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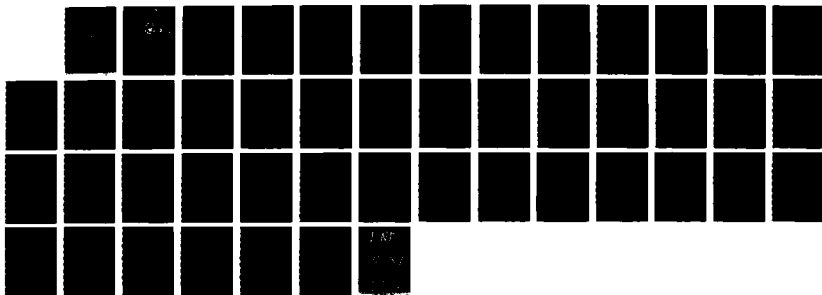
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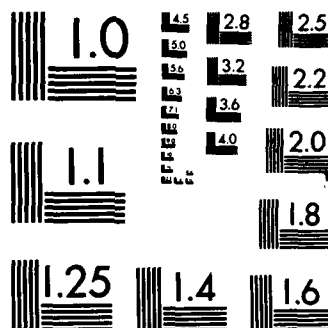
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AN EXAMINATION OF THE FACTORS THAT
AFFECT STUDENT PERFORMANCE
IN THE FIRST GRADUATE ACCOUNTING COURSE
TAKEN AT THE
NAVAL POSTGRADUATE SCHOOL

by

Thomas S. Kennedy

June 1987

Thesis Advisor

O. Douglas Moses

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An Examination of the factors that affect student performance
in the first graduate accounting course taken at the
Naval Postgraduate School

by

Thomas S. Kennedy
Lieutenant Commander, United States Navy
B.S., United States Naval Academy, 1976

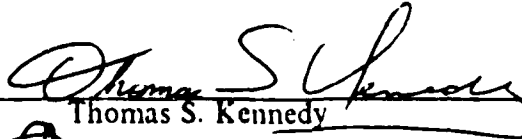
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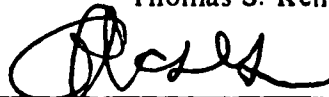
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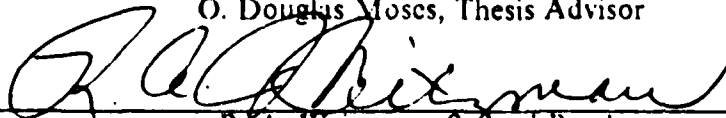
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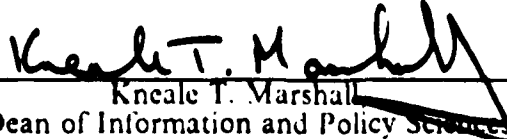
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ABSTRACT

The purpose of this study was to examine various factors in a student's background and investigate how they affect the student's performance in the first accounting courses taken at the Naval Postgraduate School (NPS). An understanding of these factors could enable future students to perform better academically. This understanding could also prove useful in the screening process used to select Naval Officers for study in Administrative Sciences at the Naval Postgraduate School. The findings indicate that undergraduate grade-point average, prior accounting course work, and prior financial management work experience are the most important influences on success in accounting courses at NPS.

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I. INTRODUCTION

A. PURPOSE OF THE STUDY

The purpose of this study was to examine various factors in a student's background and investigate how they affect the student's performance in the first accounting course taken at the Naval Postgraduate School (NPS). An understanding of these factors could enable future students to better prepare themselves in advance for accounting courses taken at NPS, thus ensuring a strong foundation for subsequent related courses of study in the program. This study used both correlation and regression analysis to analyze one hundred and five student surveys.

During the course of this study, the Administrative Science Department faculty and staff received a proposal to consider during an upcoming Curriculum Review. The proposal concerned changing the mathematical background section of the Academic Profile Code (APC) entry requirements for the Financial Management curriculum. The effects and the need for this proposed change is investigated with the available data from this study.

B. THE NAVAL POSTGRADUATE SCHOOL (NPS)

1. General

The Naval Postgraduate School (NPS) is primarily an academic institution with emphasis on programs that are relevant to Navy interests. NPS meets the Navy's needs for advance education of Naval Officers in the fields of science, engineering, operations analysis and management. Under the fully-funded education program at NPS, students receive all pay and benefits and have tuition paid by the Navy (1). All Master of Science Management programs at NPS are six quarter courses of study. The need to be able to accurately predict academic performance in order to screen potential candidates is obvious when considering the extensive costs involved with providing a quality graduate education. Selection for Navy funded graduate education is based on academic capability, outstanding professional performance, promotion potential and a strong educational background. The Graduate Record Examination (GRE) is often used as a measure of academic ability but the GRE is currently not required for admission to NPS. The primary measure of academic capability and educational background in use for NPS is the Academic Profile Code (APC).

2. Academic Profile Code (APC)

The APC is a three-digit number that summarizes pertinent portions of a Naval Officer's prior college performance. The three independent digits reflect an individual's cumulative grade point average (GPA or QPR), performance in calculus related mathematics courses, and qualifications in selected science/engineering areas. The APC system is fully explained in OPNAVNOTE 1520 (1). A summary of the APC structure taken from the Naval Postgraduate School Catalog is provided in Appendix A. An APC of 345 is required for entry into the Administrative Science Programs. The proposal under consideration recommends an APC of 335 be required for entry into the Financial Management Curriculum. Basically, the second digit change would require students to have had one calculus course with a grade of C or better upgraded from the current requirement of having two or more pre-calculus courses with a B or better average.

C. COURSES OF STUDY

All students in the Administrative Sciences department start their first quarter studies taking the same four core courses. The four courses are Financial Accounting (MN2150), Economic Decision Making (MN2031), Managerial Communication Skills (MN3333), and Mathematics for Management (MA2300). Since this study focuses on performance in the first accounting courses taken at the Naval Postgraduate School, course descriptions taken from the school catalog are provided below. Financial Accounting (MN2150) is a four credit hour course of basic accounting concepts and standards. Specific topics include the accounting cycle, asset valuation, equities and capital structure, earnings measurement, cash flow analysis, and financial statement analysis.

Managerial Accounting (MN3161) is a four credit hour course of study taken by Administrative Science students during their second quarter of study. The course provides an introduction to cost accounting with an emphasis on applications of accounting data to planning, control, and decision making. Topics covered include budgeting, flexible budgets, standard costs and variance analysis, performance measures, cost-volume-profit analysis, cost analysis for decision making, and capital budgeting. The prerequisite for this course is MN2150.

Since this study will also investigate the proposed APC change, a description of Mathematics for Management (MA2300) is also provided. This course is a five credit

hour course designed to provide a mathematical basis for modern managerial tools and techniques. Elements of differential and integral calculus, sequences and series and an introduction to matrix algebra are also included. The prerequisite for this course is college algebra. This course description is provided to give the reader background information on the mathematical instruction students initially receive at NPS. The grade from this course is not included in the analysis.

D. ACCOUNTING BACKGROUND

Students entering the Administrative Science programs come from a broad spectrum of educational backgrounds. Some student may have had no accounting instruction while others may have taken several courses throughout their academic career. It therefore becomes essential to gain an understanding of which factors influence student performance and to what extent. This study analyzes several variables in an attempt to gain that understanding. The understanding of which factors influence performance is valuable to both the student and administration. Value to the student can work in several ways. First, candidates for postgraduate education could improve their chance of success by taking off-duty accounting courses if for example previous accounting instruction proved to be beneficial. Second, a student could prepare for upcoming assignment to NPS by an increased reading of business publication if that proved beneficial to performance. Third, candidate screening could be carried out ensuring a higher success rate if for example undergraduate GPA proved to be a good predictor of student performance in the Administrative Science programs. Therefore the objective of this thesis is to study factors that may influence performance.

E. STUDY OUTLINE

The following chapters will be broken down in a manner that will hopefully prove to be easy to read and educational. Chapter II is a review and discussion of available literature on academic performance in the area of graduate level studies focusing on accounting. Chapter III provides a discussion of the methodology used in this study. Chapter IV presents the data collected for the analysis of this study. Chapter V discusses and presents the analysis results. Lastly, Chapter VI provides a summary of the conclusions and recommendations as a result of the data analysis.

II. LITERATURE REVIEW

A. GENERAL

The purpose of this chapter is to discuss previous studies, their relevance and possible contributions to this study. Due to the increasing costs of education there has been a growing interest in recent years concerning the prediction of graduate school success. Numerous studies have been conducted to examine different aspects of prediction of academic performance. The studies discussed in this chapter will be broken down into four categories:

1. Previous NPS studies
2. Other postgraduate studies
3. Studies based on accounting performance
4. General academic performance studies.

B. PREVIOUS NPS STUDIES

Three studies conducted by previous NPS students, Cook, Sofge, and Soetrisno examined prediction of academic performance at the Naval Postgraduate School. Specifically, Cook's study in 1974 investigated prediction of academic success in the Communications Management curriculum. Sofge, also in 1974, investigated prediction of performance and satisfaction of Aeronautical Engineering students. Soetrisno in 1975 examined the prediction of academic performance in the Operations Research/Systems Analysis curriculum. All three studies used identical biographical questionnaires, the Graduate Record Examination, and the Strong Vocational Interest Blank (SVIB) for data analysis.

Cook concluded that four variables of the one hundred and forty that he examined provided an improved predictive validity than the method used by the Postgraduate Selection Board. Cook used regression and correlation methods to develop four tables and two expectancy charts for predicting academic success. The first two entering variables were whether or not the student had an undergraduate major in engineering and whether or not the student graduated from the U.S. Naval Academy. The answer to those questions directed the user to one of four table matrices with the entering arguments of third year college GPA versus fourth year college GPA. A predicted Quality Point Rating (QPR) was derived from the table and compared to two expectancy charts predicting success. [Ref. 1]

Using the same basic procedures, Sofge was able to develop several models for prediction of academic performance but no predictors of student satisfaction. The variables Sofge included in his model were military rank, type of undergraduate degree (B.S. or B.A.), Naval Academy graduate, and an undergraduate index determined by multiplying the undergraduate QPR times a college quality factor based on mean Scholastic Aptitude Test scores. [Ref. 2]

Soetrisno's study was conducted in a similar manner as the preceding two studies. The most significant factor in this study indicated that students with an undergraduate average of A or A minus showed the highest correlation to subsequent postgraduate performance. [Ref. 3]

Although these studies investigated three different curriculums, they collectively indicate that academic performance at the Naval Postgraduate School is associated with Undergraduate GPA.

C. OTHER POSTGRADUATE STUDIES

Hsio-Hsuan Hsia's study at Northwestern University in 1967 closely examined the predictive validity of five variables with respect to academic success in graduate school as measured by first year postgraduate grade point averages. The predictors chosen for study were Graduate Record Examination verbal, quantitative and advanced test scores, undergraduate records, grades from previous graduate studies, type of undergraduate institution attended and choice of field of study. The results of Hsia's study showed that the most useful prediction of graduate grades was undergraduate grades. When including GRE scores, the GRE Verbal aptitude test was the best predictor of graduate grades. The third variable that showed any significance in predictive validity was grades from previous graduate studies. [Ref. 4]

In 1969 Lieutenant Colonel Ernest F. Wilson, (USAF), conducted a study of predictors of academic success of graduate students of the Resident School of Engineering, Air Force Institute of Technology. He examined three categories of variables, educational background, personal data, and military performance. He concluded that the most effective combination of variables for predicting academic success were : year of birth (age), undergraduate grade point average, officer component, source of commission, and Officer Effectiveness Report index before school. [Ref. 5]

John Senger and Richard Elster of the Naval Postgraduate School faculty conducted a review in 1974 on several studies concerning the prediction of academic performance of graduate students. This work provided a discussion and summary of numerous studies that examined single predictors such as GRE scores, the Miller Analogy Test and undergraduate grade point averages. They concluded that since competition for graduate school admission is extremely competitive, currently used predictors of graduate school performance such as undergraduate GPA and the Graduate Record Examinations are adequate. [Ref. 6]

D. STUDIES BASED ON ACCOUNTING PERFORMANCE

Burdick and Schwartz recognized the need for predicting accounting grade performance in order to analyze various methods of limiting enrollment in the face of a great demand for accounting courses and a shortage of qualified faculty. Their study illustrates how grade performance can be predicted using variables other than achievement test results. Data were collected on academic performance variables and demographic variables by means of questionnaire. The sample consisted of students enrolled in intermediate accounting courses at Arizona State University. Three pertinent factors were included in their final predictive model. First and consistent with previous studies, there was a positive relationship between grade point average and the probability of success in intermediate accounting. Second, there was a positive relationship between the grade received in introductory managerial accounting and the probability of success in intermediate accounting. The third variable that proved significant was prior bookkeeping or accounting work experience. [Ref. 7]

De'aney, et al studied the feasibility of using admission test results as an accept-reject device for intermediate accounting courses. The results of this study show that it is possible to develop a reasonably short admission test and that reasonable levels of correlation exist between the test scores and success or failure in intermediate accounting. The study also showed that preliminary accounting grades used in conjunction with the admission test score also proved significant. [Ref. 8]

Baldwin and Howe investigated students with high school bookkeeping or accounting exposure to determine if they outperformed students with no accounting exposure in the first college level accounting course. Student performance was measured four times, once at each of three midterm examinations and then after a comprehensive final exam. Although student performance varied during the term in that students with high school bookkeeping initially started out with higher scores on

the first midterm, the final overall performance of the two groups was the same. [Ref. 9] Bergin's study was similar to Baldwin and Howe's work and produced the same basic conclusion. Bergin did note however that if the under achievement of the students who had studied accounting previously could be corrected, there may be a significant difference between the two groups. [Ref. 10]

Hicks and Richardson examined three possibilities for predicting success in intermediate accounting. The three variables were the score on a diagnostic test of knowledge at the beginning of the intermediate accounting sequence, overall grade point average, and accounting (principles) grade point average. In the models developed, diagnostic as well as both GPA variables were significant in explaining the course scores and grades for students in intermediate accounting. The researchers did hedge that the mid range strength of their correlations indicates that other relevant variables possibly exist. [Ref. 11]

Canlar investigated the effects of college level exposure to accounting on student performance in the first MBA level financial accounting course. The study tried to determine the answer to two questions. First, do students with exposure to college level accounting perform better than students with no exposure? Second, does the amount of exposure, more than one course, have any effect on student performance? As seen in earlier studies, the results indicate that although students with prior exposure performed better than those without any exposure, the gap between the examination scores of the two groups narrowed as the course progressed. For those with exposure, the amount of exposure was not found to be a factor in their performance. [Ref. 12]

Ingram and Petersen conducted an evaluation of the American Institute of Certified Public Accountants (AICPA) Tests for predicting the performance of accounting majors. The sample population of this study consisted of students at the University of Iowa who were admitted to the accounting program in 1984. The students were administered the AICPA aptitude and level I achievement tests. The analysis showed that the most important variable for predicting performance in upper division courses was the students' GPAs for the first two years of college. No other variables provided a significant improvement in predictive power. The AICPA test scores provided little marginal explanatory or predictive power when considered in conjunction with other explanatory variables. The researchers concluded that the predictive benefits of the test results did not justify the costs of administering the tests. [Ref. 13]

Moses investigated four factors to explain successful performance in graduate level accounting. The factors were undergraduate GPA, prior undergraduate accounting instruction, accounting or financial work experience and independent reading of business or financial publications. After evaluating the factors on the entire sample group and several subgroups, three conclusions were made. First, that GPA was significantly related to performance in accounting. Second, unlike previous studies previous accounting instruction was not strongly related to the first graduate accounting grade. Third, that combinations of work experience or independent reading of business publications proved to be of some predictive value. [Ref. 14]

E. GENERAL ACADEMIC PERFORMANCE STUDIES

Cagiano, Geisler, and Wilcox's study on the academic performance of returning adult students is germane to this study since the vast majority of NPS students do not come directly from undergraduate work. Several relevant research questions were asked as a primary thrust of the study. First, do re-entering students perform better upon return than they did during their previous enrollment? Second, does the length of the interruption affect the level of academic performance on return? Third, does the length of the interruption affect the validity of the previous grade point average as a predictor?

In the above study, students returning to school after an interruption of one or more semesters performed significantly better on return than during previous enrollment. The amount of improvement increased as the length of the interruption increased. For students that spent one or two semesters out of school, the grade point average prior to dropping out proved useful. For students that spent three or more semesters out of school, the previous grade point average proved less useful. [Ref. 15]

F. SUMMARY

The studies discussed in this chapter are not all inclusive of the subject matter but are representative of the predominant theories regarding academic prediction factors. A general conclusion to be made from the review of available literature is that Undergraduate GPA is a proven predictor of academic performance. Each study provided a unique approach, even if only slightly different from others and several reinforced the conclusions of previous research. The review of the available studies proved beneficial to the author in the design and execution of this study.

III. METHODOLOGY

A. GENERAL

This chapter presents the methodology used in the analysis of the data to be presented in Chapter IV. The sample for this study consisted of third and fifth quarter students who had taken Financial Accounting (MN2150) during their first quarter of study at NPS and Managerial Accounting (MN3161) during their second quarter. Third quarter students had taken MN2150 during the Summer 86 quarter and MN3161 during the Fall 86 quarter. Fifth quarter students had taken MN2150 during the Winter 86 quarter and MN3161 during the Spring 86 quarter. The data was collected during the Winter 87 quarter. All of the data used in the analysis section of this study was collected from students completing a copy of the questionnaire provided in Appendix B. The questionnaire was designed to gather academic, demographic, past employment and personal data.

Third quarter students had previously participated in a similar but smaller study conducted by Assistant Professor Douglas Moses during the quarter that they had taken MN2150. A brief summary of Professor Moses' previous study was provided with the questionnaire to the third quarter students and will be discussed elsewhere in this study.

B. PROCEDURES

1. General

The primary question of the analysis was whether student performance in MN2150 and MN3161 was significantly affected by any individual factor or group of factors from a student's background. Analysis of student performance in MN3161 will include the grade received in MN2150 as an explanatory variable. The search for an answer to this question was conducted primarily using two procedures, Pearson Product-Moment Correlations and Stepwise Regression analysis to select the variable or set of variables that best explains student performance.

The analyses were conducted in three stages. Preliminary analyses of the data were conducted to determine data trends or groupings prior to the study of predictive variables. Tables of appropriate data summaries will be provided in Chapters IV and

V. The next stage consisted of tests conducted on the entire sample as a whole. Lastly, the same tests were conducted on the data segregated into subgroups to further pinpoint the impact of any specific factors. The predominant variables and relationships the studies discussed in Chapter II were also examined.

2. Pearson Correlation

The correlation step in the analysis provided a check of the relationship between sample variables and the performance criterion. Correlation measures the closeness of a linear relationship between two variables. If one variable, Y, can be expressed exactly as a linear function of another variable, X, then the correlation is 1 or -1, depending on whether the two variables are positively related or inversely related. A correlation of zero between two variables means that each variable has no linear predictive ability for the other. If the values are normally distributed, then a correlation of zero means that the variables are independent of one another. [Ref. 16] Variables that produced a Pearson Correlation coefficient with a significance of 0.10 or lower were considered probable candidates for inclusion in the regression analysis.

3. Stepwise Regression

Linear regression is a statistical procedure also used to study relationships between a dependent or response variable and an independent or regressor variable. Equation 3.1 expresses the standard form of a simple linear regression model.

$$Y = A + BX \quad (\text{eqn 3.1})$$

Where Y = the predicted value of the dependent variable

A = the vertical axis intercept

B = the rate of change per unit of explanatory variable

X = the value of the explanatory variable

Studying the response variable's dependence on more than one independent variable is known as multiple regression. Equation 3.2 expresses the standard form of a multiple regression model.

$$Y = A + B_1X_1 + B_2X_2 + \dots + B_NX_N \quad (\text{eqn 3.2})$$

Where Y = the predicted value of the dependent variable

A = the intercept on the vertical axis

B₁ = the rate of change of the first explanatory variable

X_1 = the value of the first explanatory variable
and so on out to the Nth variable. [Ref. 17]

Stepwise regression is a variation of the multiple regression procedure. The stepwise procedure searches for the best predictive model by bringing into the regression equation the independent variables one by one.

The first step of the stepwise regression procedure selects the independent variable which best predicts the dependent variable. The next step selects and enters the variable which best predicts the dependent variable given the first variable entered. This process continues until the stepwise procedure ends when no additional independent variable improves the prediction of the dependent variable.

C. SUMMARY

Once the analysis testing was complete, the results were compiled so conclusions could be developed concerning the factors that affect performance in the first graduate accounting courses at NPS. The results of the correlations of explanatory variables on the performance criteria were compared for the entire sample and the subgroups. This was done to see which explanatory variable most often produced the highest correlation coefficient throughout the subgroups. Each stepwise regression output was also examined to see which variables were most frequently selected for inclusion in the computer generated prediction models. Specific discussion and summaries of data analyses are provided in Chapter V.

IV. DATA PRESENTATION

A. GENERAL

The purpose of this chapter is to present the data collected for use in this study. As noted earlier, a sample questionnaire is provided in Appendix B. One hundred and sixty-eight questionnaires were distributed to current NPS students who had taken Financial Accounting (MN2150) during their first quarter of study. One hundred and one questionnaires were distributed to third quarter students and sixty-seven to fifth quarter students. A total of one hundred and ten questionnaires were returned for a response rate of 65.48 percent. Five of the responses were from International Students and were not included in the analysis because of learning factors related to the potential language obstacle they had to overcome and cultural background differences that could possibly have invalidated the findings. The final sample size was consisted of one hundred and five observations. Each of the one hundred and five responses provided sixty-seven variables to be considered during data analysis. This chapter provides a description of the student sample. Some of the items described here will be used as variables in later analysis.

B. SAMPLE GROUP DESCRIPTION

1. Personal Data

Fifty-eight third quarter students and fifty-two fifth quarter students responded to the questionnaire. The students ranged in age from 25 to 43 years with a mean of 32.26 years. Eighty-seven members of the response group were males and eighteen were females. Seventy-two students are married, thirty are single, and three reported being divorced, but were considered single for analysis purposes. A breakdown of the students' assigned curriculum at NPS is provided in Table I.

The twenty-seven undergraduate majors represented within the sample group were broken down into nine categories and are listed with their frequencies in Appendix B. Forty-one students had completed additional college work prior to arriving at NPS, but only five had earned a Graduate Degree.

Fifty-three students had no prior accounting while thirty-eight students had completed at least one formal course of instruction and fourteen students had completed more than two accounting courses. The average length of time since the

TABLE 1
CURRICULUM BREAKDOWN

Curr No.	Name	Sample Frequency
620	Telecommunications Systems Management	1
813	Transportation Logistics Management	3
814	Transportation Management	2
815	Acquisition and Contract Management	16
817	Administrative Sciences (Non USN)	3
819	Systems Inventory Management	3
827	Material Logistics Support Management	18
837	Financial Management	38
847	Manpower, Personnel and Training Analysis	21

most recent accounting instruction was seven years. The students reported that they had studied for MN2150 between two and twenty hours per week with a mean of 8.68 hours per week. Eighty-five students reported that they did the majority of their studying at home. Seventeen students reported that they did the majority of their studying at the NPS library and three students reported studying at other locations.

2. Military Data

The branch of service with the largest representation was the Navy eighty-eight officers. The Marine Corps was next with ten officers, followed by Coast Guard with two, and the Army and Air Force with one each. Three Department of Defense civilian employees studying at NPS were also included in the study. The breakdown of military paygrades was three O-2s, sixty-eight O-3s, twenty-nine O-4s, and two O-5s. Length of service ranged from four to nineteen years with a mean of 9.78 years. A breakdown of commissioning source for the officers is provided in Table 2.

Designators are used by the Navy as a means of classifying officers by job specialization. There were four major groupings of designators represented in the sample. Thirty-five of the students in this sample were Supply Corps Officers (3100 designator), seventeen were in the Surface Warfare Community (1110 designator),

TABLE 2
COMMISSIONING SOURCE

<i>Source</i>	<i>Sample Frequency</i>
Officer Candidate School (OCS)	52
Reserve Officer Training Corps (ROTC)	26
Academy	16
Naval Enlisted Scientific Education Program (NESEP)	5
Other	3

eleven were in the Aviation Community (13XX designator), and ten were General Unrestricted Line Officers (1100 designator). A special note on the Supply Officer designator is needed. All Supply Officers receive six months of specialized training at the Naval Supply School in Athens, Georgia prior to their initial assignment. Although accounting is not formally a part of the course of instruction, related subjects such as disbursing record keeping and stock fund management are taught there.

3. Financial Experience

Forty-five students reported that they had held an accounting, finance or financial management type job either in the military or private sector with an average of six years experience. This figure includes thirty-five Naval Supply Corps Officers. In an attempt to gauge personal financial experience, students were asked if they owned a home, actively invested in other real estate, and actively invested in stocks, bonds or other financial securities. Sixty-three students answered that they owned a home while forty-two did not. Nineteen students reported that they had invested in other real estate while eighty-six did not. Forty seven students answered that they had invested in stocks, bonds and other financial securities while fifty-eight did not.

Students were also asked how often they read business type publications such as the Wall Street Journal, Business Week or the business section of the newspaper. Thirteen students answered that they never read the publications while thirty-eight rarely did. Thirty-three read the publications occasionally, fifteen frequently, and six students answered that they read the business publications daily.

4. Accounting Grades

The performance criteria used for analysis in this study were the grades received in MN2150 and MN3161. At NPS student academic performance is evaluated in terms of quality points, based on a 4 point scale, assigned to the letter grade achieved in a course. A Quality Point Rating (QPR) of at least 3.00 in all graduate courses in the curriculum is one of four minimum requirements for the Masters Degree. The distribution of MN2150 and MN3161 grades earned by the students of this sample are listed in Table 3. Based on the requirement for students to maintain a QPR of 3.00, a grade of B or better in MN2150 and MN3161 represented successful performance while B- or lower represented unsuccessful performance.

TABLE 3
ACCOUNTING GRADE DISTRIBUTION

Letter Grade	Quality Point Value	MN2150 Frequency	MN3161 Frequency
A	4.0	17	14
A-	3.7	22	30
B+	3.3	34	36
B	3.0	21	12
B-	2.7	8	9
C+	2.3	2	2
C	2.0	1	0

5. Student Perceptions

The final question on the questionnaire gave the students an opportunity to provide a **personal** insight as to what factors they perceived influenced their performance in MN2150. Although the answers were varied they could be grouped into several categories. The largest number of responses (N= 19) indicated the quality of instruction as the most positive factor for their success. Secondly, fourteen students responded that they were extremely motivated to perform well in their first quarter of postgraduate studies. Thirdly, ten students felt that their background provided them

with a good foundation for the course material. Four students felt that being involved in a active study group aided their performance. Several students ($N = 16$) contributed negative comments that ranged from poor math background, lack of accounting experience, and family pressures to a lack of time to complete tests. Lastly, thirty-four students had no response to the question. The categories listed above provided the author with additional areas of interest to investigate as will be discussed in the data analysis section of this study.

V. DATA ANALYSIS

A. GENERAL

This chapter provides the discussion and results of the analysis conducted on the data presented in Chapter IV. The primary analysis of the data was conducted using a packaged computer program at the W. R. Church Computer Center at the Naval Postgraduate School. The program used throughout this study was the Statistical Analysis System (SAS). This system was originally developed for statistical needs and provides the user with numerous capabilities. The two SAS procedures used for the major part of the analysis were Pearson Product Moment Correlations and Stepwise Regression. Both procedures were discussed in Chapter III. Correlation at alpha levels of .10 or lower were considered significant for this study. Only the results meeting the alpha level of .10 or lower were included in the following discussion.

The most efficient way of presenting the analyses results to the reader is by summarizing the data in tables. Accordingly, the remainder of this chapter will consist of short descriptions of the individual test results accompanied with a table summary of the analyses results.

B. EXPLANATORY VARIABLES

The following codes are used to describe the independent and dependent variables used in the analysis:

	Code	Variable
1.	G2150	Grade received in MN2150
2.	G3161	Grade received in MN3161
3.	GPA	Grade point average
4.	HOURS	Hours of study for MN2150 per week
5.	READ	Business reading change (after minus before)
6.	HOME	Did students own a house? (yes = 1, no = 2)
7.	RE	Did students invest in other real estate? (yes = 1, no = 2)
8.	INV	Did students invest in stocks, bonds, etc? (yes = 1, no = 2)
9.	NOACCT	Number of previous accounting courses
10.	YRS	Years of military service
11.	UYRS	Years since college graduation

12. LONG Years of financial work experience (Zero if no work experience)
13. CLRANK Undergraduate class rank (top 10% = 1, top 3rd = 2, middle 3rd = 3, bottom 3rd = 4)
14. ACTGR Average grade in accounting courses taken prior to NPS

C. PERFORMANCE CRITERIA

The performance criteria used in this study were the grades received in MN2150 and MN3161. Only the final course grades were available so performance at different times throughout the quarter could not be evaluated. Table 4 provides a ranked summary of MN2150 and MN3161 mean grades for the entire sample and various subgroups. The full sample was broken into selected subgroups along the following dimensions:

1. Curriculum
 - i. 837 students (financial management curriculum)
 - ii. non-837 students
2. Reading
 - i. Those whose reading of business publications increased from before MN2150 to after MN2150
 - ii. Those whose reading of business publications either stayed the same or decreased from before MN2150 to after MN2150
3. GPA
 - i. Those students with an undergraduate GPA greater than or equal to 3.0
 - ii. Those students with an undergraduate GPA less than 3.0
4. Previous accounting instruction
 - i. Those students who had previous accounting instruction
 - ii. Those students who had no previous accounting instruction
5. Time since college graduation
 - i. Those students who graduated from college more than nine year ago
 - ii. Those students who graduated from college nine years or less
6. Work Experience
 - i. Those students with prior accounting or financially related work experience
 - ii. Those students with no prior accounting or financially related work experience

Although differences between the means presented are not tested statistically, there appears to be varied performance throughout the sample. The following discussions will attempt to pinpoint the cause of the differences. The subgroups were selected based on the preliminary analysis and the intention to compare current results with variable performance in previous studies. MN2150 results will be discussed separately

from the MN3161 results. Discussion of the analysis results concerning proposed APC changes will also be discussed separately.

TABLE 4
MEAN GRADE SUMMARY

DATA FOR MN2150

Subgroup	Mean	Std Dev	N
Supply Officers	3.505	0.404	35
837 Students	3.497	0.412	38
Work Experience	3.497	0.386	45
Prior Accounting	3.461	0.424	52
APC Math code = 3	3.410	0.423	29
GPA > = 3.0	3.409	0.425	73
APC Math code < = 3	3.383	0.434	81
Reading Decrease	3.377	0.484	48
Years since graduation < = 9	3.364	0.422	56
Entire Sample	3.360	0.437	105
Years since graduation > 9	3.355	0.459	49
APC Math code = 4	3.350	0.444	18
Reading Increase	3.345	0.398	57
Non Supply Officers	3.287	0.438	70
Non 837 Students	3.282	0.435	67
APC Math code > = 4	3.279	0.449	24
No Prior Accounting	3.261	0.431	53
No Work Experience	3.256	0.448	60
GPA < 3.0	3.247	0.452	32

GRADE DATA FOR MN3161

Subgroup	Mean	Std Dev	N
APC Math code = 4	3.575	0.505	4
APC Math code < = 3	3.512	0.354	33
Supply Officers	3.500	0.350	34
837 Students	3.497	0.383	38
Work Experience	3.490	0.350	44
Reading increase	3.467	0.392	56
Prior Accounting	3.437	0.378	51
GPA > = 3.0	3.417	0.398	73
APC Math code = 3	3.412	0.356	8
Years Since Graduation > 9	3.406	0.414	49
Entire Sample	3.404	0.406	103
Years Since Graduation < = 9	3.403	0.403	54
APC Math code > = 4	3.400	0.587	5
No Accounting Experience	3.373	0.429	53
GPA < 3.0	3.373	0.429	30
Non Supply Officers	3.357	0.425	69
Non 837 Students	3.350	0.420	65
No work experience	3.340	0.435	59
Reading Decrease	3.329	0.414	47

D. MN2150 RESULTS-ENTIRE SAMPLE

The tests were first conducted on the entire sample to see which variables had an overall effect on student performance. Correlation and regression results for the full sample are presented in Table 5. Here, as in previous studies, GPA was the most significant variable in explaining performance. Other variables that were important in the correlation tests were number of previous accounting courses (NOACCT), previous accounting grades (ACTGR), and the length of time in an accounting or financially related job (LONG). The correlation signs for ACTGR, NOACCT and LONG are positive as would be expected. Performance in MN2150 appears to increase if students have had previous accounting course work and also depends on the grade received in those previous courses. Performance also tends to increase depending on the number of years of financial work experience.

In regression tests, interrelationships between individual independent variables are controlled and it is possible to identify other factors that appear to affect MN2150 grade. The regression results in Table 5 continue to reveal GPA, LONG and NOACCT as positively related to grades. The number of hours (HOURS) of study is also significant with a negative sign which is unexpected, but perhaps is understandable if students with less accounting background or poorer GPA devote more effort to the course. This negative sign for hours occurs in following tests as well. Two variables (YRS, UYRS) probably both reflect the length of time that students have been away from classroom study. They appear in the regression with opposite signs. This is probably due to high correlation between the two and it makes interpretation of the signs not very meaningful.

In the next several sections results from separate analyses conducted on specific subgroups are presented. The purpose in providing the subgroup analysis is to explore the consistency of individual variables in explaining performance across different subgroups and to determine if some individual variables are associated with performance only for particular subgroups of the full sample.

E. MN2150 RESULTS-SUBGROUP ANALYSIS

1. General

The full sample was divided into subgroups along three dimensions:

1. Previous accounting study
2. Length of time since college graduation
3. Prior financial work experience

TABLE 5
FACTORS EXPLAINING MN2150 GRADE ON FULL SAMPLE

CORRELATION

	GPA	CLRANK	LONG	ACTGR	NOACCT
Corr	.363	-.206	.218	.231	.213
Alpha	.0001	.035	.025	.018	.030

REGRESSION

	Intercept	GPA	LONG	YRS	HOURS	UYRS	NOACCT
Coef	2.42	.352	.021	-.046	-.025	.041	.072
Std Error		.095	.011	.016	.008	.019	.041
Alpha		.0004	.068	.004	.004	.035	.081
R-squared = .28 F = 6.19 Significance level = .0001							

These dimensions were selected for further analysis because variables related to these dimensions were significant in the full sample tests, and each of these dimensions is readily observable and consequently could be used in evaluating students in the context of selection or placement decisions.

2. Analysis of Previous Accounting Instruction

The sample was segregated into two subgroups depending on accounting background. One group consisted of students who had previous accounting instruction and the second group consisted of students who had no previous accounting instruction. As noted in the earlier discussion on the entire sample, previous accounting grades and number of accounting courses appears to explain performance. The question remains as to what variables explain performance of those students without prior instruction. Moses found in his study that combinations of work experience or independent reading of business publications proved to be of some predictive value. Other studies showed that students with prior accounting instruction performed better early in a course but tended to slack off as the course progressed until there was no difference in performance. Table 6 summarizes the mean grades for MN2150 and MN3161 based on the number of previous accounting courses. The students with more than two previous accounting courses had the highest mean grade

for both courses, but prior accounting exposure was not a significant factor in the correlation and regression tests. Mean grades for MN3161 were higher than the MN2150 means in three out of the four groups.

TABLE 6
SUMMARY BASED ON THE NUMBER OF PREVIOUS COURSES

#	MN2150 MEAN	N	MN3161 MEAN	N
0	3.26	53	3.37	52
1	3.48	28	3.39	28
2	3.26	10	3.40	10
> 2	3.57	14	3.56	13

Correlation and regression results for the previous accounting control variable are in Table 7. GPA has a larger impact on the previous accounting group than on the no previous accounting group possibly because GPA partially reflects grades in previous accounting courses. In the accounting subgroup, only GPA met the .10 or lower significance level for correlation. The sign for the GPA coefficient was positive as expected. The number of accounting courses (NOACCT) and accounting grade (ACTGR) were not significant. Variables selected in the regression analysis were GPA and undergraduate class rank (CLRANK). The sign for the coefficients were both positive which was expected for GPA but not for CLRANK since a higher variable value represents lower standing in the college graduation class. This unexpected result is likely due to high correlation between GPA and CLRANK.

In the no previous accounting group, two variables, hours of study (HOURS), and CLRANK had significant inverse (negative) correlation coefficients. The negative coefficient for CLRANK was expected. HOURS again appears with the negative coefficient possibly because the lack of previous exposure impels the students to put forth a longer study effort. Six variables including GPA were selected in the regression analysis. GPA, years of work experience (LONG), and RE had positive coefficients. GPA and LONG were expected to be positive, GPA as a consistent predictor of performance and LONG as a result of the benefits of exposure through work experience. RE was not expected to be positive since this indicates that real estate

investment experience does not yield any learning benefits. Other investment experience (INV), military rank (RANK), and HOURS were included in the regression with negative coefficients. INV was expected to be negative which indicates that investment experience does yield accounting learning experience as a result of exposure to financial reports and stock market operations. RANK was not expected to be negative since a person with a higher military rank would be expected to have more general experience and exposure to military accounting procedures. The negative value for HOURS was unexpected as previously explained.

TABLE 7
PREVIOUS ACCOUNTING VERSUS NO ACCOUNTING
INSTRUCTION

PREVIOUS ACCOUNTING

CORRELATION

	GPA
Corr	.414
Alpha	.002

REGRESSION

	Intercept	GPA	CLRANK
Coef	1.09	.604	.157
Std Error		.177	.092
Alpha		.001	.094

R-squared = .20 F = 5.93 Significance Level = .005

NO ACCOUNTING INSTRUCTION

CORRELATION

	HOURS	CLRANK
Corr	-.312	-.256
Alpha	.023	.063

REGRESSION

	Intercept	GPA	LONG	RE	INV	RANK	HOURS
Coef	2.88	.355	.028	.218	-.222	-.163	-.031
Std Error		.139	.016	.142	.106	.097	.010
Alpha		.013	.086	.131	.043	.099	.066

R-squared = .36 F = 4.38 Significance Level = .001

3. Length of time since college graduation

The sample was divided into two groups based on the time since college graduation. One group consisted of students who had been out of college more than

nine years and the second group consisted of students out of college nine years or less. The sample mean for time since college graduation was 9.13 years. Testing was conducted on the subgroups to determine if absence from an academic environment effected student performance and to see if the undergraduate GPA was still useful as a predictor of performance. Cagiano, Geisler and Wilcox found students performed better on return to school after an absence and that after an absence of more than three semesters GPA proved less useful as a performance predictor. The difference of the mean grades for the two groups was insignificant. The mean grade for students out of college nine years or less was 3.364 compared to 3.355 for students out of college more than nine years. Variables found significant in predicting performance were in general different for each group. Results for the two groups are presented in Table 8.

GPA was again significantly correlated to the MN2150 grade in both subgroups. Four additional variables had significant correlations for the group away from college more than nine years. Previous accounting grade (ACTGR), number of accounting courses (NOACCT), years of work experience (LONG) and home ownership (HOME) all had positive correlation signs. ACTGR and NOACCT were expected to be positive to show the effect of previous accounting instruction as developed in earlier studies. LONG was expected to be positive to show the benefits of work experience that Moses investigated. HOME was not expected to be positive in order to show that the financial transactions involved with home ownership yield some learning benefits. The regression results for this subgroup included three variables. LONG, HOME and ACTGR with positive coefficients. LONG and ACTGR were expected to be positive in reinforcing the theories that prior work experience and instruction contribute to performance. HOME was not expected to be positive as explained above. The absence of GPA in the regression equation reinforces Cagiano, Geisler and Wilcox's theory that a long absence from an academic environment makes the GPA less useful in prediction of academic performance.

Three variables were significantly correlated in the group out of college nine years or less. GPA had a positive correlation while HOURS and CLRANK had negative correlation signs. GPA was expected to be positive thus reinforcing the theory that GPA indicates an individual's general academic ability. CLRANK was expected to be negative showing that an individual's relative academic standing can be correlated to future performance. The negative sign on the HOURS variable persists as previously mentioned. Only GPA and HOURS were significant in the regression

equation. GPA had a positive coefficient as expected and HOURS again had a negative value.

TABLE 8
YEARS SINCE COLLEGE GRADUATION COMPARISON

UYRS > 9

CORRELATION

	GPA	ACTGR	NOACCT	LONG	HOME
Corr	.326	.394	.384	.302	.356
Alpha	.022	.005	.006	.035	.012

REGRESSION

	Intercept	LONG	HOME	ACTGR
Coef	2.76	.031	.302	.265
Std Error		.014	.124	.118
Alpha		.039	.019	.031

R-squared = .311 F = 6.63 Significance level = .0009

UYRS < = 9

CORRELATION

	GPA	HOURS	CLRANK
Corr	.403	-.333	-.349
Alpha	.002	.012	.008

REGRESSION

	Intercept	GPA	HOURS
Coef	2.26	.431	-.032
Std Error		.126	.010
Alpha		.0012	.004

R-squared = .27 F = 9.53 Significance level = .0003

4. Work Experience

The sample was divided into two groups based on whether or not students had prior accounting or related work experience. One group consisted of students who had reported having prior accounting or related work experience and the second group consisted of students who had no prior work experience. Years of work experience (LONG) proved significant during correlation and regression tests conducted on the full sample. It appears reasonable to believe that work experience in a certain field would have a positive effect during later academic study in that area. In the correlation test for the work experience subgroup GPA, HOME and RE proved significant with positive correlation signs. GPA was expected to be positive but

HOME and RE were expected to be negative in order to show some measure of learning benefits. The regression tests included GPA with a positive coefficient and HOURS with a negative coefficient. It was interesting to note that LONG was not significant in the correlation or regression tests conducted on the subgroup with prior work experience as might be expected.

The correlation test for the no work experience subgroup included two significant variables, GPA and ACTGR. Both variables had positive correlation as expected. GPA continues to be consistently significant in the correlation tests. ACTGR was expected to be positive since no additional variables proved significant. The only variable included in the regression test was GPA. As expected the coefficient was positive. Table 9 provides a summary of the correlation and regression analysis for both groups. In summary, GPA was evident in the correlation and regression tests for both subgroups but showed more significance in the work experience group. A possible conclusion to be made from that observation is that greater aptitude displayed at the undergraduate level will direct a person into specific field of employment.

The sample was also examined by separating Supply Corps Officers from the remainder of the sample. Test results again failed to show that work experience contributed to academic performance in MN2150. This result was not surprising since Supply Corps Officers contributed thirty-five of the forty-six work experience observations.

F. MN3161 RESULTS-ENTIRE SAMPLE

Results from the analyses on MN3161 performance are analogous to the MN2150 results with the exception of three general differences. First, the MN2150 grade was significant in all correlations and was included in all of the regression models. This is most likely due to the high correlation between MN2150 and GPA and the greater explanatory power of MN2150 than GPA when explaining MN3161 grade. Second, the reading factor was included in many of the regression models. Third, GPA still proved significant in correlation to MN3161 but was not selected in any of the regression models.

The tests were again conducted on the entire sample to see which variables had an overall effect on student performance in MN3161. Correlation and regression results are presented in Table 10. The correlation signs for grade received in MN2150 (G2150), GPA and LONG are positive as would be expected. Performance in MN3161 appears to increase as a result of successful performance in MN2150. GPA still had

TABLE 9
WORK EXPERIENCE ANALYSIS

WORK EXPERIENCE

CORRELATION

	GPA	HOME	RE
Corr	.404	.248	.264
Alpha	.005	.096	.077

REGRESSION

	Intercept	GPA	HOURS
Coef	2.33	.431	-.026
Std Error		.131	.012
Alpha		.002	.03

R-squared = .26 F = 7.44 Significance Level = .002

NO WORK EXPERIENCE

CORRELATION

	GPA	ACTGR
Corr	.293	.217
Alpha	.024	.095

REGRESSION

	Intercept	GPA
Coef	2.51	.234
Std Error		.137
Alpha		.092

R-squared = .05 F = 2.94 Significance Level = .092

significant correlation to MN3161 but was overshadowed by the significance of the MN2150 grade. Performance is also still effected by the number of years of financial work (LONG). The regression equation reflects a change from the MN2150 results. Six variables were included in the MN3161 regression. G2150, RANK and a reading factor (READ) all had positive signs on their coefficients while HOME, RE and UYRS had negative coefficients. READ is defined as the difference in frequency of reading business related publications after taking MN2150 was compared to the frequency of reading business material before MN2150. READ was not significant in the MN2150 correlation or regression tests. G2150 was expected to be positive showing the learning benefit of previous exposure to accounting principles. READ was also expected to be positive to show the benefits of a sustained self-initiated reading program. RANK being positive possibly shows the ability of higher ranking and more experienced officers to outperform subordinates in advanced courses. The negative coefficients for

the HOME and RE variables were expected. This shows the experience of home ownership and real estate investment contributes to a greater understanding of capital investment and budgeting. The negative coefficients for UYRS shows that performance may be effected by long absences from an academic environment.

TABLE 10
FACTORS EXPLAINING MN3161 ON FULL SAMPLE

CORRELATION							
	G2150	GPA	LONG				
Corr	.678	.222	.167				
Alpha	.0001	.024	.092				
REGRESSION							
	Intercept	G2150	READ	HOME	RE	RANK	UYRS
Coef	1.35	.692	.088	-.128	-.149	.167	.049
Std Error		.066	.027	.062	.081	.072	.016
Alpha		.0001	.001	.041	.067	.024	.003
R-squared = .55 F = 19.17 Significance Level = .0001							

The relationship of MN2150 to MN3161 supports the results of the Burdick and Schwartz study which found a positive relationship between the grade received in introductory managerial accounting and the probability of success in intermediate accounting. Other than MN2150, previous accounting instruction was not significant in MN3161 performance.

G. MN3161 RESULTS-SUMMARY OF SUBGROUP ANALYSES DIFFERENCES

The most notable difference in the subgroup analysis of MN2150 and MN3161 performance was the significance of G2150 in every correlation and regression test. The correlation signs and regression coefficients were all positive. This result clearly highlights the importance MN2150 plays in the overall performance of Administrative Science students at NPS. This also supports earlier results that prior accounting instruction effects student performance in follow-on courses. Moses had data for MN2150 only and could not investigate the impact of prior accounting on his sample of NPS students.

Another notable difference in the subgroup analysis of MN2150 and MN3161 performance was the inclusion of READ as an independent variable with a positive coefficient as expected in more than half of the subgroup regression tests. Increased reading of business related material is positively related to MN3161 grade performance and may improve MN2150 performance if the reading is increased in preparation for taking MN2150.

The third variable that was also frequently included as an independent variable in the regression tests was home ownership (HOME). HOME was included in the entire sample and five of twelve subgroup regressions. The experience of home ownership evidently contributes to a partial understanding of capital investment and budgeting.

H. ACADEMIC PROFILE CODE (APC) CHANGES

Currently the APC entry requirement for the Financial Management Curriculum is 345. The second digit of the APC is the math code which in this case is a four. The proposal investigated in this study concerned changing the mathematical background section of the Academic Profile Code (APC) program entry requirements. The specific proposal called for lowering the math code from a four to a three. The APC structure in Appendix A shows that a stronger math background including at least one calculus course would be required. A stronger math background may be correlated to successful accounting performance. The sample was divided into four groups to analyze the need for the proposed APC math code change. The groups were:

1. APC math code = 3
2. APC math code = 4
3. APC math code < = 3
4. APC math code > = 4

Results of correlation tests are presented in Table 11. In the correlation tests conducted on the full sample math proved to be significant to MN2150 performance. The negative sign appears to indicate that a stronger math background does enhance performance. The correlation between Math APC and grade is not significant in the test of MN3161 performance. Observation of the mean grades achieved by the four subgroups are also presented in Table 11. It is apparent that there is little difference between the grades and no strong indication that lower Math APC is associated with higher accounting grades. Both plots of grade versus APC and tests of significant difference between mean grades for the different subgroups support this conclusion.

Analogous tests were conducted for Financial Management curriculum students separately. As can be seen by reviewing Table 11, math background is not significant in either course for the financial management subgroup. The data was not available to examine the effects of math background on course performance where advanced mathematical skills are required. The reader should also be cautioned that the validity of tests on some of the subgroups may be questionable due to the small sample size.

TABLE 11
SUMMARY OF APC CORRELATION AND MEAN GRADES

ENTIRE SAMPLE

CORRELATION

	MN2150	MN3161
Corr	-.198	-.150
Alpha	.088	.202

MEAN GRADES

	MN2150	N	MN3161	N
APC Math code = 3	3.41	29	3.41	28
APC Math code = 4	3.35	18	3.42	18
APC Math code < = 3	3.38	81	3.43	79
APC Math code > = 4	3.28	24	3.32	24

FINANCIAL MANAGEMENT STUDENTS

CORRELATION

	MN2150	MN3161
Corr	-.124	-.095
Alpha	.544	.643

MEAN GRADES

	MN2150	N	MN3161	N
APC Math code = 3	3.52	8	3.42	8
APC Math code = 4	3.50	4	3.57	4
APC Math code < = 3	3.50	33	3.51	33
APC Math code > = 4	3.46	5	3.40	5

I. SUMMARY OF RESULTS

Several of the findings supported the theories of previous studies. A discussion of the conclusions drawn from this analysis will be conducted in Chapter VI. The following findings provide a summary of the data analysis results:

1. GPA reflects a general academic ability and was found to be significantly correlated to performance in MN2150 and to a lesser degree MN3161.

2. Prior accounting instruction was significant to MN2150 in the full sample but not in the subgroup of students with prior accounting instruction.
3. Previous related work experience was significant to MN2150 on the full sample and specifically for students out of college more than nine years.
4. MN2150 performance was significant to MN3161 performance.
5. Business related reading was significant to MN3161 performance.
6. There is no significant performance difference in the APC math codes.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The objectives of this study was to examine which factors in a students background effect academic performance of Administrative Science department students. Based on the analyses results presented in Chapter V several conclusions can be made concerning the sample data.

1. As seen consistently in previous studies and again observed here, undergraduate GPA is significantly correlated to follow-on academic endeavors. This observation was significant for MN2150 and, to a lesser degree, for MN3161.
2. Consistent with Moses' findings, accounting or financially related work experience, including Supply Officer duties, is significant to successful performance in accounting courses at the Naval Postgraduate School.
3. That a sustained self-initiated program of increased reading of business related publications results in an increased general knowledge of financial transactions and operations. This increased knowledge contributes directly to successful performance in the first graduate level accounting courses.
4. Performance in MN2150 is highly significant to MN3161. This relationship emphasizes the point that later success in the Administrative Sciences department programs is contingent upon successful performance in MN2150.
5. There is no significant difference in performance in accounting courses with regard to math background. Students with an APC math code of four or higher performed at the same level as students with a stronger math background.

B. RECOMMENDATIONS

The conclusions discussed above may prove beneficial to both the student and the administrator. The results are, however, based on a relatively small sample and further study appears warranted. Accordingly, the following is a list of recommended areas for possible future research:

1. Conduct a similar study on a larger sample with data available through the registrar's office. This study should include GRE scores for those students who have taken the examination after their arrival at NPS.
2. Conduct a study focusing on the APC math code of students and its relationship to math related courses in the Administrative Science programs.
3. Establish a periodic or continuous study of the variables to see trends as they are developing.

APPENDIX A

ACADEMIC PROFILE CODE (APC) STRUCTURE

FIRST DIGIT

The first digit indicates overall academic performance and is derived from the following table:

Code	QPR Range
0	3.60-4.00
1	3.20-3.59
2	2.60-3.19
3	2.20-2.59
4	1.90-2.19
5	0-1.89

SECOND DIGIT

The second digit represents mathematical background according to the following criterion:

Code	Meaning
0	Significant post-calculus math with B or better average
1	Calculus sequence completed with B+ or better average
2	Calculus sequence completed with average between C+ and B
3	One calculus course with C or better
4	Two or more pre-calculus courses with B or better average
5	One pre-calculus course with C or better grade
6	No pertinent college-level math with C or better grade

THIRD DIGIT

The third digit represents previous course coverage in science and technical fields.

Code	Meaning
0	Significant pertinent upper-division technical courses with B+ or better average
1	Significant pertinent upper-division technical courses with average between C+ and B
2	Complete calculus-based physics sequence with B+ or better average
3	Complete calculus-based physics sequence with average between C+ and B
4	One calculus-based physics course with C or better grade
5	No pertinent technical courses

APPENDIX B

QUESTIONNAIRE

I. PERSONAL DATA:

Citizenship _____ Age _____ Sex _____ Marital status _____
Curriculum at NPS _____ Date of first NPS quarter _____

II. EDUCATIONAL DATA:

Undergraduate major _____ Year of degree _____
Approximate class rank: (check one)
Top 10% _____ Middle 3rd _____
Top 3rd _____ Bottom 3rd _____
What is your Academic Profile Code? _____
Approximate Grade Point Average (GPA) on a 4 point scale _____

III. EDUCATIONAL INFO-ADDITIONAL:

After your undergraduate study, but prior to arriving at NPS, did you complete additional college work? _____
How many courses? _____
In what primary area? _____
Not counting NPS study, how many years has it been since you last took a college course? _____
Do you have a Graduate Degree? _____
If yes, in what area? _____

IV. EDUCATION-ACCOUNTING:

Please list the names of accounting courses you completed prior to enrolling at NPS and the grade earned:

COURSE	GRADE
--------	-------

What was the date you completed your most recent accounting course (exclude NPS courses)? _____

V. MILITARY DATA:

Branch _____ Rank _____ Years of service _____
Commissioning source (OCS, ROTC, ACADEMY, etc.) _____
Designator _____

VI. FINANCIAL EXPERIENCE:

Have you held any accounting, finance, financial management type jobs, either in the military or private sector? _____

If yes, for how many years? _____

Type of work? _____

Prior to arriving at NPS did you

a) Own a home? _____

b) Actively invest in other real estate? _____

c) Actively invest in stocks, bonds, or other financial securities? _____

Before taking MN2150 how often did you read business type publications (e.g. Wall Street Journal, Business week, Business section of newspaper)?

Daily _____ Frequently _____ Occasionally _____ Rarely _____ Never _____

Since taking MN2150, how often do you read business type publications?

Daily _____ Frequently _____ Occasionally _____ Rarely _____ Never _____

VII. FINANCIAL MANAGEMENT COURSES AT NPS:

For each of the courses listed below please indicate

a) The quarter in your program you took the course (or will take if you plan to in the future). Your first quarter here will be #1, your second quarter #2 etc.

b) The grade you received (if applicable)

c) Whether you participated in a study group for that course (yes or no)

COURSE # NAME

QUARTER GRADE STUDY GROUP

MN2150 Financial Accounting

MN3161 Managerial Accounting

MN4122 Planning and control:
Measurement & Evaluation

MN4151 Internal Control and
Financial Auditing

MN4152 Corporate Financial Management

MN4155 Operational Auditing

MN4159 Financial Reporting & Analysis

MN4162 Cost Accounting

MN4163 Analytical Techniques for
Financial Control & Planning

OA4702 Cost Estimation

How many hours per week did you study for Financial Accounting (MN2150)? _____

Where do you do the majority of your studying (home, library, etc.) _____

What other factors influenced your performance in Financial Accounting (MN2150)? _____

APPENDIX C
UNDERGRADUATE MAJORS

Code	Majors	Frequency
1	Science: Biology/Chemistry/Oceanography/Math	12
2	Engineering: Electrical/Civil/Industrial/Metallurgical	10
3	Language: Spanish/French/German	4
4	Psychology/Sociology	8
5	Business: Marketing/Economics/Business Administration	41
6	Accounting	1
7	English/History/Art/Political Science/Theology	24
8	Communication/Speech/Journalism/Radio/Television	4
9	Criminal Justice	1

LIST OF REFERENCES

1. Cook, J.L., *Predictors of Academic Success of Graduate Students in the Communications Management Curriculum of the U.S. Naval Postgraduate School*, AD-783810, Monterey, CA, Naval Postgraduate School, 1974.
2. Sofge, C.T., *Prediction of Performance and Satisfaction of Aeronautical Engineering Students at the Naval Postgraduate School*, AD-003539, Monterey, CA, Naval Postgraduate School, 1974.
3. Soetrisno, H., *Prediction of Academic Performance of the U.S. Navy Officer Students in the Operations Research Systems Analysis Curriculum at the Naval Postgraduate School*, AD-0099122, Monterey, CA, Naval Postgraduate School, 1975.
4. Hsia, H. *A Study of Selected Intellective Factors related to Academic Performance in Graduate School*, Doctoral Dissertation, Northwestern University, 1967.
5. Wilson, E.F. *A Study of Predictors of Academic Success of Graduate Students of the Resident School of Engineering (AFIT) as the Predictors of Post Graduation Job Effectiveness*, Doctoral Dissertation, Duke University, 1969.
6. Senger, J.D. and Elster, R. *Predicting the Academic Performance of Graduate Students: A Review*, (Report No. NPS55SE74091), Monterey, CA, Naval Postgraduate School, 1974.
7. Burdick, R. and Schwartz, B.N., "Predicting Grade Performance for Intermediate Accounting," *Delta Pi Epsilon Journal*, July, 1982, 117-127.
8. Delaney, P.R., Keys, D.E., Norton, C.L. and Simon, J.R. "An Admission Test for Intermediate Accounting," *The Accounting Review*, January, 1979, 155-162.
9. Baldwin, B.A., and Howe, K.R., "Secondary-Level Study of Accounting and Subsequent Performance in the First College Course," *The Accounting Review*, July, 1982, 619-626.
10. Bergin, J.L., "The Effect of Previous Accounting Study on Student Performance in the First College-Level Financial Accounting Course," *Issues in Accounting Education*, 1983, 19-28.

11. "Predicting Early Success in Intermediate Accounting: The Influence of Entry Examination and GPA," *Issues in Accounting Education*, 1984, 61-67.
12. Canlar, M., "College-Level Exposure to Accounting Study and Its Effect on Student Performance in the First MBA-Level Financial Accounting Course," *Issues in Accounting Education*, Spring 1986, 13-23.
13. Ingram, R.W. and Petersen, R.J., "An Evaluation of AICPA Tests for Predicting the Performance of Accounting Majors" *The Accounting Review*, January, 1987, 215-223.
14. Moses, D. "Factors Explaining Performance in Graduate Level Accounting," *Issues in Accounting Education*, Fall 1987.
15. Cagiano, A., Geisler, M. and Wilcox, L., "The Academic Performance of Returning Adult Students," *The College Board Review*, Winter 1977-78.
16. Helwig, J.T., *SAS Introductory Guide*, Cary, N.C.: SAS Institute, 1978.
17. Ott, L. and Hildebrand, D.K., *Statistical Thinking for Managers*, Boston: Duxbury Press, 1983.

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