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A Study to Determine the Correlation Between Extra Study Time After School to Grades Earned by Students

William P. Young
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A STUDY TO DETERMINE THE
CORRELATION BETWEEN EXTRA STUDY TIME
AFTER SCHOOL TO GRADES EARNED BY STUDENTS

A Research Paper

Presented to the Graduate Faculty
of the Department of Occupational and Technical Studies
at Old Dominion University

In Partial Fulfillment
of the Requirements for
the Master of Science in Education Degree

By

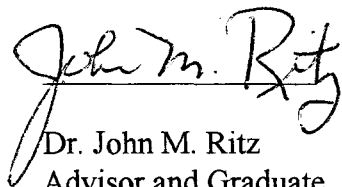
William P. Young

April 1998

APPROVAL PAGE

This research paper was prepared by William P. Young under the direction of Dr. John M. Ritz in OTED 636, Problems in Education. It was submitted to the Graduate Program Director as partial fulfillment of the requirements for the Degree of Master of Science of Education.

APPROVAL BY:



Dr. John M. Ritz
Advisor and Graduate
Program Director

4-16-98

Date

TABLE OF CONTENTS

	Page
Approval Page.....	i
Table of Tables.....	iv
CHAPTER	
I. INTRODUCTION.....	1
Statement of the Problem.....	2
Research Goals.....	2
Background and Significance.....	2
Limitations.....	3
Assumptions.....	3
Procedures.....	4
Definition of Terms.....	4
Summary and Overview.....	5
II. REVIEW OF LITERATURE.....	7
Components of Homework.....	8
Summary.....	12
III. METHODS AND PROCEDURES.....	13
Population.....	13
Research Variables.....	13
Instrument Design.....	13

	Methods of Data Collection.....	13
	Statistical Analysis.....	14
	Summary.....	14
IV.	FINDINGS.....	15
	Report of Findings.....	15
	Summary.....	17
V.	SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS.....	18
	Summary.....	18
	Conclusions.....	19
	Recommendations.....	20
	BIBLIOGRAPHY.....	22
	APPENDIX A	23

TABLE OF TABLES

	PAGE
Table 1. Raw Data.....	16
Table 2. Computation of r.....	17

CHAPTER I

INTRODUCTION

Success in any school program is dependant upon many different variables including intelligence, instructor quality, curriculum quality, material presented, and the amount of time spent studying the material presented during the day. Most of these variables are extremely difficult to analyze except the amount of time spent studying.

Industry often accuses schools of not preparing young people for entrance into the work force. This is similar to people being trained in the Navy. The student attends a school before reporting to a ship, but their skills simply are not up to the standards expected. The reasons for this could be that the curriculum in place is not exposing them to the correct material, or they did not truly master the material and therefore did not remember it when performance on the job was required.

This study involves students training to be Operations Specialists (O.S.) in the Navy. The Operations Specialist holds an extremely important job on a ship. He/she must identify and follow any contact within several hundred miles of the ship. This action not only protects his/her own ship, but also those ships in the surrounding area. This helps to allow ships to be placed in very hazardous areas to carry out the policies of the United States Government.

These reasons dictate that an O.S. must be very knowledgeable about their tasks. Any information that can be obtained to help the school administrators improve their course will allow them to send better prepared students to the fleet.

STATEMENT OF THE PROBLEM

The problem of this study was to determine the correlation between extra time of study after school to the final percentage grade earned by students in NTCS-A Manager's Course located at Dam Neck, Virginia.

RESEARCH GOALS

The following goals were established to guide the research:

1. Determine the number of extra minutes of study each student spent during the course.
2. Determine the final percentage grade for each student for the course.
3. Determine if a correlation exists between extra minutes of study and grades for the subjects of this study.

BACKGROUND AND SIGNIFICANCE

The major goal of the NTCS-A Manager's Course is to introduce and teach the advanced skills the students will need to be productive crew members on a United States Naval vessel. The NTCS-A Manager's function on a ship is very important. This person makes sure all of the other ships in the group have the same data available to them. Student critiques of the course and feedback from the supervisors of graduates assist curriculum developers in designing a program that will teach the students the material that is necessary for success on the job. Records on the extra time of study each student puts in are recorded by the school, but they have never been correlated with student grades.

Many researchers have undertaken studies concerning grades and homework, but there has not been any work in this area using the military as the subject population. Since the Navy spends huge amounts of time and money on training, it would seem to be important for them to learn about relationships that may exist between homework and grades. This could allow them to maximize the money being spent on training and increase the readiness of their people.

The information presented in this research may be used to improve the way the school is taught and assure that the newly graduated students are better prepared when they return to the fleet. Any mistake made in training can be corrected; however a mistake while on-the-job can have disastrous consequences. This study was developed to provide the administrators of the NTCS-A Manager's Course with some insight into the importance of study hours outside school.

LIMITATIONS

The following limitations were maintained during this research study:

1. The research followed four classes of NTCS-A Manager's Course students for the entire course of three weeks.
2. The research was limited to NTCS-A Manager's Course students.
3. The research was limited to students located at Dam Neck, Virginia.

ASSUMPTIONS

The following assumptions were used in this study:

1. Instructors will allow data to be collected from the student study log.
2. Instructors will allow access to students' grades.

3. Students will accurately record time spent studying.
4. Students will study for the time recorded.

PROCEDURES

This study was developed to determine the relationship that may exist between extra hours of study and the grades for NTCS-A Manager's Course students. The data was collected by using a weekly log. This log was used for each week of the three week course.

The log was simply set up to be used to record the date, student's name, and the time they began and ended the study period. These daily study times were totaled at the end of the course. Weekly test grades, for each student, were collected from the instructors. These grades were used to compute the final percentage grades. After collection and analysis, the data will be made available to the school administrators for future improvements of the course.

DEFINITIONS OF TERMS

The following terms are defined to allow the reader a better understanding of the material in this study:

1. O.S.: Abbreviation for Operations Specialist.
2. Operations Specialist: A person whose main job is to present a clear tactical picture of the surrounding area to their supervisors. This job includes identifying and tracking friendly, hostile, and unknown contacts of all types.
3. NTCS-A: Abbreviation for Navy Tactical Command System-Afloat

4. Navy Tactical Command System-Afloat: The school used to teach military members advanced skills for their jobs.
5. Percentage grades: A simple raw score from 0% to 100%. At this school above 70% is passing and below 70% is failing.
6. After hours study: School work done outside normal school hours.
7. Enlisted personnel: Any military member other than commissioned officers and warrant officers.
8. Instructors: Mid-level to senior-level enlisted personnel.
9. Administrators: Others involved in the operations of the school not including students and instructors.
10. Contact: Any aircraft, ship, or submarine within a specified distance from the ship.
11. Practical Test: The student is required to perform a certain task and is graded on the performance of that task.

SUMMARY AND OVERVIEW

Chapter I of this study introduced the basics of the NTCS-A school and the need to conduct a study concerning extra study hours at Dam Neck, Virginia. The information provided in the study will help administrators to discover if a link exists between night study and success in NTCS-A school. If a link does exist, it may help them improve the school.

Chapter II will present literature on the subject of homework and its relationship to grades. Chapter III will reveal the methods and procedures used in this study. The

statistical data and findings will be presented in Chapter IV. Chapter V will present the summary, conclusions, and recommendations of this study.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter was to review relevant literature concerning time spent on homework-vs-grades earned in the classroom setting. However, relatively few research studies deal with this topic (Strother, 1984, p. 189). Most people, students and parents alike, believe homework is an inseparable part of school. The vast majority of people also believe that more time devoted to homework will give a corresponding increase in school grades.

Whenever reformers attempt to improve the academic outcomes of American schooling, more homework seems to be one of the first steps. The justification for this probably has more to do with philosophy (students should work harder) and with ease of implementation (increased homework costs no extra money and requires no major program modifications) than with new research findings (Strother, 1984, p. 190).

Increasing the amount of homework is a recurring theme for the reason that it does not cost any extra money. The teacher simply assigns more homework. If people truly believe that an increase in homework will cause a corresponding increase in grades, then everyone will be happy except for possibly the students doing the extra work. The only problem with this line of reasoning is that the research findings do not always support this particular position. The part of this plan that administrators and parents both like is that it does not cost anything to implement. That is the major reason it seems to be so popular from time to time. As we will see, some researchers have found support for the belief that homework has a strong influence on grades while others have found

only a very weak link or even a slight negative correlation. In this chapter the following topics will be reviewed in depth: the studies supporting the use of homework, the studies that do not support the use of homework, and those studies that have shown no correlation between homework and grades.

COMPONENTS OF HOMEWORK

Nearly all of the research conducted in this area has the same weakness. Students are allowed to self-report on their time spent studying after an extended period has passed. A better method is to use a log. The students keep track of time on specific tasks at each study session. The following study utilized the log method.

Normally, homework consists of three activities: reading, reviewing, and organizing. Dickinson and O'Connell gave the following specific directions and definitions to students for keeping track of time spent on homework activities.

Reading. Record the time you begin and end reading or rereading material for this course only. Reading does not include reading headings (surveying the chapters) and underlining, unless you underline *as you read*. Be sure to write down every time you read. Indicate in your book when you start and end and then transfer the times to your Study Time Form. Note that every time you take a break (e.g., to get a drink, to go to the restroom, to talk to a friend) you should record the time you stopped reading. Record the time you resume reading on the next line.

Studying. Reviewing and organizing are forms of *studying* that take place after reading and in some cases while you are reading. Record the time you begin and end reviewing and organizing. This will generally be conducted after you read your text or listen to a lecture. Record when you start and end as you did in reading. We are providing you with a brief description of each of these study techniques. Record your total study time and estimate how much study time was spent in the following activities:

A. Reviewing is rereading underlined material, reading notes, reading headings and trying to recall information under the headings and recalling definitions and repeating material.

B. Organizing is writing answers to objectives (from text readings), usually in your own words; finding a structure (superordinate and subordinate groupings of concepts) to the material; combining lecture and reading notes, and figuring out the meaning of the material. Associating the material to what you already know, using mental images, summarizing in your own words and devising a system for recall should also be included under organizing. In some cases you may do no reading or studying during a period as long as a week. Should this occur, you should still submit your log and simply note that your totals are zero.

Some people read, review, organize, and encode all in the same time-frame. That is, they spend 2 minutes reading, underline while reading; they then review what has been read in 30 seconds and they then make notes which may take a minute or two. With this kind of studying, it would be impractical to record by minutes the difference between reading, reviewing, and organizing. We suggest that you simply record the *estimated* time spent reviewing and organizing (Dickinson & O'Connell, 1990, p. 228).

Dickinson and O'Connell addressed four important measures of time spent on homework. Total time on task was broken down into three very different activities including: reading, reviewing, and organizing. Since students were given very specific instructions about what behaviors to label as a certain activity, they should be able to provide the researcher with much better information than most other forms of self-reported data collection. The major strength this system has is that the reporting is done at least on a daily basis. It is far more accurate than a weekly or monthly estimate of time spent studying. A person simply can do a more accurate job if it is done on a daily basis. Accurate data is absolutely necessary if the conclusions of the study are to have any true significance.

In the final analysis of their data, Dickinson and O'Connell found only a weak correlation between total study time and academic achievement. However, they found a much stronger correlation between time spent on organizing information and grades. Specific information is shown in the following paragraph.

The time spent organizing had a stronger relationship with course test scores than did total study time, and time spent reading and reviewing. High-scoring students averaged almost 32 min more per week organizing than did low-scoring students, although their difference in total study time was only 53 min per week (Dickinson & O'Connell, 1990, p. 229-230).

This correlation between the time spent organizing and grades was significant. The total time spent studying by high and low scoring students was not very different, but the time devoted to organizing the data was very different. This study supports the theory that it may not be how long a student studies that matters, but the way the student studies the subject. If students are taught how to study it may be more beneficial than just telling them to study longer hours.

Cooper found that in primary grades homework had a negative impact or no effect on academic success, however in high school it had a significantly positive value. This study still did not show cause and effect between homework and grades. Do students with better grades get more homework? Does more homework cause better grades? Cooper also raised this question: If more homework time is associated with lower achievement, does homework have a detrimental effect on performance, or do brighter students simply finish assignments in less time? If the amount of time spent on

homework is believed to be the cause of higher grades, then as students get older homework has a more positive effect on achievement (Cooper, 1994, p. 27).

Time spent on homework had a small but meaningful influence on achievement. This suggests that spending more time on homework has a positive influence on academic achievement. Indeed, how students spent their time outside the school has important implications for their learning and social development.

Time spent on homework appears to increase when students have consistently good previous grades, are more motivated, have good things to say about quality of instruction and schooling, and are engaged in more coursework (Hernandez-Gantes, 1992, p. 15-16).

Many extraneous variables exist in this research. It is next to impossible to control variables such as how students spend their time out of school, previous grades, motivation toward school, and the student's home life. All of these variables have the potential to destroy the internal validity of the research study. This lack of internal validity would render any conclusions or recommendations to be highly suspect.

Students, teachers, and parents may interact more when well designed homework is assigned. Graded homework with teachers corrections/comments may also raise achievement levels (LaConte, 1981, p. 18). Well designed homework should complement the classroom work. It should motivate and encourage the student to dig deeper into the subject.

While some research says that more time spent on homework will increase grades, other research refutes this completely. The current research does not seem to prove conclusively that homework is beneficial or detrimental. Most of the research

supporting homework shows only weak correlations with increased academic achievement. Although this does seem to strengthen slightly as the student gets older, it is not to say that studying at home is useless.

What the research calls into question, however, is the effectiveness of traditional routine homework assignments growing out of a school setting. While a highly motivated convict may well turn into a potential lawyer through self-study, a student who detests mathematics is not likely to become a math wizard by doing extra problems at home.

Homework assignments for which students are highly motivated and which they feel are useful will promote learning, and those which students see as drudgery will not -- they may, in fact, further decrease student interest and lead to cheating. Required exercises, whether practice or preparation, are best accomplished in class under teacher supervision. Homework is best reserved for assignments that extend classwork and increase student interest and motivation (LaConte, 1981, p. 18).

This passage seems to state the obvious. A student will do better if he/she is interested in the subject and not as well if the subject or task is distasteful.

SUMMARY

This chapter reviewed the current research correlating time devoted to homework to academic achievement. It included some research supporting the use of homework, some research suggesting a negative influence, and some research that takes the position that there is no correlation between homework and grades. Much of the research that now exists is inconclusive. Chapter III will include the methods and procedures for data collection in the time spent on homework-vs-grades earned correlational study.

CHAPTER III

METHODS AND PROCEDURES

Chapter III, Methods and Procedures, will discuss the population, research variables, instrument design, methods of data collection, statistical analysis, and the summary. This section is used to show the reader all of the necessary information about the population, data collection, and analysis of the data.

POPULATION

The population for this study consisted of four classes of NTCS-A Manager's Course students. There were a total of 83 students in the subject classes.

RESEARCH VARIABLES

The independent variable for this study was the amount of time spent working on homework outside class time. The dependant variable was the final grade that was received for the course.

INSTRUMENT DESIGN

A study log was used to collect the data from the students. The log simply consisted of a space for the student's name and spaces for time in and time out. This data was then totaled for later use. See Appendix A for a sample log.

METHODS OF DATA COLLECTION

The log was placed in the classroom. The students were instructed on how to use the log. They were to insert the date, their name, time in, and their signature in the appropriate places upon arrival. When the study session was complete they would

complete the time out block. This would continue for the duration of the course. Grades were obtained from the class instructors. The final percentage grade assigned to each student was composed of scores from two written quizzes, two practical test, and two written tests.

STATISTICAL ANALYSIS

The total time studied each week was correlated to the grades earned by each student. The results will be presented in the following chapter. The Pearson's r Product Moment Correlation was used as the statistical method to determine the coefficient of correlation for this set of data.

SUMMARY

This chapter has presented the reader with information on the population, research variables, instrument design, methods of data collection, statistical analysis, and the summary. Chapter IV, Findings, will present the data collected and the analysis of that data.

CHAPTER IV

FINDINGS

The purpose of this chapter is to present the findings of the study. The purpose of this study was to determine if a correlation existed between extra time of study after school to the final percentage grade earned by students in the NTCS-A Manager's Course located at Dam Neck, Virginia.

A log was used to collect the data for this study. The students signed their name and arrival time in a study log. When the student was finished for the night, he/she would then place this time in the log. At the end of the course, the time for each student was totaled. The night study hours for each student were totaled and the final percentage grades were computed. These totals were used in the computations of the Pearson's r Product Moment Correlation.

REPORT OF FINDINGS

Table I indicates the total number of minutes studied and the final percentage score for each student. There were a total of 83 student used in this research. The Pearson's r Product Moment Correlation was used as the statistical method to determine the coefficient of correlation for this set of data. The computation is shown in Table 2.

TABLE I
Raw Data

Student Number	Minutes of Study	Final Score (%)
1	120	95.6
2	180	95
3	0	95.1
4	330	98.35
5	0	93.3
6	240	81.15
7	90	80.85
8	330	93.8
9	0	97.5
10	120	92.1
11	0	91.25
12	0	94.05
13	0	95.8
14	0	96.95
15	210	94.7
16	0	80.85
17	0	97.3
18	0	91.55
19	360	94
20	120	93.85
21	240	97.85
22	0	97.15
23	210	95.15
24	0	96.8
25	370	91.65
26	150	91.8
27	270	85.9
28	315	97.15
29	190	91.35
30	270	92.5
31	165	98.5
32	0	95.65
33	150	88.55
34	285	92.35
35	30	91.3
36	150	87.05
37	930	85.05
38	200	88.45
39	190	85.2
40	240	94.55
41	625	97.3
42	635	97.6

Student Number	Minutes of Study	Final Score (%)
43	210	97.2
44	510	90.65
45	425	85.4
46	410	84.55
47	350	94.45
48	330	88.35
49	120	86.95
50	225	88.45
51	105	93.25
52	185	95.2
53	445	86.85
54	0	96.55
55	0	96.85
56	740	89.5
57	290	94.9
58	185	93
59	85	88.45
60	390	91.7
61	495	94.6
62	665	94.05
63	200	83.95
64	450	84.75
65	140	90.9
66	70	98.35
67	85	93.85
68	40	95.3
69	120	91.25
70	155	87.35
71	500	93.3
72	85	95.45
73	120	84.2
74	0	92.75
75	125	81.85
76	390	87.35
77	40	98.15
78	365	98.65
79	35	90.7
80	120	93.25
81	0	96.8
82	85	88.25
83	175	94.4

TABLE II
Computation of r

Raw Data	Computation of r
$\Sigma X = 17180$	$r = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{\{N\Sigma X^2 - (\Sigma X)^2\} \{N\Sigma Y^2 - (\Sigma Y)^2\}}}$
$\Sigma X^2 = 6668850$	
$\Sigma Y = 7643.6$	
$\Sigma Y^2 = 705724.9$	
$\Sigma XY = 1570266$	
$N = 83$	$r = -.157$

This value, $r = .157$, was calculated. It was not found to be significant at the .05 level. The level of magnitude was found to show a slight or almost negligible relationship (Ritz, 1997, p. 8)

SUMMARY

This chapter has presented the data collected and the analysis of that data. Chapter V will state the summary of the study and this researcher's conclusions and recommendations.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of Chapter V was to summarize the study, draw conclusions, and make recommendations. The conclusions section will answer the research goals based upon the data collected. Finally, recommendations will be made based upon the results of the study and suggestions for future studies.

SUMMARY

The problem of this study was to determine the correlation between extra time of study after school to the final percentage grade earned by students in NTCS-A Manager's Course located at Dam Neck, Virginia. Research goals have been established to help guide this research. These goals consist of determining the number of extra time of study each student spent during the course, the final percentage grade for each student, and finally if a correlation exists between extra time studying and grades for the subjects of this study.

Educators have always been interested in the effectiveness of additional study beyond regular school hours. If additional study time can be shown to increase test scores, then it is worthwhile. However, if increases in study times do not increase test scores, then it may be a waste of time. This is why it is important that studies like this are conducted.

The limitations that governed the study included:

1. The research followed four classes of NTCS-A Manager's Course students for the entire course of three weeks.
2. The research was limited to NTCS-A Manager's Course students.
3. The research was limited to students located at Dam Neck, Virginia.

A study log was used to collect data. The students placed their name, time at beginning of study session, and the time at the completion of the session in this log.

After the course was completed this information was totaled for each student. The test grades were obtained from the course instructors. The Pearson's r Product Moment Correlation was used to determine if the variables were related.

CONCLUSIONS

The research goals were established to help guide the study. The following are the research goals and the response to each goal.

1. Determine the number of extra minutes of study each student spent during the course. These values were obtained from the student study log by subtracting the time in from the time out and converting that difference into minutes. This was done for each student for each entry. The student's entries were then totalled. These totals represent the independent variable for this study. For the 83 students involved in this study, an average of 207.27 minutes of extra study time was calculated.
2. Determine the final percentage grade for each student for the course. The grades for all students were acquired from the instructors of the course. They were comprised of a simple average of two written quizzes, two practical tests,

and two written tests. These final percentage grades were used for the dependant variable. The average grade earned by the students was 92.08%.

3. Determine if a correlation exists between minutes of study and grades for the subjects of this study. This was answered by using the information collected from the first two goals. Pearson's r Product Moment Correlation was used to correlate the paired sets of study time and grades. The value for the Pearson's r Product Moment Correlation for this set of data was $-.157$. This value was not significant at the $.05$ level. The level of magnitude was less than $.20$. The correlation in this study was not found to be significant, therefore the grades and study time are not correlated. Consequently, there was no apparent benefit to extra time spent studying for this group of students in the NTCS-A Manager's Course.

RECOMMENDATIONS

The data collected for this study do not support the use of additional study time to increase test scores. This is not to say that homework is never useful, but in this specific setting there was no benefit from additional study. Students with previous experience may not study as long as less experienced students, however they may still earn high grades.

Other researchers may consider correlating past experience with the NTCS-A system and grades for tests in the class. Research correlating extra study time at school to actual job performance would be truly useful to the United States Navy or any institution. A follow-up study for this research could be to document the performance of

graduates of this course and compare these to their final percentage grade or extra study time. This type of study, however, would be exceedingly difficult to safeguard from confounding variables.

The average final score of 92% is evidence of grade inflation. The students are expected to do well in all Navy schools. Often instructors are strongly encouraged to provide hints to the students about probable test content. An instructor with low student averages could be advised, in a negative manner, to rectify the situation.

It is also recommended that the administrators of this course examine exactly what activities the students are engaging in while signed into night study. Are the students actually studying or simply socializing?

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APPENDIX A
Night Study Log

