

THE EFFECT OF A CLASS IN STUDY HABITS ON THE
GRADES OF TWENTY-SEVEN SEVENTH GRADE
STUDENTS IN GREAT FALLS, MONTANA

by

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Submitted in partial fulfillment of the requirements
for the Master of Education degree
in the Department of Education
Montana State University
August, 1966

ACKNOWLEDGMENT

The completion of a study of this kind depends upon the assistance and cooperation of many persons. The investigator deeply appreciates the guidance and suggestions he received from faculty members during the course of this study.

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ABSTRACT

The belief that a course in study habits would raise grade achievement of junior high school students led to this investigation. A review of related literature pointed out those study habits advocated by the authorities in the field.

A study habits course was taught during the third of four grading periods of the academic year, to an experimental group of 27 seventh grade students. A control group was matched to the experimental group on the basis of sex, grade level, and intelligence Quotient. It was found that there was no statistically significant difference in grade achievement of the experimental group over control group as a result of the course in study habits.

CHAPTER I

INTRODUCTION

Junior high school teachers usually expect their students to regularly prepare assignments out of class. For most seventh grade students this is a change from their first six school years. Since at East Junior High School the teacher usually has the student for only about one hour every school day, he cannot supervise the school study time of each student to see that the necessary amount of studying is done.

It is therefore necessary for the student to know and use good study habits so that he can effectively prepare his lessons and profit as much as possible from them. "While foundations for effective studying are laid in elementary school and refinements are made as late as the graduate school, the junior high school assumes the major task of helping pupils develop the attitudes and skills of independent students."¹ This statement is one of the basic assumptions giving rise to this study.

The Problem

The purpose of this study is to determine if a formal class on study habits will be beneficial to seventh grade students in the public school system in Great Falls, Montana.

The benefit is that the student will do a better job of studying and will improve his grades.

¹Johnson, Maurite, "Study Skills," The Bulletin of National Association of Secondary School Principals, Vol. 47:30-31, October, 1963.

The Experimental Group

The group to which the study habits course was taught was the author's seventh grade homeroom group. It was one of the eighteen seventh grade groups at East Junior High School during the 1963-1964 school year. These groups are composed of students chosen in a random manner. There were 27 students in this group.

The Control Group

The control group consisted of 27 students selected from the seventh grade class of 1963-1964 at East Junior High School. These students came from the other seventeen homeroom groups.

The experimental and control groups were paired in the following manner:

1. School grade
2. Sex
3. I.Q. as determined by the Otis Quick Scoring Test of Mental Maturity which was administered to all seventh grade students in attendance at East Junior High in October, 1963.

The Course

Programmed Study Technique, How To Study Workbook, by Thomas F. Staton, Ph.D. was the study habits course used in this experiment. Dr. Staton is Professor of Psychology at Huntington College. It was

selected because it was designed to involve the student in learning how to study rather than just telling him how to study.

This course closely paralleled the following major breakdown of study habits in accordance with Guy Montrose Whipple:²

1. Physical condition (personal)
 - a. sleep
 - b. exercise
 - c. removing or compensating for physical defects of limitation
2. External conditions
 - a. place to work
 - b. light
 - c. temperature
 - d. clothing
 - e. desk and chair
 - f. equipment
3. Preparation conditions
 - a. when to study for advanced assignments
 - b. when and how to begin work
 - c. attitude of attention to work
 - d. work intensity--concentration
 - e. frustration and worry

²Whipple, Guy Montrose, How to Study Effectively, Public School Publishing Co., Bloomington, Illinois, 1916, pp. 39-42.

- f. why do this work
- g. applying for help
- h. reviewing previous lessons
- i. aim of your particular study period
- j. preview of assigned material
- k. begin with hardest or easiest assignment
- l. time given to weak points
- m. how well should the material be learned
- n. picking out important facts
- o. length of study period
- p. how to drill and necessity of repetition
- q. study breaks
- r. forming your own example
- s. marking your own books
- t. application of knowledge as soon as possible
- u. learning and memorizing terms, dates, formulas, etc.
- v. association of facts for recall
- w. memory work such as poems, speeches, etc. should be
learned as a whole
- x. how to read material to be committed to memory
- y. taking and rewriting notes

The author feels that the comparison of grades will point out that such a course would be beneficial to the seventh grade students in the public school system of Great Falls, Montana.

If this study is successful, the author hopes that he can be instrumental in getting a similar course included in the junior high school curriculum in the public schools of Great Falls, Montana.

Procedures

1. The study habits course will be taught during the third of the school year's four nine week grading periods.
2. A statistical comparison will be done to test the effectiveness of the course on grade achievement. Grades earned by the experimental and control groups before and after the experiment will be tested statistically for significant changes.

Limitations

1. The experimental group was limited to the author's seventh grade homeroom because the homerooms are homogeneous groups, and the author could effectively handle this group because it was his homeroom and presented no scheduling difficulties.
2. A period of nine weeks was chosen because it was the standard grading period, and would give ample time to present the course and to give individual attention to the students.
3. The list of study habits used as a basis for the course was selected for its similarity to others the author reviewed. It also seemed more detailed and complete.
4. Grades from the second and fourth grading periods were used in the test of significance.

CHAPTER II

REVIEW OF LITERATURE

The review of literature was made to ascertain what leaders in the field of study habits deem as good study habits. The author realizes that there may be conflicting ideas as to which study habits are important and also that one authority may stress certain study habits over others. The author has attempted to focus this review of literature on those study habits that might be most appropriate to students in the junior high school age group. This is pointed out by Northway, "To lay down one set of rules and expect them to apply equally to everyone is as dangerous a procedure as to lay down no rules at all."¹

Why Study

Among the most obvious incentives to study are:

1. recognition of the value of the subject in the future
2. not wanting to fail a particular subject
3. the feeling of being a credit to one's parents
4. wanting the approval of teachers, parents, and friends
5. resolve to get the most out of time and money invested in education
6. ambition to best your classmates,
7. to beat your own previous record
8. maintenance of a good reputation

¹Northway, Mary L., "Let's Teach Children How to Study," Grade Teacher 77:53, November 1959.

9. competition for good grades, prizes and honors
10. fear of various penalties²

Thomas emphasized this by saying, "Vigorous mental activity is put forth only when there is a feeling that the results sought after are of sufficient value to justify the effort."³ Moreover, the student may find a particular task interesting and enjoyable once he undertakes it even though it didn't seem interesting to him from the outset.⁴

Personal Physical Condition

Sleep and exercise seem to be two of the important factors that affect physical condition. It has been recommended that students of the junior high school age should have nine to ten hours of sleep for each twenty-four hour period.⁵

Physical exercise is valuable not only for muscular development, but also for proper stimulation and function of the circulatory, digestive and excretory systems of the body. Physical exercise may also afford a relaxing change from mental weariness or monotony.

Fatigue during the actual study session is not conducive to proper study. It may be reduced or eliminated by avoiding the following:

- (1) faulty posture; (2) time-consuming and profitless worry instead of

²Thomas, Frank W., Training for Effective Study, The Riverside Press, Cambridge, Massachusetts, 1922, p. 70.

³Ibid., p. 20.

⁴Whipple, Guy Montrose, How To Study Effectively Public School Publishing Company, Bloomington, Illinois, 1916, p. 17.

⁵Ibid., p. 17.

purposeful study; (3) failure to plan systematically for rest periods; (4) failure to properly utilize rest periods; (5) lack of proper amounts of sleep, exercise and nourishment.⁶

External Conditions

The study desk at home should be located in a room that will be free from distracting sounds such as television, radio, conversation, etc. The best location for the desk is facing a blank wall. It should not face a window.

Lighting should be from above and behind the student so situated as not to cause shadows or glare.

The recommended temperature range is between sixty-five and seventy degrees Fahrenheit. Ventilation should provide an adequate supply of fresh air without causing large fluctuations in room temperature.

Clothing worn during the study session should be that which is most comfortable to the student. Tight clothing should be avoided.

All equipment needed for the study session should be immediately available so that the student is not distracted by having to leave the desk to get it.

The important thought is that distractions should be eliminated as completely as possible. This is supported by Crawley's statement, "The greatest aids in improving attention or concentration show in plans

⁶Muse, Maude Blanche, Efficient Study Habits. W.B. Saunders Company, Philadelphia and London, 1929.

whereby other attractions (distractions) can be shunted off to a later time or eliminated entirely."⁷

The author realizes that these conditions exist in varying degrees depending upon the home environment.

Preparation Conditions

The most effective use of study time can be arranged through the use of a study schedule. "The ideal is to make a plan that is exact enough to get done all the things you want to do and is still flexible enough to permit adaptation to changing demands from day to day."⁸

The same study location should always be used and used only for study purposes. One may safely lean to the extreme in exercising this policy. By associating a place with the act of studying rather than with many different activities, many of the so-called preliminary preparations for study are found unnecessary to inducing a mood for study. Crawley points out that these regularly planned periods and place to study when consistently held to, will soon develop a most favorable attitude for getting down to work.⁹

⁷Crawley, Sumner Lee, Studying Efficiently. Prentice-Hall, Inc., New York, 1941, p. 50.

⁸Cole, Luella and Ferguson, Jessie Mary, Students' Guide to Efficient Study. Rinehart and Co., Inc., New York, 1946, pp. 3-4.

⁹Crawley, op. cit., pp. 50-51.

Technique for Study

Cullen in his work on study habits said, "Efficiency of study time is improved by use of good methods of attacking the assignment to be studied."¹⁰

The PQIRST technique advocated by Thomas F. Stanton is composed of five steps:¹¹

1. Previewing - Previewing can be accomplished in four different ways. Descriptive headings or titles which may appear may be scanned to get the general idea of the subject.

If topic headings are not used, key sentences at the first or last of paragraphs may give the general idea.

Some authors give a summary at the end of each chapter. Reading the summary first will afford a fine preview of the material in that chapter.

If none of the three previous methods is applicable then scanning can be employed. Scanning consists in running the eyes rapidly down the page picking out a sentence here and there to get the idea the author is trying to present.

Developing the skill to scan rapidly requires practice.

¹⁰Cullen, Joseph T., Study Habits of Graduate Students at Montana State College, 1962, p. 9. (Available in the Montana State University Library, Bozeman, Montana).

¹¹Stanton, Thomas F., How to Study, McQuiddy Printing Co., Nashville, Tennessee, 1962.

2. Question - Questions made up while progressing through the previous step may point out important facts to look for while carefully reading the material. These questions help concentration by giving something to look for while reading.
3. Read - Reaction is the keynote of effective reading. The reaction, thinking, must accompany the action of the eyes.
4. State - This step is accomplished when the reader states in his own words what has been read. This may be done after reading a paragraph, topic, or chapter. The stating should be done aloud. An idea that is so vague and unclear that it cannot be stated aloud is not going to be remembered long.
5. Test - This step is the same as the state step except that it is performed at a later time as a review. This means reflective thinking and not just rereading the text or notes. This review tests the memory and points out facts and ideas which may have been forgotten.

How much of the study time should each of the first four steps of the PQRS technique consume? Stanton gives the following answer.¹² Actual laboratory experiments have shown that the person who has a stated time to study a topic, whether that amount of time be fifteen minutes or five hours, generally makes better scores on tests on that material if he spends at least half of this total time in reflective thinking, as he

¹²Stanton, Thomas F., How to Study, High School Edition. American Guidance Service, Inc., Minneapolis, Minnesota, 1959, p. 9.

has to do in the question and state steps. This means, if you have a whole hour to study a topic, you will generally do better to spend thirty minutes or a little less, in your preview and reading steps and at least thirty minutes in your question and state steps.

Reviewing

Reviewing should be done at several different times following the initial learning. Because forgetting takes place most rapidly directly after learning takes place it therefore seems most plausible to review the next day. Subsequent reviews may be held a week later and then again in a few weeks or using some similar plan which best suits the situation. Crawley suggests that, "if we are interested in learning material so that we may add something to our intellectual equipment, then learning periods scattered throughout the time available for preparation are by far the most productive."¹³

Improvement of Reading Ability and Speed

Increasing reading speed can make the study session more palatable by saving time without reducing comprehension.¹⁴ However, the type of material being read is the determining factor as to how fast it should be read. The main technique employed to increase reading is to read segments of the sentence as opposed to reading single words. At the same

¹³Crawley, op. cit., p. 60.

¹⁴Meenes, Max, Studying and Learning. Random House, Inc., New York, 1964, p. 29.

time, the reader should force himself to move his eyes along at speed greater than that to which he is accustomed. Continued practice is the key to success in improving reading speed.

Taking Lecture Notes

The purpose in taking notes, as indicated by Meenes,¹⁵ is to indicate the purport of the material as shown by the teacher and as seen by the student. These lecture notes should include not only facts, but ideas and concepts. These facts, ideas and concepts should be written in the student's own words.

Trying to write down too much can take the student's mind from the flow of the lecture and thus important facts, ideas or concepts can be missed.

As soon as possible the lecture notes should be rewritten in better organization and form so as to render them meaningful when they are referred to at a later time.

Memorizing

Memorizing is essential when written passages, definitions, dates, etc., are to be learned verbatim. Crawley advocates three methods for memorizing, depending upon the length and the relationship of the parts

¹⁵Ibid., p. 27.

of the passage to be committed to memory. These are the whole method, the part method, and the modified part method.¹⁶

Small bits of information such as definitions, dates, lists, names, etc., may be memorized easier if they are associated with other things or through some artificial scheme of the student's own design.

Preparing for Examinations

Initial preparation for examinations begins with the first day of class. Conscientious study and review from the first day of class until the examination should provide adequate preparation. Knowing test types and how to study for each will be helpful. Sufficient time should be provided for reviewing so that cramming is not necessary.

¹⁶Crawley, op. cit., pp. 62-63.

CHAPTER III

TREATMENT OF THE DATA

Statement of the Hypothesis

The procedure involved stating the null hypothesis (H_0) and the alternate hypothesis (H_1) which were to be tested. The null hypothesis (H_0) was that there was no significant difference in grade achievement by those students who completed the course in study habits over those students that did not take the study habits course. The alternate hypothesis (H_1) was that students who completed the study habits course would show a significant improvement in grade achievement.

Selection of a Statistical Technique

In testing the hypothesis of this study it was necessary to determine from the available information if parametric or non-parametric statistics were most appropriate.

Nonparametric statistics were chosen to test these data for significance for the following reasons:

1. The statistics were not assumed to be drawn from a normally distributed population.
2. These academic grades are an ordinal scale and not an intraval scale.
3. Nonparametric statistics apply to small samples.

The Wilcoxon Matched-Pairs Signed-Ranks Test was used because the experimental and control groups were made up of matched pairs.

Confidence Level

For the test of significance used in this study, a confidence level of .01 for a two-tailed test was used in testing the hypothesis.

CHAPTER IV
THE EFFECT OF A COURSE IN STUDY HABITS
ON GRADE ACHIEVEMENT

The purpose of this study was to show that a course in study habits would raise the grades of twenty-seven seventh grade students at East Junior High School in Great Falls, Montana.

The data was tested for significance by employing the Wilcoxon Matched-Pairs Signed-Ranks Test. The formulas, format, and summary of computational procedure used in treating these data appear in Appendix A.¹

The letter grades that the students in the study received were coded to give them numerical rank. A table of this coding appears in Appendix B.

English, mathematics, social studies, and science were the subjects used for this investigation.

The test for significant difference between the experimental and control groups was applied to each school subject mentioned above. The grades were tested in each of the following ways:

1. Experimental group grades of the second quarter with experimental group grades of the fourth quarter, and
2. Experimental group grades of the fourth quarter with the control group grades of the fourth quarter.

¹Seigel, Sidney, Nonparametric Statistics for the Behavioral Sciences, McGraw-Hill Book Co., Inc., New York, 1956, pp. 75-83.

The tables of the statistical comparisons above appear in Appendix C.

Results of the Tests for Significant Difference

1. The following are the results of the tests for significant difference between the experimental group's grades for the second and fourth quarters.
 - a. English - the T-value was 49. With $N = 15$, a T-value of ≤ 16 was needed to reject the null hypothesis (H_0) at the .01 level; therefore the null hypothesis (H_0) was accepted.
 - b. Mathematics - the T-value was 47. With $N = 14$, a T-value of ≤ 13 was needed to reject the null hypothesis (H_0) at the .01 level; therefore the null hypothesis (H_0) was accepted.
 - c. Science - the T-value was 91.5. With $N = 19$, a T-value of ≤ 32 was needed to reject the null hypothesis (H_0); therefore the null hypothesis (H_0) was accepted.
 - d. Social studies - the T-value was 69. With $N = 19$ a T-value of ≤ 32 was needed to reject the null hypothesis (H_0); therefore the null hypothesis (H_0) was accepted.
2. The following are the results of the tests for significant difference between the fourth quarter grades of the experimental group and the fourth quarter grades of the control group.
 - a. English - the T-value was 82. With $N = 21$ a T-value of ≤ 43 was needed to reject the null hypothesis (H_0); therefore the null hypothesis (H_0) was accepted.

- b. Mathematics - The T-value was 110.5. With $N = 21$ a T-value ≤ 43 was needed to reject the null hypothesis (H_0) at the .01 level; therefore the null hypothesis (H_0) was accepted.
- c. Science - the T-value was 116. With $N = 22$ a T-value of ≤ 49 was needed to reject the null hypothesis (H_0) at the .01 level; therefore the null hypothesis (H_0) was accepted.
- d. Social studies - The T-value was 100. With $N = 23$ a T-value of ≤ 55 was needed to reject the null hypothesis (H_0) at the .01 level; Therefore the null hypothesis (H_0) was accepted.

Summary

The statistical analysis of the data for significant difference, the Wilcoxon Matched Pairs Signed-Ranks Test was used.

The grades used for comparison were for the subjects of English, mathematics, social studies and science.

Tests of significant difference were made for each of the above subjects by comparing first, the second and fourth quarter grades of the experimental groups, and second, the fourth quarter grades of the experimental group with the fourth quarter grades of the control group.

The null hypothesis (H_0), namely that of no significant difference, was accepted in each case tested.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this investigation was to determine if a course in study habits taught to seventh grade students would improve their grade achievement. In a culture that is placing continued emphasis on the importance of education, it is necessary that students be able to derive the most benefit from their educational opportunities as possible. The belief that students at all academic levels waste time and are not efficient in their studying led to this investigation.

Summary

The literature consulted revealed that the study habits recommended by the authorities in the field are:

1. proper attitudes toward the subject
2. keeping the body in proper physical condition
3. proper time and place for study
4. proper physical condition of the study area
5. plan for studying
6. taking lecture notes
7. improvement of reading
8. reviewing
9. memorizing
10. taking tests.

Conclusions

On the basis of the results of the statistical technique used in testing the data, the following conclusion was made: A formal course in study habits taught to twenty-seven seventh grade students at East Junior High School in Great Falls, Montana, did not significantly improve their grade achievement.

Recommendations

Since the course in study habits did not product the desired effect, the author recommends that further investigation be done in relation to the following:

1. review the current literature on learning theory to determine the appropriate design for such teaching, learning and related research, and
2. the content to be taught be experimented with in relation to different grade levels under varying learning conditions.

APPENDIX

APPENDIX A

Formulas, Format and Summary of Computational Procedure Used in Statistical Treatment of Data

Pair	a	b	$\frac{d}{(b-a)}$	Rank of d	Rank with less frequent sign
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					

$$\Sigma = \underline{\hspace{2cm}} = T$$

$T = \Sigma$ of Rank with less frequent sign

N = the number of matched pairs minus the number of pairs where $d = 0$

Summary of Procedure

These are the steps in the use of the Wilcoxon matched-pairs signed-ranks test:

1. For each matched pair, determine the signed difference (d) between the two scores.
2. Rank these d's without respect to sign. With tied d's assign the average of the tied ranks.
3. Affix to each rank the sign (+ or -) of the d which it represents.
4. Determine T = the smaller of the sums of the like-signed ranks.
5. By counting, determine N = the total number of d's having a sign.
6. The procedure for determining the significance of the observed value of T depends on the size of N:

If N is 25 or less, Table of Critical Values of T in the Wilcoxon Matched-Pairs Signed-Ranks Test shows critical values a T for various sizes of N. If the observed value of T is equal to or less than that given in the table for a particular significance level and a particular N, H_0 may be rejected at that level of significance.

APPENDIX C

Statistical Analysis

English - Experimental Group

Student Pair	2nd Qtr a	4th Qtr b	d (b-a)	Rank of d	Rank with less frequent sign
1	8	8	0		
2	9	12	3	11.5	11.5
3	6	6	0		
4	6	6	0		
5	10	9	-1	3.5	
6	5	2	-3	11.5	
7	4	1	-3	11.5	
8	12	10	-2	7.5	
9	9	6	-3	11.5	
10	10	9	-1	3.5	
11	6	6	0		
12	8	10	2	7.5	7.5
13	9	9	0		
14	3	6	3	11.5	11.5
15	6	3	-3	11.5	
16	1	1	0		
17	10	9	-1	3.5	
18	3	3	0		
19	3	2	-1	3.5	
20	9	9	0		
21	6	6	0		
22	7	7	0		
23	1	2	1	3.5	3.5
24	7	11	4	15.0	15.0
25	11	8	-1	3.5	
26	9	9	0		
27	9	9	0		

$$= 49.0 = T$$

$$T = 49.0$$

$$N = 15$$

$$.05 = 25; .01 = 16$$

Accept null hypothesis.

APPENDIX B

Coding of Grades

A+	13
A	12
A-	11
B+	10
B	9
B-	8
C+	7
C	6
C-	5
D+	4
D	3
D-	2
F	1

Mathematics - Experimental Group

Student Pair	2nd Qtr a	4th Qtr b	d (b-a)	Rank of d	Rank with less frequent sign
1	9	6	-3	10.5	
2	9	9	0		
3	6	6	0		
4	6	6	0		
5	9	9	0		
6	3	6	3	10.5	10.5
7	1	1	0		
8	9	8	-1	2.0	
9	6	6	0		
10	9	6	-3	10.5	
11	3	6	3	10.5	10.5
12	9	9	0		
13	7	7	0		
14	1	6	5	14.0	14.0
15	3	3	0		
16	3	3	0		
17	10	12	2	6.0	6.0
18	3	1	-2	6.0	
19	3	1	-2	6.0	
20	12	11	-1	2.0	
21	6	6	0		
22	6	2	-4	13.0	
23	3	3	0		
24	6	8	2	6.0	6.0
25	8	6	-2	6.0	
26	6	6	0		
27	9	8	-1	2.0	

$$\Sigma = 47.0 = T$$

$$T = 47.0$$

$$N = 14$$

$$.05 = 21; .01 = 13$$

Accept null hypothesis

Science - Experimental Group

Student Pair	2nd Qtr a	4th Qtr b	d (b-a)	Rank of d	Rank with less frequent sign
1	4	8	4	17.0	
2	9	10	1	4.5	
3	10	7	-3	15.0	15.0
4	6	7	1	4.5	
5	9	9	0		
6	3	3	0		
7	4	2	-2	11.0	11.0
8	12	11	-1	4.5	4.5
9	5	5	0		
10	10	8	-2	11.0	11.0
11	4	5	-1	4.5	4.5
12	9	9	0		
13	9	9	0		
14	3	4	1	4.5	
15	5	6	1	4.5	
16	5	2	-3	15.0	15.0
17	12	9	-3	15.0	15.0
18	1	6	5	18.5	
19	1	6	5	18.5	
20	12	12	0		
21	5	7	2	11.0	
22	5	7	2	11.0	
23	4	5	1	4.5	
24	10	8	-2	11.0	11.0
25	9	9	0		
26	6	6	0		
27	12	11	-1	4.5	4.5

$$\Sigma = 91.5 = T$$

$$T = 91.5$$

$$N = 19$$

$$.05 = 46; .01 = 32$$

Accept null hypothesis

Social Studies - Experimental Group

Student Pair	2nd Qtr a	4th Qtr b	d (b-a)	Rank of d	Rank with less frequent sign
1	2	3	1	5.0	
2	8	9	1	5.0	
3	7	6	-1	5.0	5.0
4	8	7	-1	5.0	5.0
5	9	9	0		
6	2	1	-1	5.0	5.0
7	1	3	2	11.5	
8	9	9	0		
9	1	7	6	19.0	
10	7	12	5	17.5	
11	2	3	1	5.0	
12	8	6	-2	11.5	11.5
13	6	6	0		
14	3	6	3	15.0	
15	3	3	0		
16	1	1	1	5.0	
17	10	9	-1	5.0	5.0
18	1	1	0		
19	1	1	0		
20	9	12	3	15.0	
21	8	2	-5	17.5	17.5
22	7	6	-1	5.0	5.0
23	1	3	2	11.5	
24	6	6	0		
25	6	6	0		
26	9	6	-3	15.0	15.0
27	9	11	2	11.5	

$$\sum = 69.0 = T$$

$$T = 69.0$$

$$N = 19$$

$$.05 = 46; .01 = 32$$

Accept null hypothesis.

Engoish - Control with Experimental
4th Quarter

Student Pair	Cont a	Exp b	d (b-a)	Rank of d	Rank with less frequent sign
1	8	8	0		
2	9	12	3	10.5	
3	8	6	-2	6.0	6.0
4	6	6	0		
5	9	9	0		
6	6	2	-4	15.0	15.0
7	5	1	-4	15.0	15.0
8	7	12	3	10.5	
9	5	6	1	2.0	
10	7	9	2	6.0	
11	9	6	-3	10.5	10.5
12	3	10	7	20.0	
13	5	9	4	15.0	
14	1	6	5	18.5	
15	1	3	2	6.0	
16	1	1	0		
17	9	9	0		
18	1	3	2	6.0	
19	1	2	1	2.0	
20	10	9	-1	2.0	2.0
21	6	6	0		
22	12	7	-5	18.5	18.5
23	6	2	-4	15.0	15.0
24	9	11	2	6.0	
25	1	9	8	21.0	
26	4	8	4	15.0	
27	6	9	3	10.5	

$$\Sigma = 82.0 = T$$

$$T = 82.0$$

$$N = 21$$

$$.05 = 59; .01 = 43$$

Accept null hypothesis.

Mathematics - Control with Experimental
4th Quarter

Student Pair	Cont a	Exp b	d (b-a)	Rank of d	Rank of less frequent sign
1	8	6	-2	6.0	
2	9	12	3	13.5	13.5
3	9	6	-3	13.5	
4	6	6	0		
5	9	9	0		
6	6	6	0		
7	6	1	-5	19.5	
8	9	8	-1	2.0	
9	3	6	3	13.5	13.5
10	9	6	-3	13.5	
11	8	6	-2	6.0	
12	6	9	3	13.5	13.5
13	6	7	1	2.0	2.0
14	7	6	-1	2.0	
15	3	3	0		
16	3	3	0		
17	9	12	3	13.5	15.5
18	1	6	5	19.5	19.5
19	3	1	-2	6.0	
20	9	11	2	6.0	6.0
21	3	6	3	13.5	13.5
22	10	2	-8	21.0	
23	6	3	-3	13.5	
24	11	8	-3	13.5	
25	8	6	-2	6.0	
26	6	6	0		
27	5	8	3	13.5	13.5

$$\Sigma = 110.5 = T$$

$$T = 110.5$$

$$N = 21$$

$$.05 = 59; .01 = 43$$

Accept null hypothesis.

Science - Control with Experimental
4th Quarter

Student Pair	Cont a	Exp b	d (b-a)	Rank of d	Rank with less frequent sign
1	8	8	0		
2	7	10	3	11.5	11.5
3	11	7	-4	16.0	
4	9	7	-2	7.0	
5	7	9	2	7.0	7.0
6	7	3	-4	16.0	
7	11	2	-9	22.0	
8	11	11	0		
9	6	5	-1	2.5	
10	6	8	2	7.0	7.0
11	9	5	-4	16.0	
12	6	9	3	11.5	11.5
13	3	9	6	21.0	21.0
14	6	4	-2	7.0	
15	1	6	5	19.5	19.5
16	7	2	-5	19.5	
17	12	9	-3	11.5	
18	2	6	4	16.0	16.0
19	3	3	0		
20	12	12	0		
21	6	7	1	2.5	2.5
22	11	7	-4	16.0	
23	7	5	-2	7.0	
24	9	8	-1	2.5	
25	12	9	-3	11.5	
26	5	5	0		
27	12	11	-1	2.5	

$$\Sigma = 116.0 = T$$

$$T = 116.0$$

$$N = 22$$

$$.05 = 66; .01 = 49$$

Accept null hypothesis.

Social Studies - Control with Experimental
4th Quarter

Student Pair	Cont a	Exp b	d (b-a)	Rank of d	Rank with less frequent sign
1	9	3	-6	21.0	
2	6	9	3	11.0	11.0
3	8	6	-2	6.5	
4	6	6	0		
5	3	9	6	21.0	21.0
6	4	1	-3	11.0	
7	6	3	-3	11.0	
8	9	9	0		
9	7	6	-1	3.0	
10	8	12	4	16.0	16.0
11	12	3	-9	23.0	
12	2	6	4	16.0	16.0
13	3	6	3	11.0	11.0
14	5	4	-1	3.0	
15	2	3	1	3.0	3.0
16	4	1	-3	11.0	
17	10	9	-1	3.0	
18	1	1	0		
19	2	1	-1	3.0	
20	9	12	3	11.0	11.0
21	6	2	-4	16.0	
22	12	6	-6	21.0	
23	8	3	-5	18.5	
24	11	6	-5	18.5	
25	8	6	-2	6.5	
26	3	6	3	11.0	11.0
27	11	11	0		

$$\Sigma = 100.0 = T$$

$$T = 100.0$$

$$N = 23$$

$$.05 = 73; .01 = 55$$

Accept null hypothesis.

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