of the typewriter keyboard has always been a critical part of the beginning typist's learning experience. Both good and bad habits are formed during those early days, as finger reaches, posture, hand position, and all the techniques that are so vital in the acquisition of necessary typing skills are developed.[1]

Most teachers agree that students would learn better and faster if the instructor were able to work with them individually. The teacher must constantly watch each and every student--correcting, suggesting, and demonstrating the proper techniques to ensure maximum success based on individual skills and abilities. Unfortunately, teachers cannot work individually with students if they are standing at the front of the classroom reading drill material to the class. One way to provide individual instruction in a "traditional" classroom is to use instructional tapes. The tapes free the teacher to work with students and to provide guidance and individual instruction to all who need it.[2]

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[1]Edwin Gould and Vincent Southerland, "TV Typing: Learning the Keyboard Through Instructional Television," Business Education World, LVII (September-October, 1976), 14.

[2]Audrey Schmidt Rubin, "Teaching Typing With Tapes--Individualizing the 'Traditional' Classroom," Business Education World, LVII (March-April, 1977), 31.

# Chapter 1

## INTRODUCTION

Many typewriting teachers are not satisfied with the results they are getting in their beginning typewriting classes. They would like to see a definite improvement in student performance.

> Mastery of the typewriter keyboard has always been a critical part of the beginning typist's learning experience. Both good and bad habits are formed during those early days, as finger reaches, posture, hand position, and all the techniques that are so vital in the acquisition of necessary typing skills are developed.[1]

Most teachers agree that students would learn better and faster if the instructor were able to work with them individually. The teacher must constantly watch each and every student--correcting, suggesting, and demonstrating the proper techniques to ensure maximum success based on individual skills and abilities. Unfortunately, teachers cannot work individually with students if they are standing at the front of the classroom reading drill material to the class. One way to provide individual instruction in a "traditional" classroom is to use instructional tapes. The tapes free the teacher to work with students and to provide guidance and individual instruction to all who need it.[2]

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While individualized learning centers are well suited to a skill subject such as typewriting, most typewriting classes are still conducted in the traditional manner. However, teaching a traditional typewriting class does not mean that teachers have to struggle along without the benefit of new methods or new technology.

Instructional recordings can be used in a traditional typewriting class in the following ways:[2]

1. For the initial presentation of new course material.
2. For routine drills.
3. To provide remedial work for students who have difficulty keeping up with the class.
4. As make-up lessons for absentees.

Some teachers prefer to present each new key and use the tapes for the drill portion of the lesson. Others use the tapes for the entire lesson. Either way, it makes sense to let the recorded voice do the routine job of calling out the hundreds of letters in the drill lines while the teacher works with individual students to improve their typing techniques.

## The Problem

Beginning typewriting classes at the junior high school level are typical of most classes. The students come to the typing class anxious to learn how to type. The teacher can capitalize on the initial enthusiasm of their students by encouraging them to make immediate use of newly acquired skills. Yet, both good and bad habits are formed

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[1]Ibid.

during those early days. The teacher cannot constantly observe all students during the presentation of the keyboard. In this case, another method of presenting the keyboard may be more desirable.

## Statement of the Problem

The purpose of this study was to compare the achievement of seventh grade beginning typewriting students who used the professionally prepared taped instructions in learning the keyboard with the achievement of students who received "traditional" instruction at the Oregon Trail Junior High School during the 1978-1979 school year. More specifically, the study will attempt to determine whether or not a significant difference exists between the experimental group taught with the taped instructions and the control group taught by the traditional methods when evaluating timed writings for (1) gross words per minute, and (2) typewriting errors.

## Statement of the Hypotheses

There is no significant difference between the mean gross words per minute on three minute timed writings of the experimental group when compared with the control group.

There is no significant difference in the mean number of typewriting errors on three minute writings of the experimental group when compared with the control group.

## Importance of the Study

Business teachers have always searched for better ways to plan and to present lessons and materials to students in order to make the lessons easier to understand and the skills easier to master. Today,

with the pressure to prove what students are accomplishing, teachers are accountable for accepting all students enrolling in class and helping those students achieve as much as possible.[1]

A review of literature has indicated that the use of media in instruction enhances and facilitates the learning that takes place in the classroom. Yet, there are so many classrooms in which little or no media other than the chalkboard and textbook are used. Therefore, the researcher was very much interested in the findings from a study of this nature.

## Delimitations

This study was delimited to a comparison of taped instruction versus traditional instruction with seventh grade students enrolled in a 9-week personal typewriting course at the Oregon Trail Junior High School, Olathe, Kansas. The study was conducted during the 1978-1979 academic school year and included four classes for the control group and four classes for the experimental group.

## Limitations

There was no attempt to select students for the classes. The only randomness in the selection of students for the study was by enrollment.

The study was limited to the Introduction to the Keyboard, lessons one through thirty in the text--Personal Typewriting for Junior High Students, by Wanous and Haggblade, South-Western Publishing Company.

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[1]Fred S. Cook and Robert E. Wiper, "New Media for Teaching Typewriting," New Media in Teaching the Business Subjects, Third Yearbook of the National Business Education Association (Reston, VA: National Business Education Association, 1965), p. 97.

## Definition of Terms

Some terms used in the study may not be familiar to all readers. To preclude the possibility of misinterpretation, the investigator has defined some of the more frequently used terms.

### Analysis of Variance

An arithmetic procedure for treating the data for the criterion variable; it results in a partition of the total sum of squared deviations (of all observations) from the mean into sums of squares attributable to the various experimental effects, to the interaction among them, and to sampling error; thus, it facilitates tests of the significance of these experimental and interaction effects.[1]

### Gross Words Per Minute (GWAM)

The number of standard five-stroke words of straight copy material divided by the number of minutes in the timed writing.[2]

### Instructional Tapes

Tapes that are used in presenting the keyboard in typewriting instruction. The tapes used for this study were professionally produced by the textbook publisher.

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[1]Carter V. Good, Dictionary of Education, 3rd ed. (New York: McGraw Hill, 1973), p. 639.

[2]Allien R. Russon and S. J. Wanous, Philosophy and Psychology of Teaching Typewriting (Cincinnati: South-Western Publishing Co., 1973), p. 29.

Junior High School

A school that enrolls pupils in grades seven, eight, and nine.[1]

Mean

A measure of central tendency which is obtained from the sum of the measures, observations, magnitudes, items, or scores in a statistical series, divided by their number or frequency, often shortened to mean.[2]

Significance

The degree to which a measure derived from a sample represents the corresponding measure in a population.[3]

Straight-Copy Typewriting

Straight-copy typewriting refers to word-for-word copying of cleanly printed or typed matter, without erasing and without requiring format decisions by the typist except for even righthand margins, with word division at the ends of lines as may be necessary.[4]

Traditional Method of Instruction

A term presently used to refer to the typical classroom method of the late 19th and early 20th centuries in which instruction was guided and aided by the teacher (entirely live).[5]

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[1]Good, op. cit., p. 434. [2]Ibid., p. 356. [3]Ibid., p. 534.

[4]Leonard J. West, Acquisition of Typewriting Skills (New York: Pitman Publishing Corporation, 1969), p. 227.

[5]Good, op. cit., p. 613.

## Methods of Procedure

This study was conducted during the 1978-79 school year. Eight classes of seventh grade personal typewriting students were used for the study. The same teacher taught the eight classes. For research purposes, the typewriting students were classified in the following manner: the experimental groups were taught with the aid of instructional tapes; the control groups were taught by traditional methods.

Two seventh grade personal typewriting classes were taught each quarter throughout the year. Classes met daily for 50 minutes. One class met second hour and one class met seventh hour. During the first and third quarters, the second hour students were the control group and the seventh hour students were the experimental group. During the second and fourth quarters, the second hour students were the experimental group and the seventh hour students were the control group.

The alternating of classes was done to alleviate any effect fatigue could have on the performance of the classes taught during the seventh hour.

The experimental groups consisted of four classes. Class size varied from 19-25 students, with a total enrollment of 88 students.

The control groups consisted of four classes. Class size varied from 14-24 students, with a total enrollment of 74 students.

The experimental groups were introduced to the typewriter keyboard with the tapes--Personal Typewriting for Junior High Schools, by Wanous and Haggblade, prepared by South-Western Publishing Company in correlation with the text. There were 30 tapes in the series. The tapes were approximately 30 minutes in length. This did not account for time

used in stopping the tapes at intervals when needed. One tape was used each day to present the lesson. Approximately six weeks were devoted to the keyboard presentation.

The control group's class work was conducted identically to that of the experimental group except no taped instructions were used. All classes followed an established routine in which one lesson was covered daily. Both groups used the same textbook and keyboard chart.

## Population of the Study

There was no screening of students or classes as all seventh grade students enrolled in beginning typewriting were included in the study.

Students who dropped out of school, dropped out of class, or who entered by transfer from other classes or from other schools were not considered in the test results.

## Testing Procedures

Students in the four experimental groups and four control groups were tested at the conclusion of the presentation of the keyboard, after approximately six weeks of typewriting. The test consisted of three, three-minute timed writings over straight-copy material. The copy used for the test was 1.1 syllabic intensity, indicating very easy material according to the author. The following paragraph from lesson thirty was used for the timed writings, Wanous and Haggblade (1971), page 50.

> Morley said that there is one rule for being a good talker; learn to listen. It is a good quotation to keep in mind. To talk well, give others a chance to express their views. Learn what they know. Try their views on for size. Talk only when you have something worth saying. Just keep in mind that the star of the show is the one who sings one song too few, not one too many. Use the same trick to become the star of your class in school.[1]

When the three, three-minute timed writings were completed, students circled all typewriting errors and computed the GWAM for each timed writing. On this same sheet, students recorded their names and indicated which writing contained the most net words. This information was then rechecked by the teacher and scores were recorded on a group tally sheet (Appendix B). These scores were used to analyze the data.

## Statistical Treatment of Data

The statistical technique used to test the null hypothesis was a single classification analysis of variance. The AOV test provided a statistical procedure that was appropriate for use with two or more samples. According to Roscoe, the data used in the calculations must come from (1) independent random samples from (2) normally distributed and (3) equally variable populations with (4) equal means.[2] Available data seemed appropriate to use the analysis of variance test to analyze this research.

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[1] S. J. Wanous and Berle Haggblade, Personal Typewriting for Junior High Schools, 3d ed. (Cincinnati: South-Western Publishing Co., 1971), p. 50.

[2] John T. Roscoe, Fundamental Research Statistics for the Behavioral Sciences (New York: Holt, Rinehart and Winston, Inc., 1969), p. 231.

## Chapter 2

## REVIEW OF RELATED LITERATURE

The material reviewed in this section has been divided into three classifications relating to (1) typewriting methodology in the junior high school, (2) innovations and technology in the use of media, and (3) literature from previous studies.

### Typewriting Methodology in the Junior High School

Since the invention of the typewriter and its introduction into the business office, business teachers have assumed the responsibility for developing competent operators. As long as the typewriter was confined essentially to the business office, the teaching of typewriting to persons other than those who were preparing for a vocation in the office occupations could not be justified in the public schools. Increased productivity of the American economy and the accompanying affluence of the American people has provided the means by which many individuals now have access to typewriters for personal use, thus warranting the offering of typewriting instruction to others who may want or need it.[1]

Maze further stated that as long as typewriting was essentially for vocational purposes the logical place to offer it was near the time of graduation in order that the peak of competency could be carried over into

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[1]Clarence Maze, Jr., Business Education in the Junior High School, Monograph, No. 113 (Cincinnati: South-Western Publishing Co., 1965), 43.

the first job. Now that typewriting skill has been recognized as having personal-use values, however, it has been gradually offered at lower and lower grade levels until the trend now is to offer it in the junior high school.[1]

The teaching of typewriting at the junior high school level is becoming increasingly popular, as more and more schools across the country are offering typing at this level. Many personal or intrinsic values are to be gained from a personal typewriting course. The individual outcomes vary. Some pupils wish to acquire a useful personal skill--a skill of immediate value that can be transferred to the typing of school papers and personal letters; others hope to acquire an employable skill; still others wish to explore the world of business.[2]

The junior high school typewriting course should promote accuracy and speed in performance, develop correct technique, and integrate technical English skills and typing skills. The personal-use typist needs to have the same command of basic techniques as the students who take typewriting for vocational use.

> Good technique in typewriting should be the paramount issue. Teacher and pupil should look to the process, rather than to the typewritten result. Success should be measured in terms of the method of production; hence, pupils should be graded on this basis in order that the emphasis may be properly placed. If a positive, enthusiastic attitude toward correct technique is thoroughly established during the first few weeks of the course, it will be unnatural thereafter for the pupils to use any other method. This attitude will be fostered more readily if means

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[1]Ibid.

[2]Louis C. Nanassy, "Typing Curriculum and Methodology in the Junior High School," Methods of Teaching Typewriting, XXXVIII (Somerville, New Jersey: The Eastern Business Teachers Association, 1965), p. 103.

> are employed to help the pupil develop poise and confidence during the early lessons while he is trying to grasp the spatial pattern of the keyboard.[1]

Gates applied the general principle of the importance of form in skill building to typewriting and wrote:

> We need only to point to the "hunt and peck" method of typewriting, the point-with-finger habit in reading, the cramped grip in writing, or the "dog paddle" strokes in swimming to convince most people of the inadequacies of unguided learning. By teaching and guiding the learner to acquire the touch system in typing . . . much higher proficiency is achieved. The learner left to himself adopts the first method he stumbles upon, a method that is rarely good.[2]

The keyboard learning stage is one of the most important periods in typewriting instruction. It is in the early lessons that the basic techniques are to be initiated: stroking the keys with quiet, almost motionless hands and arms; manipulating the typewriter with appropriate speed and control; reading the copy first by letter response and then by word-recognition or combination response; and learning to typewrite with continuity while holding the eyes on the copy. These techniques are basic at all levels of the skill, whether in junior high school or senior high school. They must be initiated in the letter keyboard lessons and skillfully refined through right practices in succeeding lessons.[3]

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[1] Ibid., p. 109.

[2] Arthur Gates, Arthur Jersild, T. R. McConnell, R. C. Challman, Education Psychology (New York: The Macmillan Company, 1948), 351.

[3] Jerry W. Robinson, Practices and Preferences in Teaching Typewriting, Monograph, No. 117 (Cincinnati: South-Western Publishing Co., 1967), 21.

"Learning and motivation are inseparable. Any arrangement to encourage learning must provide for motivation as well."[1] Audio-visual aids are particularly effective devices for motivating junior high school students. The motivating outcomes from the use of audio-visual aids are extremely important at the junior high level of instruction.

## Innovations and Technology in the Use of Media

The new educational innovations and media which are appearing almost daily may have a profound impact upon the teaching-learning process as it applies to typewriting.

The use of media in instruction facilitates the learning that takes place in the classroom. Research and classroom evidence would indicate that greater use could be made of tapes, transparencies, and television as supplemental teaching aids in typewriting. Yet, why are there so many classrooms in which little or no media other than the chalkboard and the textbook are used? Too often, teachers teach as they have been taught. If they haven't been taught via media, they won't use that method in their instruction.[2]

Taped instruction can be used to present new learnings, to pace the practice activities, to provide desirable timings of 1 to 5 minutes in building basic skills, to control the keystroking pace in the development of speed and accuracy, and to time various problem and production typing activities. Although most frequently used in presenting and pacing

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[1]Earnest E. Hilgard, Introduction to Psychology 3rd ed. (New York: Harcourt, Brace & World, Inc., 1969), 325.

[2]B. Bertha Wakin, "Instruction in Use of Media for Beginning Teachers," Business Education Forum, XXVIII (January, 1974), 33.

keyboard learning, taped instruction has many uses beyond the keyboard phase of instruction.[1]

Tapes, coordinated with a textbook, can perform a very useful pacing function. They force students to respond to an auditory stimulus which, when combined with the visual stimulus of a textbook drill, can provide increased multiple-sense learning opportunities.[2] The use of instructional tapes permits the teacher to devote one's full attention to observing students while they type, and students with problems can be given immediate individual attention, if necessary. Recorded lessons also can ease the problems of students who may have missed lessons due to absences or other reasons. Teachers may benefit from these taped lessons by adopting procedures used in the lessons, which can generally be regarded as excellent models to follow.[3]

Rubin made the following statements regarding teaching typing with tapes.

> Instructional recordings should be an integral part of every typing instructor's teaching strategy--particularly in the early lessons of keyboard presentation, when it is so important to develop correct fingering and good technique.
>
> The tapes can be fitted into the teacher's presentation very easily. The tape explains which finger to use, gives students an opportunity to practice the reach, and then guides students through a line of drill. The drill lines are timed to encourage students to make maximum use of the time available. During a 30-second timing Student A may type a particular line once, Student B may type it twice, and Student C may not finish it

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[1]Jerry W. Robinson and others, Typewriting: Learning and Instruction (Cincinnati: South-Western Publishing Co., 1969), p. 30.

[2]Lawrence W. Erickson, "Changing Forces in Typewriting Instruction," Business Education Forum, XXIII (November, 1968), 2.

[3]Nanassy, op. cit., p. 249.

the first time. When the class repeats the line, each student tries to improve his or her own performance.[1]

## Literature From Previous Studies

Business education literature would lead an observer to conclude that little is being done today in the utilization of tapes and records in the teaching of typewriting. Surveys to determine the use of new media revealed a lack of published information about the utilization of new materials in business education.

Business teachers in many communities are aware of and are using the new media, but few have written about their experiences. To find research studies directly concerned with the teaching of typewriting via these new media is difficult.[2]

In a monograph on teaching typewriting, Robinson noted that portions of lessons recorded on tapes supplemented the work of the teacher and freed the teacher to do individual coaching. The recordings provided group-paced typing and indicated when to return the carriage for individual guided writings. It gave direct dictation, and it furnished technique cues. It further observed that the recording was inexorable--once it was started, it kept on. No student could stall by asking questions or by making belated machine adjustments. The presentation was uninterruptable. The students, therefore, got maximum directed practice.[3]

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[1]Rubin, op. cit., p. 31.

[2]Cook, op. cit., p. 97.

[3]Robinson, op. cit., p. 23.

Robinson gave a few words of warning concerning the recordings:

> One must remember that there is no way for the machine that plays the lesson for the students to observe their responses, nor can it adapt the rate or the content of the lesson to meet group or individual needs. It does not have eyes nor ears to hear. It is a voice that must say what has been prepared for it to say. This is why recorded lessons can not replace the teacher; but it can free the teacher to do the things that only a teacher can do--observe, correct, encourage, and coach individual students while the lesson goes on for the group as a whole.[1]

Schellsted did a study on "Teaching Typing with Tapes," and observed the following advantages of taped instruction:[2]

1. The student was able to type with greater speed and accuracy.
2. The student who has been absent may receive individualized instruction and assistance.
3. The student learned to listen closely to instructions because he would hear them only once.
4. Instruction was planned and produced in advance by several teachers; this gave continuity and depth to course content.
5. The teacher was free to assist the individual student without detaining the rest of the class.
6. The teacher was able to analyze the problems of the individual student through close observation and to determine which students needed to repeat lessons.
7. There were no discipline problems.

In another study, Prieb found that the summary of the entire year's testing program showed that the experimental group, using typewriting tapes, had significantly fewer errors and higher cutoff speed, and the control group had significantly higher gross speed. It was concluded that

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[1] Ibid.

[2] Agnes Schellsted, "Teaching Typing with Tapes," Business Education World, VIII (April, 1964), 15.

the students taught by double-size typing classes with taped method could do at least as well as those taught in classes by the traditional method.[1]

Cook and Wiper made the following statements concerning media for teaching typewriting.

> New media and methods of instruction are here to stay. When used effectively, they have demonstrated that we can teach more in less time and do it more efficiently. Within the next decade refinements in existing media, especially in the machines, will provide even more impetus for the classroom teacher to utilize these tools that increase his effectiveness.
>
> The typewriting teacher of the future will utilize a variety of tools that will take his place in teaching the mechanical skills of typewriting. The teacher of the future will develop and utilize materials that emphasize using the typewriter as a writing tool--in place of the pencil. His role will be to present to the students a variety of communication problems. He will help the students acquire skills and techniques for solving these communication problems at the typewriter. He will be more concerned with the content of the answer than the speed with which the answer was written.[2]

Rubin made the following comment concerning teaching typewriting with the use of tapes.

> Instructors who are still teaching typewriting with just a keyboard chart and a demonstration stand are short-changing their students--and themselves. Teaching without tapes is like playing the piano with one hand instead of two: it can be done but the results will be only half as good.[3]

## Summary

New media for use in the typewriting classroom are expanding at an ever-increasing rate. The result is more adequate provision for

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[1]Gordon F. Prieb, "Teaching Double-Size Typing Classes with Tapes," Business Education World, XLVI (February, 1966), 27.

[2]Cook and Wiper, op. cit., p. 97.

[3]Rubin, op. cit., p. 31.

individual differences. The instructional tapes relieve the teacher of having to stand at the front of the classroom and dictate drills. The teacher is free to move about the room helping students to obtain correct posture, hand position, and rhythm. In addition, the taped lessons eliminate any possibility that important data would be omitted in the presentation--a situation that often occurred when the teacher had to give oral instructions to several different classes throughout the day. Furthermore, tapes enable the teacher to keep the class together without holding back the good students or rushing the slower ones.

## Chapter 3

## ANALYSIS OF DATA

This study was designed to determine the effectiveness of two methods of presenting the keyboard to junior high school personal typewriting students. The relationship stated in the null hypothesis was that there was no significant difference between the experimental and control group when comparing the mean gross words per minute and mean errors made on three-minute timed writings. The analysis of the data was by the analysis of variance method. The .05 level of significance was used.

### Analysis of Mean Gross Words Per Minute

At the conclusion of the presentation of the keyboard, three, three-minute timed writings were given. The timed writing with the highest net words was recorded on a group tally sheet. The results of the scores are summarized in Table 1.

The GWAM for the experimental group (a total of 88 students) had an obtained mean score of 19.18 ($\bar{X}_1$ = 19.18), while a mean score of 19.27 ($\bar{X}_2$ = 19.27) was calculated for the control group (a total of 74 students).

### Analysis of Variance

The results of the analysis of variance for the mean GWAM scores of both groups were illustrated in Table 2. The between groups variance,

Table 1

Gross Words Per Minute Scores of the Experimental and Control Typewriting Groups at Oregon Trail Junior High School, Olathe, Kansas 1978-79 School Year

| Score (X) | Experimental[a] f | Experimental[a] fX | Control[b] f | Control[b] fX | Score (X) | Experimental f | Experimental fX | Control f | Control fX |
|---|---|---|---|---|---|---|---|---|---|
| 30 | 5 | 150 | 3 | 90 | 18 | 4 | 72 | 0 | 0 |
| 29 | 1 | 29 | 1 | 29 | 17 | 5 | 85 | 4 | 68 |
| 28 | 0 | 0 | 3 | 84 | 16 | 7 | 112 | 5 | 80 |
| 27 | 3 | 81 | 2 | 54 | 15 | 4 | 60 | 8 | 120 |
| 26 | 6 | 156 | 1 | 26 | 14 | 3 | 42 | 1 | 14 |
| 25 | 1 | 25 | 2 | 50 | 13 | 7 | 91 | 4 | 52 |
| 24 | 2 | 48 | 3 | 72 | 12 | 4 | 48 | 2 | 24 |
| 23 | 7 | 161 | 3 | 69 | 11 | 0 | 0 | 4 | 44 |
| 22 | 7 | 154 | 7 | 154 | 10 | 2 | 20 | 0 | 0 |
| 21 | 5 | 105 | 2 | 42 | 9 | 3 | 9 | 2 | 18 |
| 20 | 5 | 100 | 5 | 100 | 8 | 1 | 8 | 0 | 0 |
| 19 | 6 | 114 | 12 | 228 | | | | | |

[a] $N = 88$; Mean = 19.18

[b] $N = 74$; Mean = 19.27

Table 2

Analysis of Variance of Gross Words Per Minute Between Experimental and Control Groups

| Source | Sum of Squares | df | Mean Squares | F* |
|---|---|---|---|---|
| Between | .3144 | 1 | .3144 | .0103 |
| Within | 4855.6855 | 160 | 30.3480 | |
| Total | 4856.0000 | 161 | | |

*Not significant at the .05 level.

with one degree of freedom, showed a mean square of .3144, while the sum of squares was also .3144. The mean squares for the within group variance was 30.3480 with one hundred sixty degrees of freedom. The sum of squares for the within groups variance was 4855.6855. The sum of squares for total variance was 4856 with one hundred sixty-one degrees of freedom.

An F-ratio of .0103 was smaller than the table value of 3.84 ($F$ .0103 $<$ 3.84) at the .05 level of significance. Since the obtained F-value of .0103 did not fall within the critical region, the null hypothesis was retained.

Analysis of Mean Errors

The number of errors made on the timed writings was used to compare accuracy of the experimental and the control groups. The data were analyzed from the group tally sheets. Table 3 summarized the results of the tests for the two groups.

The errors made by the experimental group had an obtained mean score of 4.39 ($\bar{X}_1$ = 4.39), while a mean score of 4.64 was calculated for the control group ($\bar{X}_2$ = 4.64).

Analysis of Variance

The results of the analysis of variance for the mean errors of both groups were illustrated in Table 4. The between groups variance, with one degree of freedom, showed a mean square of 27.3563, while the sum of squares was also 27.3563. The mean squares for the within group variance was 11.3071 with one hundred sixty degrees of freedom. The sum of squares for the within groups variance was 1809.1436. The sum of squares for total variance was 1836.5000 with one hundred sixty-one degrees of freedom.

Table 3

Errors Made on Timed Writings by the Experimental and Control Typewriting Groups at Oregon Trail Junior High School, Olathe, Kansas 1978-79 School Year

| | Experimental[a] | | Control[b] | |
|---|---|---|---|---|
| Score (X) | f | fX | f | fX |
| 0 | 8 | 0 | 4 | 0 |
| 1 | 10 | 10 | 7 | 7 |
| 2 | 11 | 22 | 9 | 18 |
| 3 | 11 | 33 | 17 | 51 |
| 4 | 13 | 52 | 6 | 24 |
| 5 | 7 | 35 | 6 | 30 |
| 6 | 8 | 48 | 4 | 24 |
| 7 | 5 | 35 | 7 | 49 |
| 8 | 7 | 56 | 7 | 56 |
| 9 | 0 | 0 | 1 | 9 |
| 10 | 3 | 30 | 1 | 10 |
| 11 | 3 | 33 | 2 | 22 |
| 12 | 0 | 0 | 1 | 12 |
| 13 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 1 | 15 |
| 16 | 2 | 32 | 1 | 16 |

[a] N = 88; Mean = 4.39
[b] N = 74; Mean = 4.64

Table 4

Analysis of Variance of Errors Made by the Experimental and Control Groups

| Source | Sum of Squares | df | Mean Squares | F* |
|---|---|---|---|---|
| Between | 27.3563 | 1 | 27.3563 | 2.4193 |
| Within | 1809.1436 | 160 | 11.3071 | |
| Total | 1836.5000 | 161 | | |

*Not significant at the .05 level.

The obtained F-ratio of 2.4193 was smaller than the table value of 3.84 ($F\ 2.4193 < 3.84$) at the .05 level of significance. Since the obtained F-value of 2.4193 did not fall within the critical region, the null hypothesis was retained.

## Summary

The statistical results of this experiment clearly indicate that there was no significant difference in mean gross words per minute between the experimental and control group.

Table 4 showed that no significant difference existed in mean number of errors for the two groups.

While an analysis of the data failed to reveal that there was a significant difference in speed and accuracy between the two methods of keyboard presentation, there were some observational advantages that justify the using of tapes in the typewriting classes.

The researcher observed that students enjoyed a change in classroom routine and that taped instruction would be a satisfactory complement to traditional instruction. Use of professionally prepared tapes insured uniformity of instruction in all classes. Tapes were ideal for days when the teacher was absent.

Observation revealed that tapes and recordings relieved the teacher of voice fatiguing drills and dictation.

The typewriting tapes provided excellent technique cues that reinforced proper typewriting techniques. Also, the students could not waste time and therefore, got maximum directed practice.

# Chapter 4

## SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This study was conducted to compare two methods of keyboard presentation to seventh grade personal typewriting students: traditional teaching method versus taped instruction method. The method of research used was experimental.

### Summary

During the 1978-79 school year, eight seventh grade personal typewriting classes from Oregon Trail Junior High School in Olathe, Kansas, were used in an experimental study to provide evidence as to the effectiveness of tapes. Four classes of the experimental group (a total of 88 students), received taped instruction, and four classes of the control group, (a total of 74 students), received the traditional method of instruction. The same teacher taught both groups.

At the conclusion of the introduction to the keyboard, three, three-minute timed writings were given to the four experimental groups and the four control groups. The difference in the gross words a minute and number of errors made computed F values that were not enough to be significant at the .05 level of significance for the groups.

The findings of the study revealed the following facts:

1. There was no significant difference in mean gross words per minute on three-minute timed writings of the experimental group when compared with the control group.

2. There was no significant difference in mean number of typewriting errors made on three-minute timed writings of the experimental group when compared with the control group.

## Conclusions

Analysis of the data indicated there was no significant difference in mean gross words a minute and mean errors made on three-minute timed writings between students receiving taped instruction and students receiving traditional teaching method of keyboard presentation. However, the researcher found several advantages that justify the use of tapes in presenting the keyboard to seventh grade junior high school students.

1. The teacher was able to observe the students more carefully.

2. The teacher was free to assist the individual student without detaining the rest of the class.

3. Technique cues and reminders encouraged proper typewriting habits and techniques.

4. The instruction was presented on the tapes only once; therefore, the students learned to listen more carefully.

5. Students absent were able to make up their lessons without interfering with other class members.

6. The tapes reduced discipline problems.

7. The tapes were uninterruptable; therefore, the students got maximum directed practice.

8. The tapes provided better-prepared lessons.

9. The tapes relieved the teacher from constant dictation.

The researcher noted several disadvantages in using the tapes:

1. The slower students became frustrated and discouraged due to the high rate of dictation on the tapes.

2. The faster students were held back on the more advanced lessons due to the slow rate of dictation on the tapes.

3. Students became bored with the same speaker's voice.

4. Students in the back of the room had a problem understanding the speaker.

## Recommendations

1. In teaching typewriting to supplement the traditional method of instruction, it is recommended that the teacher should use tapes and other innovative teaching devices.

2. Further studies on the use of tapes in the typewriting classroom should be done on the senior high school level.

3. It is recommended that tapes should be used to assist, but not replace, the teacher.

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# BIBLIOGRAPHY

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# APPENDIX A

## OUTLINE OF TAPE CONTENTS

# OUTLINE OF TAPE CONTENTS

## Lesson 1



## Lesson 2



## Lesson 3



## Lesson 4



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**The asterisk under the textbook page column indicates instruction which is on the tape but is not correlated with material in the textbook.

OUTLINE OF TAPE CONTENTS
(contd.)

Lesson 5



Lesson 6



Lesson 7



Lesson 8



Lesson 9

OUTLINE OF TAPE CONTENTS
(contd.)

Lesson 10

| Skills Taught | Textbook Page |
|---|---|
| Keyboard Review | 18 |
| Location of x and p | 18 |
| Location Drills for x and p | 19 |
| Reinforcement Exercises | 19 |
| Paragraph Typing | 19 |

Lesson 11

| | |
|---|---|
| Keyboard Review | 20 |
| Location of w and m | 20 |
| Location Drills for w and m | 20 |
| Reinforcement Exercises | 21 |
| Sentence Typing (1-minute writings) | 21 |

Lesson 12

| | |
|---|---|
| Keyboard Review | 22 |
| Location of q and Comma | 22 |
| Location Drills on q and Comma | 22 |
| Reinforcement Exercises (emphasis on "eyes on copy") | 23 |
| Paragraph Typing (1-minute writings) | 23 |

Lesson 13

| | |
|---|---|
| Keyboard Review | 23 |
| Location of z and Question Mark | 24 |
| (completes introduction of alphabetic reaches) | 24 |
| Location Drills for z and Question Mark | 24 |
| Reinforcement Exercises | 24 |
| Sentence Typing (1-minute writings) | 24 |

Lesson 14

| | |
|---|---|
| Keyboard Review | 25 |
| Typing Whole Words | 25 |
| Proofreading Instructions | 26 |
| Paragraph Typing | 26 |
| Typing Letters of the Alphabet | ** |

# OUTLINE OF TAPE CONTENTS
(contd.)

## Lesson 15

| Skills Taught | Textbook Page |
|---|---|
| Keyboard Review | 27 |
| Typing Whole Words | 27 |
| Typing Sentences (1-minute writings) | 27 |
| Paragraph Typing (1-minute writings) | 27 |

## Lesson 16

| | |
|---|---|
| Keyboard Review | 28 |
| Setting the Ribbon Control | 28 |
| Typing Letters of the Alphabet to Rhythmical Patterns | ** |
| Typing Whole Words | 28 |
| Sentence Guided Writings | 28 |

## Lesson 17

| | |
|---|---|
| Keyboard Review | 29 |
| Typing Letters of the Alphabet to Rhythmical Patterns | ** |
| Sentence Guided Writings | 30 |
| Paragraph Typing (1-minute writings) | 30 |
| Centering Paragraph Copy | 30 |

## Lesson 18

| | |
|---|---|
| Keyboard Review | 31 |
| Typing Letters of the Alphabet to Rhythmical Patterns | ** |
| Typing Whole Words | 31 |
| Paragraph Typing (1- and 2-minute writings) | 31-32 |
| Centering Paragraph Copy | 31-32 |

## Lesson 19

| | |
|---|---|
| Keyboard Review | 32 |
| Typing Letters of the Alphabet to Rhythmical Patterns | ** |
| Typing One-Hand Words | 32 |
| Sentence Guided Writings | 32 |
| Paragraph Typing (1- and 3-minute writings) | 33 |

OUTLINE OF TAPE CONTENTS
(contd.)

Lesson 20

| Skills Taught | Textbook Page |
|---|---|
| Keyboard Review | 33 |
| Typing Phrases | 33 |
| Sentence Guided Writings | 34 |
| Paragraph Typing (1- and 3-Minute Writings) | 34 |

Lesson 21

| | |
|---|---|
| Keyboard Review | 35 |
| Location Reaches to the 1, 3, and 7 | 35 |
| Number Location Drills (3 and 7) | 36 |
| Phrase Dictation | 36 |

Lesson 22

| | |
|---|---|
| Keyboard Review | 37 |
| Shift of the 3 and 7 (# and &) | 37 |
| Location Reaches to the 5 and 9 | 37 |
| Number Location Drills ( 5 and 9) | 37 |

Lesson 23

| | |
|---|---|
| Number Series of 13579 | ** |
| Keyboard Review | 38 |
| Shift of 5 and 9 (% and left parenthesis) | 38 |
| Location Reaches to the 4 and 8 | 39 |
| Number Location Drills (4 and 8) | 39 |
| Typing Sentences (word, letter-by-letter, and combination levels) | 39 |

Lesson 24

| | |
|---|---|
| Keyboard Review | 40 |
| Shift of 4 and 8 ($ and apostrophe) | 40 |
| Location of Apostrophe on Electric | xiii |
| Sentence Skill Builder using Numbers and Symbols | 40 |
| Typing a Script Paragraph | 40 |

OUTLINE OF TAPE CONTENTS
(contd.)

Lesson 24
(contd.)

| Skills Taught | Textbook Page |
|---|---|
| Script Paragraph Typing (1-minute writings) | 40 |
| Paragraph Typing (goal of no more than 2 errors per paragraph) | 41 |

Lesson 25

| | |
|---|---|
| Keyboard Review | 41 |
| Dictation of Phrases (flowing rhythm) | 41 |
| Location of Reaches to 2 and 0 | 42 |
| Location Drills (2 and 0) | 42 |
| Sentence Guided Writings | 42 |

Lesson 26

| | |
|---|---|
| Keyboard Review | 43 |
| Shift of 2 and 0 (" and right parenthesis) | 43 |
| Location of " on an Electric Typewriter | xii |
| Location of Reaches to 6 and Hyphen | 43 |
| Location Drills (6 and Hyphen) | 43 |
| Sentence Guided Writings | 44 |
| Paragraph Typing (1-minute timings with new goals | 44 |

Lesson 27

| | |
|---|---|
| Keyboard Review | 44 |
| Introduction to the Backspace Key | 45 |
| Location of Underline and Asterisk | 45 |
| Location of Underline and Asterisk (Electric Typewriter | xiii |
| Location Drills for Underline and Asterisk | 45, xiii |
| Sentence Typing | 45 |
| Sentence Typing (1-minute writings) | 45 |
| Paragraph Typing (1-minute writings with new goals) | 45-46 |

OUTLINE OF TAPE CONTENTS
(contd.)

Lesson 28

| Skills Taught | Textbook Page |
|---|---|
| Keyboard Review | 46 |
| Location of ¢ (manual and electric typewriters) and ½ | 46, xiii |
| Location Drills for ¢ and ½ | 47, xiii |
| Dictation of Numbers and Symbols | 47 |
| Paragraph Typing on Numbers and Symbols | 47 |
| Paragraph Guided Writings (1-minute timings with new goals | 47 |

Lesson 29

| | |
|---|---|
| Keyboard Review | 48 |
| Location of @ (manual and electric typewriters) and ¼ | 48, xiii |
| Location of / and Colon | 48 |
| Dictation of Phrases | 48 |
| Sentence Typing (1-minute writings) | 49 |

Lesson 30

| | |
|---|---|
| Keyboard Review | 49 |
| Location of the Exclamation | 49, xiii |
| Location of the Point and Dash | 49, xiii |
| Complete Review of Numbers and Symbols | 50 |
| Paragraph Typing (1- and 2-minute writings with goals | 50 |

# APPENDIX B

## GROUP TALLY SHEETS

CONTROL GROUP TALLY SHEET

Second Hour-First Quarter

| Student Number | Gross Words Per Minute | Errors |
|---|---|---|
| 1. | 27 | 15 |
| 2. | 24 | 16 |
| 3. | 24 | 8 |
| 4. | 22 | 2 |
| 5. | 20 | 3 |
| 6. | 19 | 7 |
| 7. | 19 | 3 |
| 8. | 19 | 2 |
| 9. | 19 | 3 |
| 10. | 19 | 9 |
| 11. | 19 | 11 |
| 12. | 16 | 2 |
| 13. | 15 | 3 |
| 14. | 15 | 3 |
| 15. | 15 | 6 |
| 16. | 14 | 2 |
| 17. | 13 | 4 |
| 18. | 11 | 4 |

EXPERIMENTAL GROUP TALLY SHEET

Seventh Hour-First Quarter

| Student Number | Gross Words Per Minute | Errors |
|---|---|---|
| 1. | 30 | 16 |
| 2. | 30 | 16 |
| 3. | 26 | 11 |
| 4. | 26 | 6 |
| 5. | 24 | 11 |
| 6. | 23 | 2 |
| 7. | 23 | 7 |
| 8. | 22 | 2 |
| 9. | 21 | 2 |
| 10. | 21 | 4 |
| 11. | 20 | 11 |
| 12. | 17 | 1 |
| 13. | 17 | 4 |
| 14. | 17 | 2 |
| 15. | 16 | 1 |
| 16. | 16 | 1 |
| 17. | 13 | 1 |
| 18. | 13 | 3 |
| 19. | 13 | 2 |

EXPERIMENTAL GROUP TALLY SHEET

Second Hour-Second Quarter

| Student Number | Gross Words Per Minute | Errors |
|---|---|---|
| 1. | 30 | 6 |
| 2. | 30 | 5 |
| 3. | 27 | 6 |
| 4. | 26 | 8 |
| 5. | 26 | 8 |
| 6. | 23 | 6 |
| 7. | 22 | 5 |
| 8. | 22 | 2 |
| 9. | 22 | 4 |
| 10. | 22 | 4 |
| 11. | 22 | 4 |
| 12. | 21 | 4 |
| 13. | 21 | 8 |
| 14. | 20 | 4 |
| 15. | 19 | 6 |
| 16. | 19 | 6 |
| 17. | 19 | 1 |
| 18. | 18 | 1 |
| 19. | 18 | 10 |
| 20. | 18 | 1 |
| 21. | 16 | 5 |
| 22. | 16 | 1 |
| 23. | 15 | 3 |
| 24. | 14 | 0 |
| 25. | 14 | 0 |

CONTROL GROUP TALLY SHEET

Seventh Hour-Seventh Quarter

| Student Number | Gross Words Per Minute | Errors |
|---|---|---|
| 1. | 28 | 2 |
| 2. | 23 | 4 |
| 3. | 23 | 5 |
| 4. | 22 | 1 |
| 5. | 22 | 8 |
| 6. | 20 | 2 |
| 7. | 20 | 3 |
| 8. | 19 | 5 |
| 9. | 17 | 6 |
| 10. | 17 | 11 |
| 11. | 15 | 3 |
| 12. | 15 | 1 |
| 13. | 15 | 0 |
| 14. | 12 | 2 |

CONTROL GROUP TALLY SHEET

Second Hour-Third Quarter

| Student Number | Gross Words Per Minute | Errors |
|---|---|---|
| 1. | 30 | 2 |
| 2. | 30 | 10 |
| 3. | 25 | 7 |
| 4. | 22 | 5 |
| 5. | 22 | 3 |
| 6. | 22 | 4 |
| 7. | 21 | 3 |
| 8. | 21 | 5 |
| 9. | 20 | 8 |
| 10. | 20 | 3 |
| 11. | 19 | 7 |
| 12. | 19 | 3 |
| 13. | 19 | 7 |
| 14. | 19 | 3 |
| 15. | 17 | 3 |
| 16. | 17 | 3 |
| 17. | 16 | 6 |
| 18. | 16 | 8 |
| 19. | 15 | 7 |
| 20. | 13 | 4 |
| 21. | 12 | 0 |
| 22. | 11 | 1 |
| 23. | 11 | 2 |
| 24. | 11 | 3 |

EXPERIMENTAL GROUP TALLY SHEET

Seventh Hour-Third Quarter

| Student Number | Gross Words Per Minute | Errors |
|---|---|---|
| 1. | 30 | 10 |
| 2. | 29 | 8 |
| 3. | 26 | 2 |
| 4. | 24 | 0 |
| 5. | 23 | 7 |
| 6. | 23 | 3 |
| 7. | 22 | 8 |
| 8. | 21 | 7 |
| 9. | 20 | 3 |
| 10. | 20 | 3 |
| 11. | 20 | 7 |
| 12. | 19 | 5 |
| 13. | 19 | 4 |
| 14. | 18 | 4 |
| 15. | 17 | 3 |
| 16. | 16 | 2 |
| 17. | 16 | 0 |
| 18. | 14 | 4 |
| 19. | 13 | 3 |
| 20. | 12 | 1 |
| 21. | 9 | 2 |

EXPERIMENTAL GROUP TALLY SHEET

Second Hour-Fourth Quarter

| Student Number | Gross Words Per Minute | Errors |
|---|---|---|
| 1. | 27 | 8 |
| 2. | 27 | 5 |
| 3. | 26 | 8 |
| 4. | 25 | 10 |
| 5. | 23 | 0 |
| 6. | 23 | 10 |
| 7. | 19 | 5 |
| 8. | 17 | 0 |
| 9. | 16 | 2 |
| 10. | 15 | 5 |
| 11. | 15 | 3 |
| 12. | 15 | 0 |
| 13. | 14 | 3 |
| 14. | 13 | 7 |
| 15. | 13 | 1 |
| 16. | 13 | 4 |
| 17. | 12 | 4 |
| 18. | 12 | 1 |
| 19. | 10 | 3 |
| 20. | 10 | 6 |
| 21. | 9 | 0 |
| 22. | 9 | 2 |
| 23. | 8 | 3 |

CONTROL GROUP TALLY SHEET

Seventh Hour-Fourth Quarter

| Student Number | Gross Words Per Minute | Errors |
|---|---|---|
| 1. | 30 | 8 |
| 2. | 29 | 1 |
| 3. | 28 | 7 |
| 4. | 28 | 7 |
| 5. | 27 | 8 |
| 6. | 26 | 1 |
| 7. | 25 | 3 |
| 8. | 24 | 5 |
| 9. | 23 | 8 |
| 10. | 22 | 1 |
| 11. | 19 | 6 |
| 12. | 16 | 3 |
| 13. | 16 | 2 |
| 14. | 15 | 5 |
| 15. | 13 | 0 |
| 16. | 13 | 4 |
| 17. | 9 | 0 |
| 18. | 9 | 1 |