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A STUDY TO DETERMINE IF OFFICE PERSONNEL EMPLOYEES AT MONTANA STATE UNIVERSITY MEET THE MINIMUM TYPING REQUIREMENTS SET FORTH BY THE JOB ACCORDING TO ITS TITLE AND DESCRIPTION

by

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ABSTRACT

The first purpose of this study was to determine if the minimum standard of typing ability was being met or exceeded by office personnel at Montana State University. The second purpose of this study was to determine if office personnel employees received hourly, monthly, and yearly salaries which were less than, the same as, or more than salaries received by office employees with similar job titles who worked for the federal government under civil service.

Thirty-three office personnel employees at Montana State University were selected at random from five different job title categories. Each employee was given a five-minute straight-copy typing test identical to that used by the civil service. The tests were scored for gross words per minute, net words per minute, and number of errors made. A comparison of these scores was made against established norms for speed and accuracy and also against the defined requirements of competency for each job title.

The test results indicated that typists with lower competency requirements performed at a lower level than typists with higher competency requirements. However, within any single job level area there was a wide variation of speed and accuracy displayed. The test further revealed a larger number of typists who did not meet the minimum net words per minute required for their job. A comparison of typists' gross words per minute scores with established norms showed that almost three-fourths of the typists ranked in the upper 50th percentile for accuracy. Typists with higher job titles, such as Secretary I, II, and III, ranked most often in the upper 50th percentile in speed and accuracy, and a larger number of typists with lower requirement job titles of Clerk-Typist I and II ranked in the lower 50th percentile. Salary comparisons revealed that at all levels civil service employees earned a higher salary and received better increases in pay with experience and promotion.

Conclusions were based upon typing skill comparisons with requirements of job title and salaries paid to Montana State University office personnel and civil service clerical employees. The main conclusions drawn are: (1) higher job level office personnel showed more competency in each case than the job levels below them; (2) the general level of competency for those tested was less than that set forth in each job title area; (3) accuracy seemed to be more of a problem for the typists than speed; (4) there was a tendency to rank high in speed and low in accuracy or high in accuracy and low in speed, with some exceptions; and (5) test participants compared quite favorably over-all with established norms both in speed and accuracy, with a less favorable comparison in accuracy; and (6) civil service workers received a higher salary and advanced faster and farther than did MSU office personnel employees.

CHAPTER I

INTRODUCTION

Typing tests are among the most widely used of psychological tests. In the proficiency testing area, typing ranks close to the top in volumn of testing. Public employment service offices, large companies, associations, such as the National Business Education Association, and State Merit Systems administer thousands of typing tests to prospective office employees each year. (3:34)

Typing skill is one of the valuable skills which can be measured to determine the capability of a prospective office worker. If the measurement of typing ability is to be valid, there must be a basis for selection of testing material. Too often, variables such as syllable intensity of testing material and speed and accuracy requirements are not established. This results in a vague and subjective evaluation of a prospective office employee's typing ability. It is important that a test result be reliable, based on extensive testing of test validity.

Typewriting is a skill; therefore, emphasis is on doing rather than on knowing. The most satisfactory test for typists is the performance test. (10:352) Droege makes the following statement:

> There are many different straight copy typing tests in current use. They vary in length, type of material in the test, time limit and format. However, there is evidence that, within broad limits, these differences are not associated with substantial differences in test scores. (3:34)

Droege's conclusions were based on an unpublished study of 200 Iowa State Employment Service applicants. In this study, means and standard deviations of words per minute, scores and error scores were about the same for five and ten-minute administrations of two forms of the U. S. Employment Service typing tests. Another unpublished comprehensive study, conducted by the U. S. Employment Service on 483 cases, investigated the effects of differences in test length, type of test material, time limit, and format on test scores. The findings of this study indicated that none of these differences in the tests had an appreciable effect on distribution of words per minute or error scores. (3:34)

Statement of the Problem:

The first purpose of this study was to determine if the minimum standard of typing ability is being met or exceeded by office personnel at Montana State University. This was accomplished through the testing of a random selection of employees by job title.

The second purpose of this study was to determine if office personnel employees at Montana State University received hourly, monthly, and yearly salaries which are less than, the same as, or exceed salaries received by office employees with similar job titles who worked for the federal government under civil service. This was accomplished through collecting hourly, monthly, and yearly salary schedules from Montana State University office employees and civil service office employees.

Need for the Study:

This study was important because at the time it was done the Montana State University Personnel Department did not have a standard test battery to give to prospective office employees. It was the intent of this study to prepare and validate a standardized typing test which would become a part of the total test battery. The study also determined if a number of Montana State University Personnel employees, selected at random by job title, met the minimum typing skill requirements set forth by the title and description of their job.

From this study the writer answered the following questions:

1. Do office employees in the Montana State University Personnel Department meet the minimum speed and accuracy requirements of typing ability set forth by the title of their job?
2. Are the results of the tests administered to a selected number of Montana State University office personnel employees consistent with established norms?
3. Do office employees in the Montana State University Personnel Department earn an hourly, monthly, and yearly salary comparable to federal government civil service employees?

Limitations of the Study:

The limitations of this study were:

1. The study tested only typing ability and test validity.

2. Only 33 Montana State University office personnel employees were tested. They were selected at random according to job title with an equal number of employees tested under each of the five job classifications.
3. All employees tested used electric typewriters.

Definition of Terms:

To insure clarity for the reader, certain items are defined by the writer.

1. Clerk Typist I - Displaying sufficient skill in typing to type at a rate of 40 net words per minute for five minutes.
2. Clerk Typist II - Displaying sufficient skill in typing to type at a rate of 50 net words per minute for five minutes.
3. Gross words per minute - The total number of words typed each minute, not counting any rate penalty for typing errors.
4. Net words per minute - The total number of words typed each minute less a deduction of so many words per error, or a limit on the number of errors allowed.
5. Five-minute writing - Straight copy typing exactly as shown for a period of five minutes.
6. Straight copy - Copy of average word difficulty based on a syllable intensity of 1.4.

7. Secretary I - Displaying sufficient skill in typing to type at a rate of 60 net words a minute.
8. Secretary II - Displaying a sufficient skill in typing to type at a rate of 60 net words per minute.
9. Secretary III - Displaying a sufficient skill in typing to type at a rate of 60 net words per minute.
10. Production typing - Typing which results in a variety of finished products which is typical of typing done on the job.
11. Syllable intensity - Average number of syllables per word.

CHAPTER II

REVIEW OF LITERATURE

Test sources were reviewed for findings concerning speed and accuracy requirements. There was also an effort to find results concerning the validity and reliability of each test. These are reported where information is available.

State of Montana Merit System Council:

The State of Montana Merit System Council has developed a performance test to measure prospective employees' qualifications as typists. The test is administered to persons seeking employment positions as Clerk-Typist I, Clerk-Typist II, Clerk-Stenographer I, Clerk-Stenographer II, Secretary I, Clinic Secretary, and Clerk-Interviewer.

The typing test consists of one article from which the testee will make as many copies as he or she can in six minutes. All testees are given a four-minute writing for warm-up in which they type the instructions for the typing test. Applicants for Clerk-Typist I and Clerk-Stenographer I positions must type 40 words a minute in order to pass, and applicants for Clerk-Typist II and Clerk-Stenographer II positions must type 50 words a minute. Three errors are allowed at the minimum passing point for each position. The Secretary I and II positions require five and two years of experience, respectively, and the ability to type a minimum of 50 words a minute.

This test has not been validated or tested for reliability through repetition and follow-up studies. The syllable intensity of the paragraph typed has not been determined for purposes of positively establishing the ease or difficulty of the material being typed. (12)

U. S. Civil Service Test:

The U. S. Civil Service has developed a performance typing test to measure a prospective employee's typing ability. In the test the applicant meets a single task, that of copying material exactly as it is presented. He must demonstrate how rapidly he can do so and with what accuracy. This test is administered to persons seeking government employment positions. The job titles are Clerk-Typists and Clerk-Stenographers. The Clerk-Typists may have a GS rating from two to four, and the Clerk-Stenographers may have a GS rating from three to five. The only effect which the typing test has on an applicant's GS rating is the area of typing accuracy. Regardless of rating, all applicants must type at a minimum rate of 40 words a minute. Following is a chart showing the maximum number of errors permitted according to job title and GS rating. (5:29)

Table 1

Maximum Number of Errors Permitted on 5-Minute Tests
At Various Speeds for Typing Scores Required
For Typist and Stenographer Positions

SPEED	MAXIMUM NUMBER OF ERRORS PERMITTED		
Gross Words Per Minute	GS-2 Clerk-Typist GS-3 Clerk-Stenographer	GS-3 Clerk-Typist GS-4 Clerk-Stenographer	GS-4 Clerk-Typist GS-5 Clerk-Stenographer
Under 40	Ineligible	Ineligible	Ineligible
40	3	3	2
41-42	4	4	2
43-44	5	4	2
45-47	6	5	3
48-49	6	5	3
50-52	7	6	4
53-54	7	6	4
55-56	8	7	5
57-59	8	7	5
60-61	9	8	6
62-64	9	8	7
65-66	10	9	7
67-68	10	9	8
69-71	11	10	8
72-73	11	10	9
74-76	12	11	10
77-78	12	11	10
79-80	12	12	10

(5:34)

A study was conducted in the early 1960's to establish the validity and reliability of typing tests given to prospective government employees. One was by Robert C. Droege, Research Psychologist for the

United States Employment Service. The other was done by the United States Employment Service in cooperation with Ohio and Washington State Employment Services.

Droege stated that typing skill qualifications are usually evaluated in terms of speed of typing, which is measured by the number of words per minute typed on a test, and accuracy of typing, which is measured by the number of errors typed on the test. From previous research he concluded that even though there are many straight copy typing tests in current use, which tests vary in length and type of material used, these differences do not result in substantial differences in test scores. The purpose of his study, therefore, was to establish adequate national norms for use in interpreting test scores.

In Droege's study, he used only employed workers who were required to use a typewriter an average of at least one hour per day. He administered one of the recently developed USES typing tests. The time limit was five minutes. He tested a total of 2,659 individuals, 1320 on electric typewriters and 1339 on manual typewriters. The testing was done in 1960 and 1961. Elimination of cases was done to achieve percentage distributions of age, education, sex, and industry in the norm samples as close as possible to those for the population of employed typists, stenographers, and secretaries. The final samples consisted of 881 tested on electric typewriters and 881 on manual typewriters. The tables shown below indicate the findings in terms of distribution of

words per minute scores, distribution of error scores, and percentile norms for words per minute and error scores. The findings indicate that separate norms are needed for manual and electric typewriters. (3:34)

Table 2

Distribution of Words per Minute Scores

Words Per Minute	Frequency		Percent	
	Manual	Electric	Manual	Electric
120-124	-	1		.1
115-119	-	-		
110-114	-	-		
105-109	-	1		.1
100-104	-	1		.1
95- 99	-	8		.9
90- 94	-	25		2.8
85- 89	7	35	.8	4.0
80- 84	11	72	1.2	8.2
75- 79	30	133	3.4	15.1
70- 74	87	137	9.9	15.6
65- 69	124	149	14.1	16.9
60- 64	166	128	18.8	14.5
55- 59	178	93	20.2	10.6
50- 54	124	50	14.1	5.7
45- 49	74	20	8.4	2.3
40- 44	42	17	4.8	1.9
35- 39	24	5	2.7	.6
30- 34	9	3	1.0	.3
25- 29	4	2	.5	.2
20- 24	1	1	.1	.1

Table 3

Distribution of Error Scores

	Frequency		Percent	
Errors	Manual	Electric	Manual	Electric
0- 2	130	93	14.8	10.6
3- 5	227	230	25.8	26.1
6- 8	196	198	22.2	22.5
9-11	126	145	14.3	16.5
12-14	82	61	9.3	6.9
15-17	49	56	5.6	6.4
18-20	36	42	4.1	4.8
21-23	16	20	1.8	2.3
24-26	4	12	.5	1.4
27-29	7	7	.8	.8
30-32	2	8	.2	.9
33-35	3	1	.3	.1
36-38	-	2	-	.2
39-41	1	1	.1	.1
42-44	2	2	.2	.2
45-47	-	1	-	.1
48+	-	2	-	.2

Table 4

Percentile Norms for Words per Minute and Error Scores

	Words per Minute		Errors	
Percentile	Manual	Electric	Manual	Electric
99	82	94	0	1
95	74	87	2	2
90	71	82	2	3
85	69	80	3	4
80	67	78	4	4
75	65	76	4	5
70	64	74	5	5
65	63	73	5	6
60	61	71	6	6
55	60	70	6	7
50	59	68	7	8
45	57	67	8	8
40	56	65	9	9
35	55	64	9	10
30	54	62	10	11
25	52	60	12	12
20	50	58	13	14
15	48	56	14	16
10	45	53	17	19
5	40	48	20	22
1	32	38	29	33

National Business Entrance Tests:

An investigation of the validity, reliability, and available norms in typing for the National Business Entrance Test Series No. 19-50 was conducted. It was found that the test covers common office jobs such as typing letters, filling out forms, setting up statistical material, addressing envelopes, typing from rough drafts, and straight copy typing

for speed and accuracy. The tests are designed to be given by the typing instructor at the end of each semester over a two-year period; therefore, there are four tests available. However, a test may be given to a prospective employee or may be used for employee promotional purposes.

The method of scoring the tests is based on a point system, with points earned on each part. The maximum number of points which a testee could earn is only limited by his ability. Students are ranked by a percentile ranking system based on and compared with other testees. A chart for determining error penalty resulting in net words a minute is provided for the five-minute writing part. The net words per minute typed represents the number of points earned on that part of the test. If a student receives more than 20 errors he will not receive any points on the writing. He will also receive no points if his gross words per minute are less than eleven.

A percentile chart which will make it possible for the testee to be ranked is provided. The portion of the chart which deals with the typewriting test is shown in Table 5.

A study was conducted by Natale at Columbia University in 1963. This study was done on Test Series No. 18-46. One hundred high school seniors were tested and then retested ten days later on the same form of the tests. The scores received on the two identical tests were compared. The sample used for determining the validity of the typewriting

Table 5

National Business Entrance Tests Series #19-50
Percentile Table for Participating High Schools and Colleges
United States and Dominion of Canada

PERCENTILE	TYPEWRITING	
	Sec.	Col.
99	270	284
90	244	266
80	230	260
75	224	256
70	218	250
60	208	244
50	194	238
40	182	226
30	164	210
25	158	206
20	150	196
10	120	176
Passing Score	170	170
Percent Passed	67	91
Top Score	285	291
Tests Taken	2764	428

Total skills tests - Secondary: 7875; College: 1278; Total: 9153.

test consisted of 94 typists who had taken the National Business Entrance Test while high school seniors (1958-1959). The test scores achieved by these examinees were compared with the proficiency rating scale scores provided by the employers of the examinees.

It was found that the reliability coefficient for the typewriting test was .86, which is high. This would indicate that the test is measuring consistently; however, it was recommended that other measures of reliability be determined. The validity coefficient for the typewriting test was found to be .68. This would indicate that the test does have some predictive validity in measuring the typing skills needed by beginning workers. It was recommended that other measures of validity be determined, and recommendations were made for improved use of the tests. (7:1887)

The most current information from the Mental Measurements Yearbook, edited by Oscar K. Buros, indicates that no acceptable norms have been established for the National Business Entrance Test in typewriting. (2)

Typing Tests for Business:

Typing tests for business are designed to be given to applicants for typing positions. The test provides six scores, straight copy five-minute writings, a letter, revised manuscript, numbers, and tables. Mary T. Harrison's review of this test in Mental Measurements Yearbook indicated that the difficulty level of the material is average (1.4

syllabic intensity) for the units on Letters and Straight Copy. The revised manuscript is somewhat more difficult, with a syllabic intensity of 1.6. It was the reviewer's opinion that this seemed appropriate.

The Instruction Manual contains all information needed to score each unit of the test accurately and consistently. The reliability coefficients are based on correlations between first and second testings regardless of form. The coefficients, based on an N of 125, range from .67 for Tables to .81 for Speed and Letters. The standard error of measurement for Letters, Revised Manuscript, and Tables could be considered somewhat larger than is desirable, but these are the units on which a person might expect learning to be reflected on the retest score. The only validity claimed is face validity. The difficulty of the tasks presented appears appropriate for the time allowance.

Three norm tables are provided for this test. They are student and trainees, applicant population, and employed population. Gross words per minute on the straight copy units are reported in percentiles. Accuracy scores are reported in quartiles. The writer states, "This procedure seems less valuable than reporting net typing scores in percentile form." For example, a testee who types 65 words per minute with nine errors, nets 56 words per minute and is ranked in the 90th percentile. A testee who types 56 words per minute with no errors is 50th percentile. The question, therefore, that may arise is which typist is the most efficient. (2:1007)

Typing Tests Provided by Southwestern Publishing Co. to Accompany Century 21 Typewriting:

Typewriting textbook companies provide standardized tests to accompany their text books. These tests are designed to be used by instructors in evaluating the level of skill and competency of students at various points in their learning process. The content and scoring methods of two tests will be reviewed here - Achievement Test Number Six to be given at the completion of the second semester, and Achievement Test Number 12 to be given at the completion of the fourth semester.

Test Number Six consists of two parts, a five-minute straight copy writing and problem typing. In the problem typing the student works from Problem One to Problem Four for a period of 30 minutes. Problem One contains a business letter, Problem Two is an interoffice correspondence, Problem Three is a tabulation problem, and Problem Four is a manuscript with figures.

The scoring and grading of the five-minute straight copy writing is based on two separate letter grades. One grade is for speed and one grade is for accuracy. If the student typed at a speed of 49 words a minute or higher, he received an A for speed; if he typed between 44 and 48 words a minute, he received a B; between 34 and 43 was a C; and between 26 and 33 was a D. If the speed was less than 26 words a minute, the testee received an F. The accuracy grade is based on two allowable errors per minute of typing. If the error score fell between 0 and 2,

the testee earned an A, between 3 and 4 was a B, between 5 and 9 was a C, and between 10 and 14 was a D. If the number of errors was more than 14, the testee received an F.

The problems part of the test was graded on a net production rate per minute basis. The testee was required to erase and correct all errors that are made. If the student typed 22 net words a minute or higher, he received an A. If he typed between 19 and 21 net words a minute, a B was earned; between 15 and 18 words a minute was a C; and between 12 and 14 words a minute was a D. If the testee's net words a minute were less than 12, he received an F.

The Grading Scale chart for Tests Number Six and Twelve is shown below.

Table 6a

Grading Scale - Achievement Tests 6 and 12

Test No.	Lesson Nos.	Test Parts	Copy To Be Graded	Basis of Grade	Allowable Errors a Minute
6	126-150	6A	5' Straight-Copy Timed Writing	GWAM Errors	2
		6B	Problem Typing (30' timed production)	N-PRAM	Corrected
12	276-300	12C	5' Straight-Copy Timed Writing	GWAM Errors	1½
		12D	Production Typing (35' timing)	N-PRAM No. Probs.	Corrected

Table 6b

Grading Scale - Achievement Tests 6 and 12

Test No.	Test Parts	Copy To Be Graded	Grading Scale A	B	C	D
6	6A	5' Straight-Copy Timed Writing	49-up	44-48	34-43	26-33
			0-2	3-4	5-9	10-14
	6B	Problem Typing (30' timed production)	22-up	19-21	15-18	12-14
12	12C	5' Straight-Copy Timed Writing	61-up	56-60	50-55	46-49
			0-2	3-4	5-7	8-12
	12D	Production Typing (35' timing)	22-up	20-21	18-19	16-17
			4	3	2½	2

(6:S202-S203)

Test Number 12 given at the end of the fourth semester is very similar to Test Number Six. It contains two parts, a straight copy five-minute writing and production problem typing for 35 minutes.

The allowable errors per minute on the five-minute writing was one and one-half rather than two, and the speed scale was higher. The production or problem part of the test contained five problems to be typed consecutively. Problem One was a business letter, Problem Two a manuscript, Problem 3 an interoffice communication, Problem Four a purchase order, and Problem 5 a tabulation problem. The production part of this could be graded by either net production rate per minute or number of problems completed. Reference can be made to the chart above for the last number of problems completed and net production rate per minute for the appropriate grade.

The skill levels indicated on the tests specified for various letter grades are based on performance scores of students throughout the country. Since national norms represent less than the ideal in any given classroom situation, the authors recommend adjustment of these scales to meet the needs and methods of any classroom situation. (6:S202-S203)

Summary:

On the basis of available norms and the tests reviewed, the writer would recommend the use of material comparable to that used by the U. S. Civil Service Commission. The Montana Merit System Council test had no established norms, but in the opinion of the experts they had not been proven to be as valid as would be desirable. The Typing Tests for Business Series may have reliable norms available, but the writer was able to find only one critique of the tests. No samples of the test were reviewed. This could be a fairly reliable testing device. The final tests which were reviewed were not intended to be used for job entry purposes; therefore, employment level comparisons are not available. It was the intent of the writer to provide a comparison of competency required on employment tests to the competency suggested by grade assignment on classroom instruction tests.

It becomes quite difficult to compare the norms of the five tests reviewed. Some of the norms are based on percentile ratings, some on a

test which involves only a five-minute writing, while others consist of production problems as well as timed speed and accuracy writings. One test in use which was reviewed had no established validity or reliability; however, a general comparison would indicate that the general range of accuracy which a prospective employee would have to demonstrate would be in the area of three errors per minute. The required minimum speed for typists would be between 40 and 60 net words per minute. It should be noted also that research indicates the need to distinguish between scores on tests taken on electric and non-electric typewriters.

CHAPTER III

PROCEDURES

Introduction:

The study was made first to determine if the minimum standard of typing ability was met or exceeded by office personnel at Montana State University. This data was acquired through testing a random sample of office personnel employees. The employees were selected from each of the five job titles which exist.

The study was made secondly to determine if office personnel employees at Montana State University received hourly, monthly, and yearly salaries which are less than, the same as, or greater than salaries received by office employees with similar job titles who worked for the federal government under civil service.

The Procedures Chapter was organized by indicating who was tested and selected and how they were tested and selected. It indicates the method used to collect data and explains how the data was collected. It finally indicates how the gathered data was interpreted.

Population Description:

The head of the Personnel Department at Montana State University selected at random 35 office employees from each of five job areas. These job areas are Clerk-Typist I, Clerk-Typist II, Secretary I, Secretary II, and Secretary III.

Method of Collecting Data:

The data was gathered by administering a straight copy typing test to 35 office personnel employees at Montana State University. This test compared in difficulty to the typing test given by the U. S. Civil Service Commission. Each participant typed a prepared paragraph to warm up. Two five-minute writings were then administered. The writing with the greatest speed and fewest errors was scored, and the method of scoring was the same as that used on civil service typing tests.

The basic principles in charging typing errors are as follows:

Charge 1 for each --

Word or punctuation mark incorrectly typed or in which there is an erasure. (An error in spacing which follows an incorrect word or punctuation mark is not further charged.)

Series of consecutive words omitted, repeated, inserted, transposed, or erased. Charge for errors within such series, but the total charge cannot exceed the number of words.

Line or part of line typed over other material typed, typed with all capitals, or apparently typed with the fingers on the wrong keys.

Charge from the margin where most lines are begun by the applicant or from the paragraph indention most frequently used by the applicant. (3:29)

The scale for determining words per minute was provided on the test copy. The number of errors which were allowed to the completion of each line was indicated also. Net words per minute were determined by using the net words a minute chart provided with the test, which is prepared by the United Business Education Association. The chart was prepared to

be used in conjunction with Test Number Two of the National Business Entrance Tests. The net words per minute rate was used to determine the testee's typing qualifications for the particular job title held; and the gross words per minute rate, with a certain number of errors, was used to determine where each participant fell on the chart indicating the national norms of the test.

Each testee's test was numbered with a number between one and seven. Each testee color-marked their test paper to indicate the appropriate job title. This was done at the completion of the test. The following colors were used for identification:

Clerk-Typists I --- Red
Clerk-Typists II --- Blue
Secretary I --- Black
Secretary II --- Green
Secretary III --- Yellow

The salary comparison data was collected from the Personnel Department at Montana State University where hourly, monthly, and yearly salaries were shown for each of the five job titles of office employees at Montana State University. The five job titles were Clerk-Typist I, Clerk-Typist II, Secretary I, Secretary II, and Secretary III. The hourly, monthly, and yearly comparison data was collected from the U. S. Civil Service Department for office employees who had similar job descriptions to the office personnel employees at Montana State University. These job titles were GS 2, 3, 4, and 5.

Analysis of Data:

The data received was analyzed through a percent comparison. The results are shown in chart form. A comparison of established departmental minimum standards was made with actual net words per minute results. A percent comparison was made with established test norms provided by the U. S. Civil Service Commission based on studies of tests given.

A further comparison was made of hourly, monthly, and yearly salaries received by office employees at Montana State University and GS 2, 3, 4, and 5 office employees of the U. S. Civil Service.

From the results of this data, conclusions were drawn. These conclusions are based on findings which either indicate employees meet, do not meet, or exceed the minimum standards for their employment. Conclusions also were made relevant to established national norms to determine the place of validity of the test administered. Further conclusions were drawn regarding salaries of office employees at Montana State University as compared to salaries of office employees of the U. S. Civil Service.

From these conclusions, recommendations were made.

CHAPTER IV

FINDINGS OF THE STUDY

This chapter will contain the findings of the study which were gathered in three different areas. These areas were comparison of typing test scores with already established job descriptions to determine their validity, comparison of test scores with established norms from a similar test, and comparison of salaries paid to civil service clerical workers and salaries paid to office personnel employees at Montana State University.

JOB TITLE REQUIREMENT COMPARISONS WITH TEST SCORES

The five-minute straight-copy timed writing typing test given to seven Clerk-Typist I employees, six Clerk-Typist II employees, six Secretary I employees, seven Secretary II employees, and seven Secretary III employees showed the results which are indicated in the tables discussed in this chapter.

Table 7

Clerk-Typist I Test Results

Clerk-Typist I (40 Net Words a Minute)				
Test No.	Job No.	Errors	Gross Words Per Minute	Net Words Per Minute
15	1 - 1	13	77	36
19	1 - 2	5	51	36
26	1 - 3	12	64	31
18	1 - 4	18	77	30
14	1 - 5	14	55	25
24	1 - 6	12	50	25
23	1 - 7	29	65	15
Total		103	439	198
Mean		14.7	62.7	28.3

Test Results:

According to the job description for a Clerk-Typist I employee at Montana State University, the office employee should be able to type a minimum of 40 net words per minute. Of the seven Clerk-Typist I office employees who took the five-minute straight-copy timed writing test, the highest net words per minute typed was 36, and the lowest net words per minute was 15. The average net words per minute was 28.3. One typist typed 31 net words per minute, one typed 30 net words per minute, and two typed 25 net words per minute. The total net words per minute of all seven office employees was 198.

Of the seven Clerk-Typist I office employees who took the test, the highest gross words per minute typed was 77, with two typists achieving

this rate. The lowest gross words per minute rate was 50, and one received this score. One typist typed 51, one 55, one 64, and one 65 gross words per minute. The mean or average gross words per minute rate received by all seven typists was 62.7. The total gross words per minute received by all Clerk-Typist I employees was 439 words.

The fewest number of errors which any one Clerk-Typist I made was five, and one typist had this many. Two typists had 12 errors, one had 13, one had 14, one had 18, and one had 29 errors. The total number of errors made by all seven Clerk-Typist I employees was 103. The mean or average number of errors of the seven typists was 14.7.

Conclusions:

When a comparison was made between the minimum required net words per minute rate (40) required for a Clerk-Typist I and the net words per minute scores of the seven Clerk-Typist I employees who took the test, it was found that none of the typists met the minimum required rate. However, all typists exceeded forty gross words per minute, which would indicate that those taking the test all had some difficulty typing with a high degree of accuracy. From the results of the test scores it was concluded that either the minimum required proficiency of 40 net words per minute was too high, or that the typists taking the test needed to have a greater proficiency in typing. Another factor which may have contributed to the low net word per minute scores and high number of errors

was the condition under which the test was taken. Each testee was in a classroom situation typing beside other testees, which was not a typical office setting. The anxiety element of wanting to do well could have affected the typing scores, as well as the fact that the typists were not totally familiar with the machine they were using.

Table 8

Clerk-Typist II Test Results

Clerk-Typist II (50 Net Words a Minute)

Test No.	Job No.	Errors	Gross Words Per Minute	Net Words Per Minute
13	2 - 1	4	70	52
7	2 - 2	3	65	52
17	2 - 3	2	63	54
20	2 - 4	7	55	34
5	2 - 5	5	49	34
8	2 - 6	30	46	12
Total		51	348	238
Mean		8.5	58	39.8

Test Results:

According to the job description for a Clerk-Typist II employee at Montana State University, the minimum net words per minute which the office employee should be able to type was 50. Of the six Clerk-Typist II office employees who took the five-minute straight-copy timed writing test, the highest net words per minute typed was 54. One typist received a score of 54 net words per minute. Two typists received a score of 52

net words per minute; two received a score of 34 net words per minute; and one typist received a score of 12 net words per minute. The average mean net words per minute score of all six Clerk-Typist II employees was 39.8. The total net words per minute received by all six employees was 238.

The highest gross words per minute rate for Clerk-Typist II employees was 70, and the lowest was 46. One typist received a score of 70 gross words per minute, one a score of 65 gross words per minute, one a score of 63 gross words per minute, one a score of 55 gross words per minute, one a score of 49 gross words per minute, and one a score of 46 gross words per minute. The mean gross words per minute of all six Clerk-Typist II employees was 58. The total gross words per minute typed by all six employees was 348 words.

The fewest number of errors made by the six Clerk-Typist II employees was two, and the largest number of errors was 30. One typist made two errors, one three errors, one four errors, one five errors, one seven errors, and one made 30 errors. The mean number of errors made by all six employees was 8.5, and the total number of errors made by all six typists was 51.

Conclusions:

When a comparison was made between the net words per minute scores of Clerk-Typist II employees and the minimum required net words per

minute level of 50, it was found that three out of the six employees met this minimum requirement. It was concluded that the over-all level of accuracy of Clerk-Typist II employees was quite high, with the exception of one, Number 2-6. However, the net words per minute rate in no one case was more than four words above the minimum set forth by the job description. There was, therefore, reason to believe that either the minimum competency level was a little high or that the over-all level of skill of these six employees was marginal.

The condition under which the test was given was not a typical office setting, and the element of anxiety and competition was potentially very high. This could have been a meaningful factor in affecting the test results. Another factor worth mentioning was the fact that all typists were typing on machines which they were not totally familiar with.

Table 9

Secretary I Test Results

Secretary I (60 Net Words a Minute)				
Test No.	Job No.	Errors	Gross Words Per Minute	Net Words Per Minute
16	3 - 1	4	96	75
25	3 - 2	2	68	63
4	3 - 3	6	76	50
12	3 - 4	7	75	47
9	3 - 5	9	70	38
34	3 - 6	11	70	36
32	3 - 7*	0	0	0
Total		39	455	309
Mean		6.5	75.8	51.5

*Test was thrown out because she failed to type first paragraph.

Test Results:

A Secretary I employee's job description called for a minimum level of typing competency of 60 net words per minute. Seven Secretary I typists took the five-minute straight-copy timed writing test, and the highest net words per minute score was 75, and the lowest score was 36. One typist received a net words per minute score of 75, one a score of 63, one a score of 50, one a score of 47, one a score of 38, and one a score of 36. The score of typist Number 3-7 was not counted because of failure to type the first paragraph of the test writing. The mean net words per minute typed by the six Secretary I employees was 51.5, and

the total net words per minute typed by all Secretary I employees was 309.

The highest gross words per minute rate received by Secretary I typists was 96, and the lowest rate was 68. One typist received a score of 96 gross words per minute, one a score of 76, one a score of 75, two a score of 70, and one a score of 68. One test, Number 3-7, was thrown out because of failure to type the first paragraph of the test writing. The mean gross words per minute of the six Secretary I employees was 75.8, and the total gross words per minute typed by all six typists was 455.

The fewest number of errors received by the six Secretary I employees was 2, and the largest number of errors was 11. One typist made two errors, one four errors, one six errors, one seven errors, one nine errors, and one 11 errors. The mean number of errors made by all six Secretary I employees was 6.5, and the total number of errors made by all six typists was 39.

Conclusions:

Two Secretary I employees received a net words per minute score above 60 net words per minute, which was the minimum requirement according to the job description of a Secretary I. Four typists received scores which were less than 60 net words per minute. Secretary I typist Number 3-2 received the lowest gross words per minute score but had only two

errors; therefore, she was one of the two typists who received a net word per minute rate within the minimum required. From the results it could be concluded that either the majority of the Secretary I typists did not have proficiency in typing high enough to do their job well, or that the minimum required proficiency set forth by the Personnel Department at Montana State University was too high. Other factors entering into the results of this test were the setting and conditions under which the test was administered. Typists were not typing in a typical office setting, and they were competing with each other, which would naturally create a degree of anxiety and nervousness. They were also using machines which they had not typed on previously.

The over-all level of errors for Secretary I typists was not high; but due to errors, four out of the six typists were not able to meet the minimum net words per minute goal of 60. Increased proficiency in accuracy would result in an increased net words per minute score.

Table 10

Secretary II Test Results

Secretary II (60 Net Words a Minute)				
Test No.	Job No.	Errors	Gross Words Per Minute	Net Words Per Minute
21	4 - 1	3	86	70
2	4 - 2	6	83	56
1	4 - 3	9	89	56
22	4 - 4	5	75	52
11	4 - 5	8	77	46
6	4 - 6	14	65	29
29	4 - 7	6	90	63
Total		51	565	372
Mean		7.3	80.7	53

Test Results:

The job description of a Secretary II employee calls for a minimum competency level in typing of 60 net words per minute. Out of the seven Secretary II typists who took the five-minute straight-copy timed writing test, the highest net words per minute score was 70, and the lowest was 29. One Secretary II typist received a score of 70 net words per minute, one a score of 63, two a score of 56, one a score of 52, one a score of 46, and one a score of 29. The mean net words per minute score of all Secretary II typists was 53. The total net words per minute score of all seven Secretary II typists was 372.

The highest gross words per minute score received by the seven Secretary II typists was 90, and the lowest score was 65. One typist received a gross words per minute score of 90, one a score of 89, one a score of 86, one a score of 83, one a score of 77, one a score of 75, and one received a score of 65. The mean gross words per minute score was 80.7, and the total gross words per minute typed by all Secretary II typists was 565.

Secretary II typists' accuracy scores ranged from three errors to 14 errors. One typist had three errors, one had five errors, two had six errors, one had eight errors, one had nine errors, and one had 14 errors. The mean or average number of errors was 7.3, and the total errors for all seven typists was 51.

Conclusions:

Only one Secretary II typist received a net words per minute score above 60 words per minute, which was the minimum rate set forth by the Personnel Department at Montana State University for a Secretary II. All typists were able to reach a gross words per minute rate of at least 60, but the one closest to 60, Number 4-6, received the largest number of errors. It was concluded that either the minimum level of competency required for a Secretary II typist was too high, or the typists tested did not possess competency at a level high enough to perform their jobs as typists satisfactorily. Variable factors which could have entered

into the testing and might have affected the results were the group setting under which the test was given, the anxiety created because of the knowledge that a test was being taken, and the fact that the typists were not totally familiar with the machines they were using.

Table 11

Secretary III Test Results

Secretary III (60 Net Words a Minute)

Test No.	Job No.	Errors	Gross Words Per Minute	Net Words Per Minute
10	5 - 1	5	92	68
28	5 - 2	14	88	41
3	5 - 3	11	79	40
27	5 - 4	8	62	37
30	5 - 5	7	111	81
31	5 - 6	4	77	57
33	5 - 7	4	71	53
Total		53	580	377
Mean		7.6	82.9	53.9

Test Results:

In order for a Secretary III to receive a job under that title at Montana State University, he or she must be able to type at a rate of 60 net words per minute. Seven Secretary III typists took the five-minute straight-copy timed writing typing test, and the range of net words per minute scores was from 81 to 37. One Secretary III typist received a score of 81, one a score of 68, one a score of 57, one a score of 53,

one a score of 41, one a score of 40, and one a score of 37. The mean net words per minute for the seven Secretary III typists was 53.9, and the total net words per minute for all seven typists was 377 words.

The gross words per minute scores for the seven Secretary III typists ranged from 111 to 62. One typist received a gross words per minute score of 111, one a score of 92, one a score of 88, one a score of 79, one a score of 77, one a score of 71, and one a score of 62. The mean gross words per minute score for all seven Secretary III typists was 82.9, and the total gross words per minute typed by all was 580 words.

The range of errors for Secretary III typists was from four to 14. Two typists made four errors, one made five errors, one made seven errors, one made eight errors, one made 11 errors, and one made 14 errors. The average or mean number of errors was 7.6, and the total number of errors for all seven Secretary III typists was 53.

Conclusions:

Since only two of the Secretary III typists were able to meet the minimum net words per minute rate requirement of 60 net words per minute, it might be concluded that either the minimum requirement was too high, or that the Secretary III employees tested did not have a sufficient level competency in typing to hold the level of job which they had. Since all Secretary III typists were able to surpass 60 gross words per minute, it might be concluded that emotional and psychological factors, such as the

test setting in a group and the competitive situation, may have been meaningful in contributing to the high level of errors. One must further take into consideration the fact that the testees were typing on machines with which they were not totally familiar.

Table 12

Total Errors, Gross Words A Minute, Net Words A Minute, and Mean

	Errors	Gross Words Per Minute	Net Words Per Minute
Clerk Typist I	103	439	198
Clerk Typist II	51	348	238
Secretary I	39	455	309
Secretary II	51	565	372
Secretary III	53	580	377
Total	297	2387	1494
Mean	9	72.3	45.3

Table 13

Average Errors, Gross Words A Minute, Net Words A Minute, and Mean

	Average Errors	Average Gross Words Per Minute	Average Net Words Per Minute
Clerk Typist I	14.7	62.7	28.3
Clerk Typist II	8.5	58.0	39.8
Secretary I	6.5	75.8	51.5
Secretary II	7.3	80.7	53.0
Secretary III	7.6	82.9	53.9
Total	44.6	360.1	226.5
Mean	9	72.02	45.3

Summary of Findings:

Office employees at Montana State University may hold one of five different job titles, which are Clerk-Typist I, Clerk-Typist II, Secretary I, Secretary II, and Secretary III. Thirty-four office employees at Montana State University were selected at random to take a five-minute straight-copy timed writing typing test. Seven Clerk-Typist I employees, six Clerk-Typist II employees, seven Secretary I employees, seven Secretary II employees, and seven Secretary III employees were tested.

The minimum required level of skill set forth by Montana State University for each group of employees was as follows: Clerk-Typist I must type 40 net words per minute; Clerk-Typist II must type 50 net words per minute; Secretary I, Secretary II, and Secretary III must all type 60 net words per minute. The average net words per minute for all employees tested ranged as follows: Clerk-Typist I - 28.3; Clerk-Typist II - 39.8; Secretary I - 51.5; Secretary II - 53.0; and Secretary III - 53.9 net words per minute. The average net words per minute for all typists whose tests were scored was 45.3 net words per minute.

The average gross words per minute typed by all employees tested were Clerk-Typist I, 62.7; Clerk-Typist II, 58.0; Secretary I, 75.8; Secretary II, 80.7; and Secretary III, 82.9. The average gross words per minute for all 33 typists whose tests were scored was 72.3.

The average number of errors for all Clerk-Typist I employees was 14.7; for Clerk-Typist II employees, it was 8.5; for Secretary I employees,

it was 6.5; for Secretary II employees, it was 7.3; and for Secretary III employees, it was 7.6. The average number of errors for all 33 typists whose tests were scored was nine.

Summary Conclusions:

The test as a whole would indicate that as the level of job progressed from Clerk-Typist I to Secretary III, the average net words per minute for each group gradually became higher. This would bring one to the conclusion that Secretary III employees were more competent than Secretary II typists, that Secretary II typists were more competent than Secretary I typists, that Secretary I typists were more competent than Clerk-Typist II employees, and that Clerk-Typist II employees were more competent typists than Clerk-Typist I employees.

The average gross words per minute scores over-all would indicate that in general a typist's speed became greater as the job proficiency requirement became greater. The only exception to this was between the Clerk-Typist I and Clerk-Typist II gross words per minute scores. The average gross words per minute score of Clerk-Typist I employees was 4.7 average gross words per minute higher than that of Clerk-Typist II employees.

The average number of errors over-all had a tendency to become less as the job title requirements increased. The only exception to this was between the titles of Secretary I and Secretaries II and III. The

average number of errors for all Secretary I employees was 6.5, and for Secretary II employees it was 7.3. For Secretary III employees it was 7.6.

It could be concluded from these results that the general level of competency for office personnel employees was less than that set forth in each job title area. It could be concluded further that in all areas measured - errors, gross words per minute, and net words per minute - there was a tendency for the employees to be more proficient as the job title level moved up from Clerk-Typist I through Secretary III. It might also be concluded that of the office employees tested, accuracy seemed to be more of a problem than was speed. However, one must remember the circumstances and psychological effect of testing in a group setting and in a competitive atmosphere, and one must take into account the fact that the typists were not totally familiar with their machines. These factors could account considerably for the general low level of accuracy.

TEST COMPARISONS WITH NORMS

A table was prepared for each of the five job titles of office employees at Montana State University indicating the gross words per minute typed and the number of errors made by each of the typists who took the five-minute straight-copy timed writing typing test. A comparison of the gross words per minute and norm percentile ranking established through a study done by Droege was made. (3:34) The norm comparison

percentiles were taken from Table 4 discussed in Chapter II, Review of Literature. Only the percentile norms for electric typewriters were used since all the testees used electric typewriters. A comparison of the number of errors and norm percentile ranking established on a similar test also was made. The results of these comparisons were as follows.

Table 14

Clerk-Typist I Norm Comparisons

Clerk-Typist I (40 Net Words a Minute)					
Job No. 1	Percentile Norm	Gross Words Per Minute On Test	Job No. 1	Percentile Norm	Errors On Test
1-1	75-80	77	1-2	75	5
1-4	75-80	77	1-3	25	12
1-7	40	65	1-6	25	12
1-3	35	64	1-1	20-25	13
1-5	10-15	55	1-5	20	14
1-2	5-10	51	1-4	10-15	18
1-6	5-10	50	1-7	1-5	29

Norm Comparison Results:

The highest gross words per minute for Clerk-Typist I employees was 77, and this person ranked in the 75-80 percentile. The lowest gross words per minute score was 50, and this person ranked in the 5-10 percentile. Five out of the seven Clerk-Typist I employees ranked below the 50 percentile, and two of the seven ranked above the 50 percentile.

The fewest number of errors received by Clerk-Typist I employees was five, which placed that person in the 75 percentile. The largest number of errors received was 29, which placed that person in the 1-5 percentile range. Only one person ranked above the 50th percentile on accuracy, and six ranked below the 50th percentile on accuracy. The majority of Clerk-Typist I participants received from 12-14 errors, and they ranked between the 20th and 25th percentile.

It was interesting to note that Clerk-Typist I participants who had a tendency to rank high on the speed percentile scale had a tendency to rank low on the accuracy percentile scale. Typist Number 1-1 ranked in the 75-80 percentile on speed and in the 20-25 percentile on accuracy. Typist Number 1-4 ranked in the 75-80 percentile on speed and in the 10-15 percentile on accuracy. Typist 1-2 ranked in the 5-10 percentile on speed and in the 75th percentile for accuracy.

Conclusions:

It would appear that Clerk-Typist I typists in general were either fast and inaccurate or slow and accurate. It would further appear that the majority of the typists ranked low in both speed and accuracy. In general, they ranked below the 50th percentile. Due to the fact that the job title of Clerk-Typist I calls for a somewhat low proficiency level of 40 net words per minute, one might expect this group of typists to be quite low.

Table 15

Clerk-Typist II Norm Comparisons

Clerk-Typist II (50 Net Words a Minute)					
Job No. 2	Percentile Norm	Gross Words Per Minute On Test	Job No. 2	Percentile Norm	Errors On Test
2-1	55	70	2-3	95	2
2-2	40	65	2-2	90	3
2-3	30-35	63	2-1	80-85	4
2-4	10-15	55	2-5	70-75	5
2-5	5-10	49	2-4	55	7
2-6	1-5	46	2-6	1-5	30

Norm Comparison Results:

The highest gross words per minute received by a Clerk-Typist II was 70, which placed that person in the 55th percentile on the percentile norm scale. The lowest gross words per minute rate received was 46, which placed that typist at the 1-5 percentile range. Five out of the six Clerk-Typist II employees ranked below the 50th percentile on the percentile norm scale.

The fewest number of errors received by Clerk-Typist II employees was two, and that person ranked in the 95th percentile on the accuracy norm percentile scale. The greatest number of errors made was 30, which ranked that person in the 1-5 percentile norm on the percentile scale range. Five out of the six Clerk-Typist II employees ranked above the

50th percentile on the percentile norm scale for accuracy, and three out of the six ranked in the 75th percentile and above.

Conclusions:

Clerk-Typist II employees who took the test ranked better on accuracy than they did on speed. The typist who had the lowest speed had the greatest number of errors. The typist who had the highest speed ranked about in the middle of the group with a 80-85 percent rating for accuracy on the percentile accuracy scale. It would appear that this group, overall, was concentrating more on performing higher on accuracy than they were on speed.

Table 16

Secretary I Norm Comparisons

Secretary I (60 Net Words a Minute)					
Job No. 3	Percentile Norm	Gross Words Per Minute On Test	Job No. 3	Percentile Norm	Errors On Test
3-1	99-100	96	3-2	95	2
3-3	75	76	3-1	80-85	4
3-4	70-75	75	3-3	60-65	6
3-5	55	70	3-4	55	7
3-6	55	70	3-5	40	9
3-2	50	68	3-6	30	11
3-7	Thrown out - failed to type first paragraph				

Norm Comparison Results:

The gross words per minute rate for Secretary I typists ranged from 96 to 68, and the percentile ranking on the percentile norm scale was from 100 to 50. All six typists ranked at or above the 50th percentile on the percentile norm scale, with half of them ranking in the 70th percentile or above.

The range of accuracy for Secretary I typists was from two to 11 errors, with a percentile ranking from 95 to 30 on the percentile accuracy norm scale. Four out of the six typists ranked above the 50th percentile for accuracy. The typist who ranked the highest in speed was second to the highest on accuracy, but the typist who ranked the highest on accuracy was the lowest on speed. There was a tendency for those who ranked in the middle percentile norm ranges in speed to rank in the same general area for accuracy.

Conclusions:

The fastest typist was one of the most accurate typists; the slowest typist was the most accurate typist. All typists were quite proficient in speed, ranking at or above the 50th percentile, and most typists were quite proficient in accuracy, with four out of six ranking above the 50th percentile in accuracy. One might conclude, therefore, that this group over-all performed quite well on both speed and accuracy but that the performance was slightly better on speed than on accuracy.

Table 17

Secretary II Norm Comparisons

Secretary II (60 Net Words a Minute)					
Job No. 4	Percentile Norm	Gross Words Per Minute On Test	Job No. 4	Percentile Norm	Errors On Test
4-7	95-99	90	4-1	90	3
4-3	95-99	89	4-4	70-75	5
4-1	90-95	86	4-2	60-65	6
4-2	90-95	83	4-7	60-65	6
4-5	75-80	77	4-5	45-50	8
4-4	70-75	75	4-3	40	9
4-6	40	65	4-6	20	14

Norm Comparison Results:

The gross words per minute range for Secretary II typists who took the test was from 90 to 65, with a percentile range on the percentile norm scale from 99 to 40. All but one typist ranked at or above the 70th percentile level on the percentile norm scale, and one ranked below the 50th percentile. Four out of the seven typists ranked in the 90th percentile and above on speed.

The range of accuracy for Secretary II typists was from three to 14 errors with a percentile norm rating range from 90 to 20 percent. Five out of the seven typists received accuracy percentile norm ratings of 50 percent or above, and two typists received accuracy percentile ratings below 50 percent. The typist who received the highest percentile norm

rating on speed ranked in the 60-65 percentile range for accuracy. The typist who received the highest percentile rating for accuracy ranked third highest on speed in the 90-95 percentile range. The typist who ranked the lowest on accuracy also ranked the lowest on speed. The typist who ranked second lowest on speed ranked second highest on accuracy.

Conclusions:

Over-all, Secretary II typists ranked quite high on the norm percent speed scale and ranked average or high average on the accuracy scale. One might also conclude that just because there was a high percentile ranking on speed, it does not necessarily always follow that there was a high ranking on accuracy, although this has occurred in some cases. In general, Secretary II typists ranked higher on the norm percentile scale in speed than they did on accuracy.

Table 18

Secretary III Norm Comparisons

Secretary III (60 Net Words a Minute)					
Job No. 5	Percentile Norm	Gross Words Per Minute On Test	Job No. 5	Percentile Norm	Errors On Test
5-5	100	111	5-6	80-85	4
5-1	95-99	92	5-7	80-85	4
5-2	95-99	88	5-1	70-75	5
5-3	80-85	79	5-5	55	7
5-6	75-80	77	5-4	45-50	8
5-7	60	71	5-3	30	11
5-4	30	62	5-2	20	14

Norm Comparison Results:

The range of gross words per minute for Secretary III typists who took the five-minute straight-copy test was from 111 to 62, and the percentile ranking on the norm percentile scale for speed was from 100 to 30 percent. All but one of the typists ranked above the 50th percentile, and all but two ranked at or above the 75th percentile. Three out of the seven typists ranked at or above the 95th percentile in speed.

The fewest number of errors which occurred among Secretary III typists was four, with two persons receiving this number, and the greatest number of errors was 14. The percentile range on the accuracy norm percentile scale was from 80-85 percent at the upper end down to 20 percent at the lower end. Five out of the seven Secretary III typists received a percentile rating on accuracy above the 50th percentile, and only three out of the seven received a percentile ranking for accuracy at the 70th percentile or above. The typist who was at the top in speed at the 100th percentile ranked about in the middle for accuracy at the 55th percentile. The typist who was at the bottom in speed ranked near the bottom end of the scale in accuracy at the 45-50th percentile. The typist who ranked at the top in accuracy ranked near the bottom on speed in relation to the other participants but rated in the 75-80 percentile range for speed. The typist who ranked second from the top on accuracy also ranked second from the bottom on speed.

Conclusions:

Secretary III typists, over-all, ranked higher in speed than in accuracy. There was a tendency to rank high in the area of speed and low in the area of accuracy or high in accuracy and low in speed. There was not a tendency to be high in both speed and accuracy or low in speed and accuracy for any one typist.

These results would tend to suggest that these people were typing at speeds outside of their range of best control.

Table 19

Speed Percentile Rankings

Job No.	Total In Percentile Range		Norm Percentile	Gross Words Per Minute
5-5			100	111
3-1	2		99-100	96
5-1			95-99	92
4-7			95-99	90
4-3			95-99	89
5-2	4		95-99	88
4-1			90-95	86
4-2	2		90-95	83
5-3	1		80-85	79
5-6			75-80	77
4-5			75-80	77
1-4			75-80	77
1-1			75-80	77
3-3	5		75	76
4-4			70-75	75
3-4	2	(16)	70-75	75
5-7	1		60-65	71
3-6			55	70
3-5			55	70
2-1			55	70
3-2	4	(5)	50	68
4-6			40	65
2-2			40	65
1-7	3		40	65
1-3			35	64
2-3			30-35	63
5-4	3	(6)	30	62
2-4			10-15	55
1-5	2		10-15	55
1-2			5-10	51
1-6			5-10	50
2-5	3		5-10	49
2-6	1	(6)	1-5	46

Table 20

Accuracy Percentile Rankings

Job No.	Total In Percentile Range		Norm Percentile	Errors On Test
3-2			95	2
2-3			95	2
4-1			90	3
2-2	4		90	3
5-7			80-85	4
5-6			80-85	4
3-1			80-85	4
2-1	4		80-85	4
5-1			70-75	5
4-4			70-75	5
2-5			70-75	5
1-2	4	(12)	70-75	5
4-7			60-65	6
4-2			60-65	6
3-3	3		60-65	6
5-5			55	7
3-4			55	7
2-4	3	(6)	55	7
5-4			45-50	8
4-5	2		45-50	8
4-3			40	9
3-5	2		40	9
5-3			30	11
3-6	2	(6)	30	11
1-6			25	12
1-3			25	12
1-1			20-25	13
5-2			20	14
4-6			20	14
1-5	6		20	14
1-4	1		10-15	18
1-7			1-5	29
2-6	2	(9)	1-5	30

Summary of Findings:

An over-all view of the percentile norm comparisons showed a general tendency of the typists to rate higher on the norm percentile speed scale from Clerk-Typist I to Secretary III, although the Clerk-Typist I office employees ranked higher, over-all, on speed than did the Clerk-Typist II employees. In general, a comparison of the five job title groups on accuracy would reveal a tendency to rank higher as the level of required proficiency goes up from Clerk-Typist I to Secretary III employees; however, there was very little variation between Secretary I, II, and III employees, with Secretary III employees not doing as well on the accuracy scale as Secretary I and II employees tested.

Twenty-one typists out of 33 ranked at or above the 50th percentile in speed. Sixteen of the 33 ranked at or above the 70th percentile in speed. Eighteen out of 33 ranked at or above the 50th percentile in accuracy, and 12 out of 33 ranked at or above the 70th percentile in accuracy.

Twelve out of 33 typists ranked below the 50th percentile in speed, and 15 out of 33 ranked below the 50th percentile in accuracy. Six out of 33 typists ranked below the 30th percentile in speed, and nine out of the 33 typists ranked below the 30th percentile in accuracy.

Following is the number of office employees who ranked in the upper 50 percentile in speed, according to job title:

Clerk-Typist I --- 2
Clerk-Typist II --- 1
Secretary I --- 6
Secretary II --- 6
Secretary III --- 6

Following is the number of office employees who ranked in the upper 50 percentile in accuracy, according to job title:

Clerk-Typist I --- 1
Clerk-Typist II --- 5
Secretary I --- 4
Secretary II --- 4
Secretary III --- 4

Following is the number of office employees who ranked in the lower 50 percentile in speed, according to job title:

Clerk-Typist I --- 5
Clerk-Typist II --- 5
Secretary I --- 0
Secretary II --- 1
Secretary III --- 1

Following is the number of office employees who ranked in the lower 50 percentile in accuracy, according to job title:

Clerk-Typist I --- 6
Clerk-Typist II --- 1
Secretary I --- 2
Secretary II --- 3
Secretary III --- 3

In general, the charts above show that the typists with the higher job titles of Secretary I, II, and III ranked most often in the upper 50th percentile in speed and that this was also true with accuracy. It

should be noted, however, that the Clerk-Typist II employees had more participants in the upper 50th percentile for accuracy than did any of the secretary titles.

There was a large number of Clerk-Typist I and II employees who ranked in the lower 50 percentile in speed. Six out of seven Clerk-Typist I employees ranked in the lower 50 percentile on accuracy; however, there was a measurable number of secretary title people in the lower 50 percentile in accuracy, with the Secretary I title having only two in this range.

Summary Conclusions:

Test participants compared quite favorably over-all with the established norms both in speed and accuracy. One could conclude that there was a less favorable comparison in the area of accuracy than in speed, and that typists who should be more competent due to their job title had as much or more difficulty with accuracy as did the lower job title employees who were not expected to be as competent. One could further conclude from the findings that the Clerk-Typist I employees definitely showed less competency in both speed and accuracy than did participants from the other four job title areas. This was an expected result since the level of expected competency of Clerk-Typist I employees was lower than that for typists holding job titles of Clerk-Typist II, and Secretary I, II, and III.

SALARY COMPARISON OF CIVIL SERVICE OFFICE EMPLOYEES AND MONTANA STATE UNIVERSITY OFFICE EMPLOYEES

Civil service clerical employees were paid according to GS ratings from GS 2 to GS 5. As the GS rating goes up, the salary goes up. They were also paid on the basis of experience over a series of ten advancement steps. A clerical worker could advance from step one through step three at the rate of one step per year. The advancement through steps four, five, and six were at the rate of one step each two years, and the advancement through steps seven, eight, nine, and ten were at the rate of one step every three years. It would, therefore, take a clerical worker at any GS level 21 years to advance through the ten pay steps to the top.

Office personnel employees at Montana State University would begin at any one of five levels which were Clerk-Typist I, Clerk-Typist II, Secretary I, Secretary II, and Secretary III. If an employee started as a Clerk-Typist I didn't necessarily mean that with experience he or she would advance to a higher title, although this could have been a possibility. After an employee had worked satisfactorily for a period of six months, he would receive a two percent increase in salary. Any salary increase from that point would be either by advancing to a higher job title or because of an across the board salary increase voted by the legislature.

The following yearly, monthly, and hourly salary tables for civil service and Montana State University office employees were prepared to show the relationship of salaries between the two. The tables show each of the three methods of determining payment.

Table 21

Yearly Salary Schedule - 1973
Civil Service
Clerical Employees

RATING	S T E P S				
GS	1	2	3	4	5
2	5,432	5,613	5,794	5,975	6,156
3	6,128	6,332	6,536	6,740	6,944
4	6,882	7,111	7,340	7,569	7,798
5	7,694	7,951	8,202	8,465	8,722
	6	7	8	9	10
2	6,337	6,518	6,699	6,880	7,061
3	7,148	7,325	7,556	7,760	7,964
4	8,027	8,256	8,485	8,714	8,943
5	8,979	9,236	9,493	9,750	10,007

Table 22

Yearly Salary Schedule - 1973
Montana State University
Office Personnel Employees

Title	Salary	2% Increase	Promoted Salary
Clerk-Typist I	3,822	76.44	3898.44
Clerk-Typist II	4,424	88.48	4512.48
Secretary I	4,646	92.92	4738.92
Secretary II	5,378	107.56	5485.56
Secretary III	5,929	118.58	6047.58

Table 23

Monthly Salary Schedule - 1973
Civil Service
Clerical Employees

RATING	S T E P S				
GS	1	2	3	4	5
2	452.66	467.75	482.83	497.92	513.00
3	510.66	527.67	544.66	561.67	578.67
4	573.50	592.88	611.67	630.75	649.83
5	641.17	662.58	683.50	705.42	726.83
	6	7	8	9	10
2	528.08	543.17	558.25	573.33	588.42
3	595.67	610.42	629.67	646.67	663.67
4	668.92	688.00	707.08	726.17	820.25
5	748.25	769.67	791.08	812.50	833.92

Table 24

Monthly Salary Schedule - 1973
Montana State University
Office Personnel Employees

Title	Salary	2% Increase	Promoted Salary
Clerk-Typist I	318.50	6.37	324.87
Clerk-Typist II	368.67	7.37	376.04
Secretary I	387.17	7.74	394.91
Secretary II	448.17	8.96	457.13
Secretary III	494.08	9.88	503.96

Table 25

Hourly Salary Schedule - 1973
Civil Service
Clerical Employees

RATING	S T E P S									
GS	1	2	3	4	5	6	7	8	9	10
2	2.61	2.70	2.79	2.87	2.96	3.05	3.13	3.22	3.31	3.39
3	2.95	3.04	3.14	3.24	3.34	3.44	3.53	3.63	3.73	3.83
4	3.31	3.42	3.53	3.64	3.75	3.86	3.97	4.08	4.19	4.30
5	3.70	3.82	3.95	4.07	4.19	4.32	4.44	4.56	4.69	4.81

Table 26

Hourly Salary Schedule - 1973
Montana State University
Office Personnel Employees

Title	Salary	2% Increase	Promoted Salary
Clerk-Typist I	1.84	.0368	1.88
Clerk-Typist II	2.13	.0426	2.17
Secretary I	2.23	.0446	2.37
Secretary II	2.59	.0518	2.64
Secretary III	2.85	.0570	2.91

The salary which was paid to an office employee under civil service or as an employee of Montana State University was very close to the same at any level whether one was paid hourly, monthly, or yearly, assuming that a person was working the same number of hours under any one plan. To earn a salary at an hourly rate equal to a monthly rate salary, the employee employed by civil service or Montana State University would have had to work 173 hours per month. The monthly rate in each case multiplied by 12 would give the yearly salary rate at a comparable level.

The yearly salary rate for a civil service clerical worker with a GS 2 rating would have been $5,432. As that employee was advanced downward to a GS 3 rating, his yearly salary would have increased to $6,128, which would be an increase of $696. If the worker moved from the 10th step down to a GS 3 rating, his increase would have been $903, for a salary of $7,964 annually. If the worker moved from GS 3, Step 1, to

GS 4, Step 1, the increase would have been $754 and a yearly salary of $6,882. If it moved from GS 3, Step 10, down to GS 4, Step 10, the increase would have been $979 yearly and an annual salary of $8,943. If a worker moved from a GS 4, Step 1, down to a GS 5, Step 1, the increase would have been $812 annually and a salary of $7,694. If he moved from Step 10 down to a GS 5 rating from a GS 4 rating, the salary would have been $10,007, with an annual increase of $1,064.

As a GS 2 rated worker moved across from Step 1 to Step 2, his salary increased to $5,613, or an increase of $181. When moving across from one step to the next all the way to the 10th step, in each case the increase was $181 for a GS 3 rated employee. At the attainment of the 10th step the employee would have earned $7,061 annually.

A GS 3 rated civil service employee began at Step 1 earning $6,128 with a step increase of $204 between each step. By the time the employee reached the 10th step, he would have earned an annual salary of $7,964.

A GS 4 rated civil service employee began by earning $6,882 at Step 1, received a $229 salary increase between each step, and earned $8,943 by the time he attained the 10th step.

A GS 5 rated civil service employee began at Step 1 earning $7,694, received $257 with each step advancement, and earned $10,007 upon the attainment of the 10th step.

If the salary of a full-time civil service clerical worker were figured on an hourly or monthly basis, he would have earned very close

to the same salary, with the same increases, as was shown for the yearly salary explained above.

Office employees at Montana State University who began at the lowest level of Clerk-Typist I began at a salary of $3,822 annually. At the end of six months' employment and with satisfactory job performance, the employee received a two percent increase of $76.44, which increased the annual salary to $3,898.44. If the employee advanced to Clerk-Typist II, he would have received a salary of $4,424, which was an increase of $602 before the two percent increase. After six months the employee received an increase of $88.48, which raised the annual salary to $4,512.48. If the employee advanced from Clerk-Typist II to Secretary I, he received a salary of $4,646, which was an increase of $222 before the two percent increase. After six months the employee received a two percent increase of $92.92, which raised the annual salary to $4,738.92.

If an employee advanced from Secretary I to a Secretary II position, the increase in salary was $732, going from an annual salary of $4,646 to $5,378. After six months and a two percent increase, the employee earned $5,485.56 as a result of an increase of $107.56. If an employee advanced from a Secretary II to a Secretary III position, the new annual salary was $5,929, with an increase of $551. Upon receiving a two percent increase within six months, the annual salary was $6,047.58, which was an increase of $118.58.

The determination of a full-time office employee's salary on a monthly or hourly basis, as compared to yearly, would result in nearly the same increases upon advancing from one position to another or upon receiving the two percent six months' experience increase at any point.

Civil service clerical employees earned a much higher salary than Montana State University office personnel employees. This was true at all comparable levels of job title or rank.

A Clerk-Typist I earned a beginning salary of $3,822 annually, while a GS 2 civil service employee at Step 1 earned $5,432 annually. This was $1,610 more annually. A GS 2 rated civil service employee at the 10th step earned $7,061 annually, and a Clerk-Typist I after receiving the six-month two percent increase earned $3,898.44. The civil service employee earned $3,162.56 more annually.

A Clerk-Typist II Montana State University office employee earned an annual salary of $4,424, and a GS 3 civil service clerical worker earned $6,128 at Step 1. The civil service employee earned $1,704 annually more than the Montana State University employee. At Step 10, the civil service clerical worker earned $7,964, and the Clerk-Typist II employee earned $4,512.48 after receiving a six-months' experience two percent increase. The civil service worker earned $3,451.52 more annually than the Clerk-Typist II.

A Secretary I Montana State University office employee began by earning an annual salary of $4,646, and a GS 4 rated civil service

employee at Step 1 earned $6,882 annually. The civil service employee earned $1,236 more annually than the Montana State University employee. At Step 10, the civil service employee earned $8,943 annually, and the Secretary I employee earned $4,738.92 after receiving a six-month experience two percent increase. The civil service worker earned $4,204.08 more annually than the Secretary I employee.

A Secretary II Montana State University office employee began by earning an annual salary of $5,378, and a GS 5 rated civil service employee at Step 1 earned $7,694 annually. The civil service employee earned $2,316 more annually than the Montana State University employee. At Step 10, the civil service employee earned $10,007 annually, and the Secretary II employee earned $5,485.56 after receiving a six-month experience two percent increase. The civil service worker earned $4,521.44 more annually than the Secretary II employee.

A Secretary III Montana State University office employee began by earning an annual salary of $5,929, and a GS 5 rated civil service employee at Step 1 earned $7,694 annually. The civil service employee earned $1,765 more annually than the Montana State University employee. At Step 10 the civil service employee earned $10,007 annually, and the Secretary III employee earned $6,047.58 after receiving a six-month experience two percent increase. The civil service worker earned $3,959.42 more annually than the Secretary III employee.

Summary:

Civil service clerical employees received a much higher salary at the lowest rank of GS 2 and at Step 1 than low entry level Montana State University office employees. This trend continued through each title and rank increase. As civil service employees received salary increases because of work experience and Montana State University employees received their increases, this gap became wider and wider until civil service employees received $4,521.44 more annually than the highest paid Montana State University office employees.

Conclusions:

The following conclusions are made from the Montana State University - civil service salary comparison findings:

1. Civil service clerical workers received a much higher entry level salary than Montana State University office workers at the entry level.
2. Civil service clerical workers were able to advance in salary over a much greater period of employment than Montana State University office employees.
3. Federal government legislation has provided a much higher and more attractive salary schedule for civil service clerical employees than Montana State government legislation has provided for Montana State University office workers.

4. Basically the same salary would be earned by a full-time clerical worker whether he received his salary on a yearly, monthly, or hourly basis.

CHAPTER V

SUMMARY

This investigation was a study to determine whether or not office personnel employees at Montana State University met, did not meet, or exceeded the typing qualifications set forth by the job description of the job which they held. A further purpose was to compare salaries paid to office personnel employees at Montana State University with salaries paid to office employees working under the Federal Government Civil Service System. A five-minute straight-copy typing test was given to 33 office personnel employees at Montana State University. Seven held the job title of Clerk-Typist I, six of Clerk-Typist II, six of Secretary I, seven of Secretary II, and seven of Secretary III. From the results of this test, an effort was made to evaluate the typing requirements for each job title and the adequacy of the salary being paid.

SUMMARY OF REVIEW OF LITERATURE

The review of literature involved a search for typewriting tests which had been given throughout the country by various people and agencies. Speed and accuracy requirements were noted, and an effort was made to determine the validity and reliability of the tests through established norms. The following tests were reviewed: The State of Montana Merit System Test, U. S. Civil Service Test prepared by Droege, A National Business Entrance Test, Typing Tests for Business, and Typing Tests

provided by Southwestern Publishing Company to accompany Century 21 Typewriting Text, 1972.

SUMMARY OF PROCEDURES

Thirty-three office personnel employees at Montana State University were selected at random from five different job title categories. Each employee was given a five-minute straight-copy typing test identical to that used by the civil service. The tests were scored for gross words per minute, net words per minute, and the number of errors made. A comparison of these scores was made against established norms for speed and accuracy and also against the defined requirements of competency for each job title. Conclusions and recommendations were made from the findings.

SUMMARY OF FINDINGS

In general, the test results indicated that typists with lower competency requirements performed at a lower level than typists with higher competency requirements. However, within any single job level area there was a wide variation of speed and accuracy displayed, ranging all the way from very low to quite high.

The results of the five-minute straight-copy typing test revealed a large number of typists who did not meet the minimum net words per minute required for their job. The Clerk-Typist I position required 40 net words per minute, and the average of all seven typists was 28.3. The Clerk-

Typist II position required 50 net words per minute, and the average of all six participants was 39.8. The Secretary I position called for 60 net words per minute, and the average of all six typists was 51.5. The Secretary II position required 60 net words per minute, and the average of all seven participants was 53. The Secretary III position required 60 net words per minute, and the average of all seven typists was 53.9.

The comparison of typists' gross words per minute speed with established norms showed 21 typists ranking above the 50th percentile and 16 ranking at or above the 70th percentile. Twelve typists ranked below the 50th percentile, and six ranked below the 30th percentile. A comparison of accuracy scores with established norms revealed that 18 ranked above the 50th percentile, and 12 ranked above the 70th percentile. Fifteen typists ranked below the 50th percentile, and nine ranked below the 30th percentile.

In general, typists with higher job titles, such as Secretary I, II, and III, ranked most often in the upper 50th percentile in speed and accuracy. There was a larger number of Clerk-Typist I and II employees who ranked in the lower 50 percentile in speed and accuracy.

Salary comparisons revealed that at all levels civil service employees earned a higher salary and received better increases in pay with experience and promotion.

CONCLUSIONS

The conclusions drawn from this study were based upon typing skill comparisons of office employees at Montana State University and civil service clerical workers. Conclusions were also drawn from comparisons which were made between salaries earned by Montana State University office employees and those earned by civil service clerical workers. The conclusions are:

1. Secretary III typists tested were more competent than Secretary II; Secretary II typists were more competent than Secretary I typists; Secretary I typists were more competent than Clerk-Typist II employees; and Clerk-Typist II employees were more competent typists than Clerk-Typist I employees.
2. The general level of competency for office personnel employees tested was less than that set forth in each job title area.
3. In all areas tested there was a tendency for the employees to be more proficient as the job title level moved up from Clerk-Typist I through Secretary III.
4. Of the office employees tested, accuracy seemed to be more of a problem than was speed.
5. Secretary III typists ranked higher in speed than in accuracy.
6. There was a tendency to rank high in speed and low in accuracy or high in accuracy and low in speed, with some exceptions.

7. Many typists were typing either outside of their range of control and therefore had many errors or below their range of speed with low errors and low speed.
8. Test participants compared quite favorably over-all with established norms both in speed and accuracy, with a less favorable comparison in the area of accuracy.
9. Civil service clerical workers received a much higher entry level and top level salary than Montana State University office workers.
10. Civil service clerical workers were able to advance in salary over a much greater period of employment than Montana State University office employees.
11. Federal government legislation has provided a much higher salary for civil service clerical employees than Montana State government legislation has provided for Montana State University office workers.
12. The same salary would be received by a full-time office employee under civil service or at Montana State University whether they were paid on an annual, monthly, or hourly basis.

RECOMMENDATIONS

The author feels that the following recommendations concerning office employees should be made to the Personnel Department at Montana State University:

1. The minimum requirements of competency set forth by the department be re-evaluated and either lowered to be consistent with the apparent level of employee competency, or the employees not be hired unless they possess the prescribed level of competency.
2. The Personnel Department at Montana State University use the test that was used in this study, or a similar test, for all prospective office employees in determining whether or not their typing competency is sufficient for employment.
3. Serious effort should be put forth to create salary levels comparable to that paid by the Federal Government to clerical workers and a greater provision for experience advancement should be made.

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APPENDIX

Test Number _____

WORK COMPLETION SHEET

TYPING TEST

MSU OFFICE PERSONNEL EMPLOYEES

Job Number _____

Job Color _____

Minimum Net Words
Per Minute for Job Title _____

Gross Words per Minute _____

Number of Errors _____

Net Words per Minute _____

Percentile Rank _____

TYPING EXAMINATION
FOR
OFFICE PERSONNEL AT MONTANA STATE UNIVERSITY

Read these directions carefully.

A practice exercise appears at the bottom of this sheet, and the test exercise itself is on the next page. First study these directions. Then, when the signal is given, begin to practice by typing the practice exercise below on the paper that has been given you. The examiner will tell you when to stop typing the practice exercise.

In both the practice and the test exercises, space, paragraph, spell, punctuate, capitalize, and begin and end each line precisely as shown in the exercises.

The examiner will tell you the exact time you will have to make repeated copies of the test exercise. Each time you complete the exercise, simply double space and begin again. If you fill up one side of the paper, turn it over and continue typing on the other side. Keep on typing until told to stop.

Keep in mind that you must meet minimum standards in both speed and accuracy and that, above these standards, accuracy is twice as important as speed. Make no erasures, insertions, or other corrections in this plain-copy test. Since errors are penalized whether or not they are erased or otherwise "corrected," it is best to keep on typing even though you detect an error.

PRACTICE EXERCISE

This practice exercise is similar in form and in difficulty to the one that you will be required to typewrite for the plain-copy test. You are to space, capitalize, punctuate, spell, and begin and end each line precisely as in the copy. Make no erasures, insertions, or other changes in this test because errors will be penalized even if they are erased or otherwise corrected. Practice typewriting this material on scratch paper until the examiner tells you to stop, remembering that for this examination it is more important for you to typewrite accurately than to typewrite rapidly.

DO NOT TURN TO NEXT PAGE UNTIL TOLD TO DO SO BY THE EXAMINER.

FIVE-MINUTE STRAIGHT-COPY TYPING TEST

	Gross Words Per Minute Per Line Typed	
Because they have often learned to know types of architecture by decoration, casual observers sometimes fail to realize that the significant part of a structure is not the ornamentation but the body itself. Architecture, because of its close contact with human lives, is peculiarly and intimately governed by climate. For instance, a home built for comfort in the cold and snow of the northern areas of this country would be unbearably warm in a country with weather such as that of Cuba. A Cuban house, with its open court, would prove impossible to heat in a northern winter.	--	52**
	--	54
	--	56
	--	59
	--	61
	--	64
	--	66
	--	68
	--	71
	--	73
Since the purpose of architecture is the construction of shelters in which human beings may carry on their numerous activities, the designer must consider not only climatic conditions, but also the function of a building. Thus, although the climate of a certain locality requires that an auditorium and a hospital have several features in common, the purposes for which they will be used demand some difference in structure. For centuries builders have first complied with these two requirements and later added whatever ornamentation they wished. Logically, we should see as mere additions, not as basic parts, the details by which we identify architecture.	--	76
	--	78
	--	80
	--	82
	--	84
	--	86
	40*	88
	42	90
	44	92
	47	95
	49	98

*First typing of exercise.
**Second typing of exercise.

LINE KEY FOR 5-MINUTE TYPING TEST SHOWING MAXIMUM NUMBER OF ERRORS PERMISSIBLE FOR VARIOUS TYPING SPEEDS, AT GRADES GS-2 TYPIST AND GS-3 STENOGRAPHER

Speed.--In the following example, more than 16 lines must have been typed for any speed rating. This sample key is constructed on the premise that if the competitor made the first stroke in her final line (even if it was an error), she is given credit for that line in determining the gross words per minute.

Accuracy.--The gross words per minute typed, at any line, is the number outside the parentheses opposite that line. The numbers in the parentheses show the maximum number of errors permitted for that number of gross words per minute typed. The number of errors permitted increases with the speed. (This sample key shows the requirements for GS-2 typist and GS-3 stenographer.) If the number of strokes per line were different, this table would have to be altered accordingly.

	Maximum Number of Errors Per Gross Words Per Minute Typed	
Because they have often learned to know types of archi-	-----	52(7)**
tecture by decoration, casual observers sometimes fail to	-----	54(7)
realize that the significant part of a structure is not the	-----	56(8)
ornamentation but the body itself. Architecture, because	-----	59(8)
of its close contact with human lives, is peculiarly and	-----	61(9)
intimately governed by climate. For instance, a home built	-----	64(9)
for comfort in the cold and snow of the northern areas of	-----	66(10)
this country would be unbearably warm in a country with	-----	68(10)
weather such as that of Cuba. A Cuban house, with its open	-----	71(11)
court, would prove impossible to heat in a northern winter.	-----	73(11)
Since the purpose of architecture is the construction of	-----	76(12)
shelters in which human beings may carry on their numerous	-----	78(12)
activities, the designer must consider not only climatic con-	-----	80(12)[2]
ditions, but also the function of a building. Thus, although	-----	------
the climate of a certain locality requires that an auditorium	-----	------
and a hospital have several features in common, the purposes	-----	------
for which they will be used demand some difference in struc-	40(3)*	------
ture. For centuries builders have first complied with these	42(4)	------
two requirements and later added whatever ornamentation they	44(5)	------
wished. Logically, we should see as mere additions, not as	47(6)	------
basic parts, the details by which we identify architecture.	49(6)	------

*First typing of exercise.
**Second typing of exercise.

[1] The minimum rated speed is 40 gross words per minute for typing from printed copy.
[2] Any material typed after 80 gross words per minute (which is considered 100 in speed) is not rated for accuracy.
Note: The number of errors shown above must be proportionately increased for tests which are longer than 5 minutes.

STUDENTS TYPEWRITING TESTS

CHART FOR DETERMINING SCORES ON TIMED WRITINGS - SECOND SEMESTER*

Scores should be determined from this chart as follows: For a student who wrote 60 gross words a minute with 3 errors, locate the column marked "3" under "Errors." Move down that column to the line opposite the one indicating "60" for the "Gross Words a Minute." The score "48" represents the "Mailable Words a Minute" presented in the nearest whole number, and is the number of points the student is to receive on the timed writing. Students who make more than 20 errors on the timed writing will receive no points for this part of the test.

*This chart is an adaptation of the Scoring Chart for Determining Mailable Words a Minute on Straight-Copy Five-minute Timed Writings (without carbon copy) for second-semester high school typewriting presented by Irol Whitmore Balsley in the publication of the Department of Business and Economic Research, School of Business Administration, Louisiana Polytechnic Institute, Ruston, Louisiana, entitled "A Study of the Validity of Some Methods of Measuring Straight-Copy Typewriting Skill."

Gross Words a Minute	ERRORS																				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
80	80	74	68	64	59	56	53	50	47	45	43	41	39	38	36	35	34	32	31	30	29
79	79	73	67	63	59	55	52	49	47	44	42	40	39	37	36	34	33	32	31	30	29
78	78	72	67	62	58	54	51	49	46	44	42	40	38	37	35	34	33	32	31	30	29
77	77	71	66	61	57	54	51	48	46	43	41	39	38	36	35	34	32	31	30	29	28
76	76	70	65	60	56	53	50	47	45	43	41	39	37	36	34	33	32	31	30	29	28
75	75	69	64	60	56	52	49	47	44	42	40	38	37	35	34	33	31	30	29	28	27
74	74	68	63	59	55	52	49	46	44	42	40	38	36	35	33	32	31	30	29	28	27
73	73	67	62	58	54	51	48	45	43	41	39	37	36	34	33	32	31	30	29	28	27
72	72	66	61	57	54	50	47	45	43	40	39	37	35	34	33	31	30	29	28	27	26
71	71	65	61	56	53	50	47	44	42	40	38	36	35	33	32	31	30	29	28	27	26
70	70	64	60	56	52	49	46	44	41	39	38	36	34	33	32	30	29	28	27	26	26
69	69	64	59	55	51	48	45	43	41	39	37	35	34	32	31	30	29	28	27	26	25
68	68	63	58	54	51	47	45	42	40	38	37	35	33	32	31	30	28	28	27	26	25
67	67	62	57	53	50	47	44	42	40	38	36	34	33	32	30	29	28	27	26	25	24
66	66	61	56	52	49	46	43	41	39	37	35	34	33	31	30	29	28	27	26	25	24
65	65	60	55	52	48	45	43	40	38	37	35	33	32	31	29	28	27	26	25	25	24
64	64	59	55	51	48	45	42	40	38	36	34	33	31	30	29	28	27	26	25	24	23
63	63	58	54	50	47	44	41	39	37	35	34	32	31	30	29	27	26	26	25	24	23
62	62	57	53	49	46	43	41	39	37	35	33	32	30	29	28	27	26	25	24	23	23
61	61	56	52	48	45	43	40	38	36	34	33	31	30	29	28	27	26	25	24	23	22

(Continued)

STUDENTS TYPEWRITING TESTS

CHART FOR DETERMINING SCORES ON TIMED WRITINGS
SECOND SEMESTER (continued)

Gross Words a Minute	ERRORS																			
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
60	60	55	51	48	45	42	40	37	35	34	32	31	29	28	27	26	25	24	23	23	22
59	59	54	50	47	44	41	39	37	35	33	32	30	29	28	27	26	25	24	23	22	22
58	58	53	49	46	43	40	38	36	34	33	31	30	28	27	26	25	24	23	23	22	21
57	57	52	49	45	42	40	38	36	34	32	31	29	28	27	26	25	24	23	22	22	21
56	56	52	48	44	42	38	37	35	33	31	30	29	27	26	25	24	23	23	22	21	21
55	55	51	47	44	41	38	36	34	32	31	30	28	27	26	25	24	23	22	22	21	20
54	54	50	46	43	40	38	36	34	32	30	29	28	27	26	24	24	23	22	21	20	20
53	53	49	45	42	40	37	35	33	31	30	28	27	26	25	24	23	22	21	21	20	19
52	52	48	44	41	39	36	34	32	31	29	28	27	26	24	24	23	22	21	20	20	19
51	51	47	44	41	38	36	34	32	30	29	27	26	25	24	23	22	21	21	20	19	19
50	50	46	43	40	37	35	33	31	30	28	27	26	25	24	23	22	21	20	20	19	18
49	49	45	42	40	36	34	32	31	29	28	26	25	24	23	22	21	21	20	19	19	18
48	48	44	41	38	36	34	32	30	28	27	26	25	24	23	22	21	20	19	19	18	18
47	47	43	40	37	35	33	31	29	28	26	25	24	23	22	21	20	20	19	18	18	17
46	46	42	39	37	34	32	30	29	27	26	25	24	23	22	21	20	19	19	18	17	17
45	45	41	38	36	33	31	30	28	27	25	24	23	22	21	20	20	19	18	18	17	16
44	44	41	38	35	33	31	29	27	26	25	24	23	22	21	20	19	18	18	17	17	16
43	43	40	37	34	32	30	28	27	25	24	23	22	21	20	19	19	18	17	17	16	16
42	42	39	36	33	31	29	28	26	25	23	23	22	21	20	19	18	18	17	16	16	15
41	41	38	35	33	30	29	27	26	24	23	22	21	20	19	19	18	17	17	16	16	15
40	40	37	34	32	30	28	26	25	24	23	21	21	20	19	18	17	17	16	16	15	15
39	39	36	33	31	29	27	26	24	23	22	21	20	19	18	18	17	16	16	15	15	14
38	38	35	32	30	28	27	25	24	22	21	20	19	19	18	17	17	16	15	15	14	14
37	37	34	32	29	28	26	24	23	22	21	20	19	18	17	17	16	16	15	14	14	14
36	36	33	31	29	27	25	24	22	21	20	19	18	18	17	16	16	15	15	14	14	13
35	35	32	30	28	26	24	23	22	21	20	19	18	17	16	16	15	15	14	14	13	13
34	34	31	29	27	25	24	22	21	20	19	18	17	17	16	15	15	14	14	13	13	12
33	33	30	28	26	25	23	22	21	20	19	18	17	16	16	15	14	14	13	13	13	12
32	32	29	27	25	24	22	21	20	19	18	17	16	16	15	15	14	13	13	13	12	12
31	31	29	26	25	23	22	20	19	18	17	17	16	15	15	14	14	13	13	12	12	11

(Continued)

STUDENTS TYPEWRITING TESTS

CHART FOR DETERMINING SCORES ON TIMED WRITINGS
SECOND SEMESTER (continued)

Gross Words a Minute	ERRORS																			
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
30	30	28	26	24	22	21	20	19	18	17	16	15	15	14	14	13	13	12	12	11	11
29	29	27	25	23	22	20	19	18	17	16	16	15	14	14	13	13	12	12	11	11	11
28	28	26	24	22	21	20	18	17	17	16	15	14	14	13	13	12	12	11	11	11	10
27	27	25	23	21	20	19	18	17	16	15	15	14	13	13	12	12	11	11	11	10	10
26	26	24	22	21	19	18	17	16	15	15	14	13	13	12	12	11	11	11	10	10	10
25	25	23	22	20	19	17	16	16	15	14	13	13	12	12	11	11	11	10	10	9	9
24	24	22	20	19	18	17	16	15	14	14	13	12	12	11	11	10	10	10	9	9	9
23	23	21	20	18	17	16	15	14	14	13	12	12	11	11	10	10	10	9	9	9	8
22	22	20	19	18	16	15	15	14	13	12	12	11	11	10	10	10	9	9	9	8	8
21	21	19	18	17	16	15	14	13	12	12	11	11	10	10	10	9	9	9	8	8	8
20	20	19	17	16	15	14	13	12	12	11	11	10	10	9	9	9	8	8	8	8	7
19	19	17	16	15	14	13	13	12	11	11	10	10	9	9	9	8	8	8	7	7	7
18	18	17	15	14	13	13	12	11	11	10	10	9	9	9	8	8	8	7	7	7	7
17	17	17	14	14	13	12	11	11	10	10	9	9	8	8	8	7	7	7	7	6	6
16	16	16	16	14	13	12	11	11	10	9	9	9	8	8	8	7	7	7	7	6	6
15	15	14	13	12	11	11	10	9	9	8	8	8	7	7	7	7	6	6	6	6	6
14	14	13	12	11	10	10	9	9	8	8	8	7	7	7	6	6	6	6	6	5	5
13	13	12	11	10	10	9	9	8	8	7	7	7	6	6	6	6	5	5	5	5	5
12	12	11	10	10	9	8	8	8	7	7	7	6	6	6	5	5	5	5	5	5	4
11	11	10	10	9	8	8	7	7	7	6	6	6	5	5	5	5	5	4	4	4	4

PERSONNEL SERVICES OFFICE
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA 59715

TO: Vice Presidents
Deans
Department Heads

FROM: Personnel Technician

SUBJECT: Typing Test

Personnel Services with the cooperation of the Montana State University Commerce Department, is developing a typing test to use as an indicator of typing speed. The test will be in full operation by September 1973, and will reflect the speed of all applicants for clerical and secretarial positions at Montana State University. Personnel requesting transfers will also be required to take the examination. Although typing speed is not entirely indicative of typing skill, there is a need for a standardized test. Giving each applicant the identical test and evaluating each test by the same method should make an applicant's typing speed figure more accurate.

In order to validate the test, Mr. Dave Long, a graduate student in Commerce, will conduct an initial testing session involving approximately 35 clerk typists and secretaries chosen by random sample. We are also interested in determining whether the typing speeds established in 1971 as minimum qualifications are still valid.

All secretaries and clerk typists who have been chosen to participate have been sent letters of explanation. We are emphasizing that we are interested only in the test scores; no identifying marks will be on the papers and no position will be jeopardized as a result of this survey.

The testing session will be held in the Commerce Department, Reid Hall, Room 305, Thursday, July 26, 1973, at 1:00 P.M. A maximum of thirty minutes is the estimated length of the examination. We have asked the personnel who have been selected to contact their supervisors to arrange to attend the testing session. Your cooperation in developing this project is greatly appreciated.

If the employee cannot be released, please notify the Employment Section so we may select an alternate.

CCD/JLR;vd

Info cy: President

—Montana State University—

Bozeman, Montana 59715 Tel. 406-994-3583

Personnel Services

July 23, 1973

Ms. Jane Doe
Anyplace
Campus

Dear Jane:

Personnel Services, with the cooperation of the Montana State University Commerce Department, is developing a typing test to use as an indicator of typing speed. The test will be in full operation by September, 1973, and will reflect the speed of all applicants for clerical and secretarial positions at Montana State University. Personnel requesting transfers will also be required to take the examination.

In order to validate the test, Mr. Dave Long, a graduate student in Commerce, will conduct an initial session involving a group of Montana State University personnel holding clerical and secretarial positions. You have been chosen by a random sample to participate in this testing group. Your cooperation is greatly appreciated. Please understand that your position will in no way be jeopardized if you participate. Absolutely no identifying marks will appear on the test papers and no attempt will be made to single out a person's score.

A letter explaining the importance of this test has been sent to all Department Heads. If you are interested in playing a role in the development of the exam, please contact your supervisor and arrange to be out of the office for a maximum of thirty minutes on Thursday, July 26 at 1:00 p.m. The test will be conducted in Reid Hall, Room 305.

Important: Please contact the Personnel Services Office Employment Section to confirm your appointment or for further questions.

Thank you for your cooperation.

Sincerely yours,

C. C. Dye
Personnel Director

Judith L. Rogers
Personnel Technician

CCD/JLR:vd

Info Cy: President
V.P. for Administration

—Montana State University—
Bozeman, Montana 59715 Tel. 406-994-3583

Personnel Services

August 21, 1973

Mr Dave Long
Culbertson, Montana 59218

Dear Dave:

On behalf of Personnel Services I would like to thank you for working to develop a typing test for Montana State University.

We feel that having this test at our disposal will enable all departments to be more objective in their evaluation of applicants' typing speeds.

We certainly appreciate the fine job you have done.

Sincerely yours,

C. C. Dye
Personnel Director

Judith L. Rogers
Judith L. Rogers
Personnel Technician

CCD/JLR;vd
Enc.