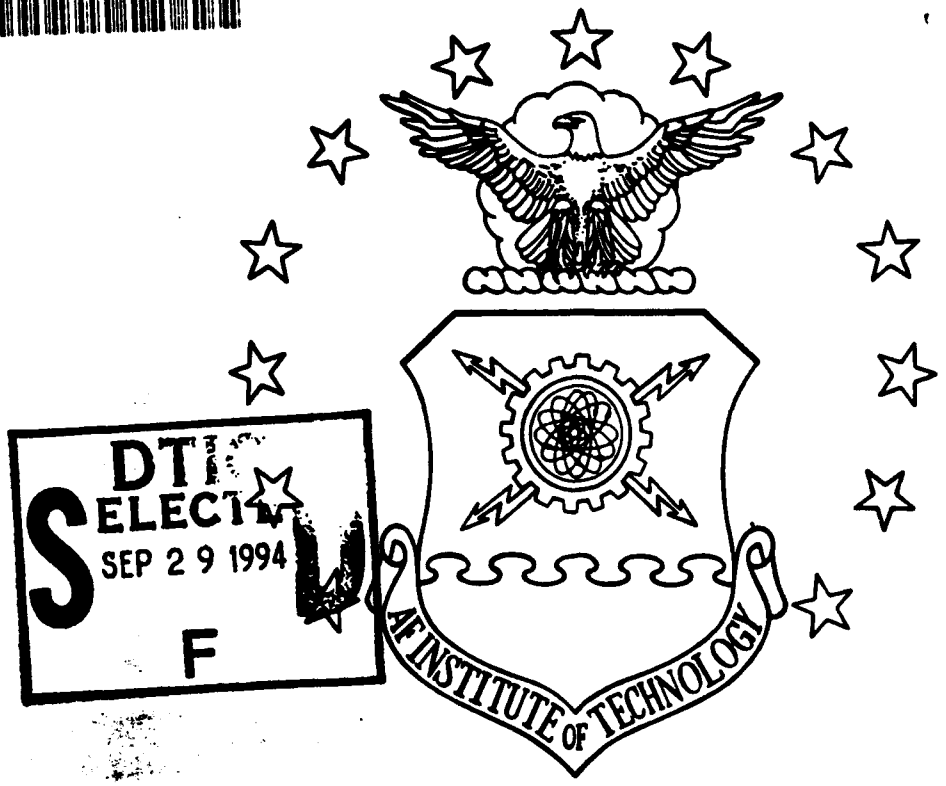

AN ANALYSIS OF THE USEFULNESS OF GRADUATE EDUCATION TO CONTRACTING PROFESSIONALS AS PERCEIVED BY GRADUATES AND THEIR SUPERVISORS

THESIS

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AFIT/GCM/LAS/94S-9

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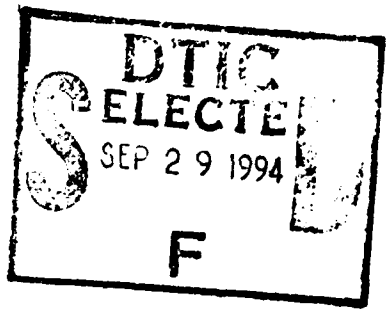

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AFIT/GCM/LAS/94S-9

AN ANALYSIS OF THE USEFULNESS OF GRADUATE EDUCATION TO CONTRACTING PROFESSIONALS AS PERCEIVED BY GRADUATES AND THEIR SUPERVISORS

THESIS

Presented to the Faculty of the School of Logistics and Acquisition Management

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the

Requirements for the Degree of

Master of Science in Contracting Management

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September 1994

Preface

This study was undertaken to assess the usefulness of graduate education to contracting professionals as perceived by those professionals and their supervisors. Graduate degrees are becoming increasingly important as contracting becomes accepted as a profession. Such an assessment is necessary because of the increasing complexity of contracting. Also, cutbacks in the government budgetary system have resulted in higher scrutiny of the need for DoD and Air Force sponsored graduate education programs. Such close scrutiny warrants further studies on the usefulness of graduate education to contracting professionals to justify expenditures. The 22 skills investigated in this study address only a small facet of the total usefulness of graduate education for contracting professionals.

The researcher's would like to thank our advisors, Lieutenant Colonel Carl Templin and Major T. Scott Graham, for their invaluable assistance in keeping us on the straight and narrow path. A special thanks to our computer support guru, Captain Anthony Woodson, who gave so much of his time to help us. His patience and support have been immeasurable. We would also like thank our families and friends for their moral support.

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Abstract

The purpose of this research was to assess the usefulness of graduate education to contracting professionals as perceived by graduates and their supervisors. Based on a list of 22 skills used by contracting professionals, graduates and their supervisors were surveyed to determine to what extent graduates possess these skills, developed these skills in their graduate degree program, and use these skills in the performance of their jobs. Air Force Institute of Technology Contracting Management Graduates since 1988 and contracting professionals with master's degrees within the Air Force Materiel Command were identified for this study.

As a result of this study, the researchers found that AFIT Contracting Management Graduates developed technical skills in their degree program to a greater extent than graduates with other types of degrees. Even though there were differences in the development of skills between different degree types, the researchers found few differences in the possession and use of skills among graduates. Graduates rated their possession of skills higher than their development of those skills in their graduate degree program. Therefore, the researchers conclude that graduates must have supplemented their development of these skills through avenues other than graduate education.

AN ANALYSIS OF THE USEFULNESS OF GRADUATE EDUCATION TO CONTRACTING PROFESSIONALS AS PERCEIVED BY GRADUATES AND THEIR SUPERVISORS

I. Introduction

Background

Historically, contracting has often been viewed as a clerical function. Contracting in the 1920s was a matter of writing the order to purchase a service or supply. Since that time, many laws have been passed and regulations written governing contracting in the Department of Defense (DoD). In 1986, the General Accounting Office (GAO) and the Packard Commission

> argued that the procurement profession was a complex one involving a major portion of the federal budget and that it required knowledge and skills in various areas, including cost and price analysis, contract law and procurement legislation, mathematics, forecasting, and the economic climate. The GAO panel also pointed out that new cost accounting standards and legislative and regulatory requirements have increased the complexity of contracting tasks, reinforcing the need for a strong background in accounting and business (Fox, 1988:254).

It is clear that the increasing complexity has moved contracting well beyond the clerical function.

A similar trend has been observed for the purchasing function, the corporate counterpart of DoD contracting. In many commercial firms, purchasing agents are responsible for material management decisions (Parasuraman and Bowers, 1983:22). "Companies such as General Motors, NCR, and St. Regis Paper Company have made

large investments in purchasing personnel and in training them to cope with their complex responsibilities" (Parasuraman and Bowers, 1983:22). Additionally, purchasing agents have an increasing impact on the profitability of manufacturers (Basta, 1989:26). The growing complexity and the influence on profitability has prompted a movement to "professionalize" the purchasing field. This movement advocates training, education, certification, and minimum experience and qualification requirements for positions of responsibility in purchasing. As a result, companies are demanding highly qualified purchasing agents with more education than ever before. Top Professions, a guide which describes the qualifications and salaries of most professions, states that "The most powerful preparation for a career in purchasing management is an undergraduate engineering degree coupled with an MBA" (Basta, 1989).

Education is a key element to the professionalization of the contracting field. Graduate education is highly desired by both the United States Air Force and its industry counterparts. "Contracting officers are required to ... understand the effect of competition, the marketplace, analytical models, computer technology, and business strategies" (Fox, 1988:254). Graduate education provides individuals with tools in thought processing. It demonstrates dedication and a level of ability necessary for coping with the increasingly complex field of contracting.

Officers and civilians in Air Force contracting are encouraged to obtain graduate degrees (AFR 36-1, 1989:A14-29). The Graduate Contracting Management (GCM) program within the Air Force Institute of Technology (AFIT) provides the Air Force with graduates who are specialized in contracting management.

Purpose

Both the Air Force and its industry counterparts identify the types of degrees that are desirable for an individual who is working in the contracting profession. However,

individuals may choose to obtain graduate degrees in other unrelated fields. The purpose of this study is to investigate the usefulness of graduate education to the contracting professional as perceived by graduates and their supervisors. For the purposes of this study, the researchers defined usefulness in terms of the skills that are required to perform the contracting function effectively. By identifying the skills needed by contracting professionals, the researchers believe that they can estimate to what extent graduate education contributes to the development of those skills thereby determining the usefulness of graduate education to contracting professionals.

Research Question

The researchers hypothesize that an AFIT in-residence Contracting Management degree is more useful to contracting professionals in the performance of their duties than any other graduate degree. The following investigative questions were developed for this study:

1. What skills are needed for contracting professionals to perform their jobs?
2. To what extent did contracting professionals develop the skills necessary for their jobs in their graduate degree program?
3. To what extent do the supervisors' responses agree with the graduates' responses in the possession and use of these skills?

Scope/Limitations

This study surveyed military and civilian systems contracting professionals with graduate degrees within Air Force Materiel Command (AFMC) and graduates of the AFIT GCM program since 1988. In the context of this research, usefulness is defined in terms of the skills that are required to perform the contracting function effectively. These skills are identified in Chapter II. The researchers recognize that these skills are not inclusive of all skills which are useful to contracting professionals or all knowledge

gained in a graduate degree program. However, due to time constraints it was necessary to identify and limit the number of skills investigated in this study.

Definition of Terms

Several key terms will be used frequently throughout this research. It is important that these terms are defined in order to provide a common reference.

1. Usefulness - The quality of having utility and especially practical worth or applicability (Woolf, 1977:1288).

2. Graduate Degree - Any master's degree, law degree or other post undergraduate degree from an accredited college or university.

3. Contracting Professionals - Individuals working in the Air Force Specialty Code (AFSC) 64PX as well as Government civilians working in the 1100/1102 job series. The functions of contracting professionals as used in this research include, but are not limited to, requirements generation, contract planning, negotiations, contract award, contract modifications, contract administration, production and manufacturing, quality assurance, purchasing, contract termination, and contract closeout (Sherman, 1979:19-32). For the purposes of this research, contracting professionals and purchasing professionals are used interchangeably.

Overview of the Study

This research report is divided into five chapters. Chapter I , Introduction, introduced the need for graduate education in contracting and provided background on graduate education in both the Air Force and commercial industry. Chapter I also stated the specific purpose of the research including the hypothesis and investigative questions and

discussed the scope/limitation of this particular research project. Chapter II, The Literature Review, provides an in-depth review of current literature pertaining to contracting and graduate education in the DoD and commercial industry. It also presents the skills which were used to measure the usefulness of graduate education to contracting professionals. Chapter III, Methodology, establishes procedures for answering the investigative questions. Chapter IV, Data Analysis, presents and analyzes the survey data using the research methodology. Chapter V, Summary, Conclusions, and Recommendations, provides interpretation, conclusions, and recommendations for further studies.

II. Literature Review

A comprehensive review of the literature revealed that contracting has become a highly complex field. As a result, many experts believe that graduate education has become increasingly important in both the DoD and commercial industry.

Interest in the acquisition arena has been gaining momentum since the late 1940s. Various commissions have struggled with the problems of military acquisition and offered prescriptions to fix them. These commissions - the two Hoover Commissions of 1949 and 1955, the Fitzhugh Commission of 1970, the Commission on Government Procurement in 1972, the Grace Commission of 1983, and the Packard Commission of 1986 - have all recognized the need for competent, trained, and educated civilian and military acquisition professionals (Mavroules, 1991:18). Most recently, the Defense Acquisition Work Force Improvement Act (DAWIA) was passed in 1991. Previous to the passage of DAWIA, a year-long study was conducted to look at the state of the acquisition work force. This study concluded that "acquisition is such a complex process that professional skills and attributes are essential for the people performing acquisition functions" (Mavroules, 1991:17). The objective of DAWIA is to improve the professional qualities of the acquisition work force. DAWIA established a Defense Acquisition University, which provides professional educational development and training of the acquisition workforce. DAWIA also established minimum experience requirements, and education and training standards based on the complexity of the job (Flinn, 1992:1).

Historically, contracting has been considered a clerical function in which personnel follow the rules and regulations as if they were a recipe. Over the last decade, contracting has evolved into a more professionalized field. Congressman Mavroules stated, "The complexity of the acquisition process makes it virtually impossible to rely on rules and

regulations in every situation. We need people who can and will exercise their judgment when buying on behalf of the taxpayer" (Mavroules, 1991:17). The federal Office of Personnel Management (OPM) defines a professional position as "one in which successful performance requires a base of knowledge that is acquired, not through on-the-job training, but only through a course of study in a specified discipline" (Fox, 1988:254). Currently, civilian contracting officers are classified as administrators by OPM. However,

> in 1986 both the GAO and Packard Commission strongly recommended that the entire GS-1102 series be reclassified as professional. They argued that the procurement profession was a complex one involving a major portion of the federal budget and that it required knowledge and skills in various areas, including cost and price analysis, contract and procurement legislation, mathematics, forecasting, and the economic climate (Fox, 1988:254).

In industry, most sizable organizations require purchasing agents to have at least a bachelor's degree and prefer a master's degree in business administration or management. Continuing education is considered a necessity for advancement and for keeping up with changes in the field (Harkavy, 1990:46). Results from a study commissioned by the Center for Advanced Purchasing Studies (CAPS) indicated that the two most desirable degrees, both currently and in the future, are a bachelor's degree in business with specialization in Purchasing/Materials Management, and a combination of a technical undergraduate degree plus a master's degree in business. A master's degree in business administration (M.B.A.) ranked fourth in the type of degree required by many firms in private industry (Kolchin and Giunipero, 1993:32). The Air Force also encourages its members to seek master's degrees. Air Force Regulation 36-1, Officer Classification, specifies the qualifications for an "acquisition contracting officer." The individual must have a knowledge of government contract law, federal acquisition and contracting regulations/directives, contract pricing, budget and funding procedures, and trade

practices. Furthermore, a master's degree in business administration, industrial management, or contracting management is desirable. The existence of the AFIT and the Naval Post Graduate School demonstrates the importance the DoD places on graduate education. Furthermore, the GCM Program within AFIT demonstrates the importance of graduate education for contracting professionals.

Graduate education provides individuals with the necessary cognitive knowledge and analytical skills, but more importantly, it merges these skills with the "action skills" which enable people to put their knowledge to work (Jennings, 1989:440). Furthermore, graduate education

> requires mastering the knowledge, modes of thought, and techniques of intellectual inquiry appropriate to a particular field of study and also the application of these competencies to an original research problem that advances the discipline. Whereas, undergraduates and professional school students are expected primarily to master a body of knowledge, graduate students are asked to take an extra step by making an original contribution to this body of knowledge. This is to be accomplished within a context of rapid technological advances that will make it increasingly difficult to predict the problems that will be encountered in the future or the knowledge that will be required to solve them. (Powers and Enright, 1987:659)

Colleges and universities play an important role in providing education to purchasing professionals. Participants in the CAPS study were asked what role colleges have in improving the effectiveness of their purchasing staff. Respondents indicated that the two most important roles colleges play was to provide students with an understanding of the purchasing function and to offer a specific major in purchasing/materials management. Providing a better integration of courses in the total curriculum was listed as third most important. Respondents desired a structured sequence of courses that provide skills for

future purchasing professionals. Developing case studies was also viewed as an important task for colleges and universities. Finally, colleges were also seen as important in providing technical skills to the student of purchasing (Kolchin and Giunipero, 1993:77).

As the purchasing profession becomes increasingly more complex, it is important to determine what these changes mean in terms of the knowledge and skills required by purchasers to perform effectively in the field.

> The change in the purchasing process that is occurring will dictate a different skill set for purchasing professionals of the future. For instance, the de-emphasis on transactions and the move toward managing the supply chain may require more training in value chain management. The greater use of information technology will require greater facility in using such systems in reducing cycle time. Partnering arrangements require different negotiation skills and suggest the need for different types of negotiation training. The move toward global sourcing requires greater levels of cultural awareness, and programs to develop these skills in purchasers must be developed by companies to ensure that their buyers become competent. (Kolchin and Giunipero, 1993:20)

In 1990, CAPS commissioned a study on Purchasing Education and Training (PET) to determine what the purchasing education, training requirements, and resources will be in the year 2000. The goals of the PET study included answering the following questions: (1) How is the purchasing function changing as we approach the 21st century? (2) How will these changes in the function affect the body of knowledge for the purchasing discipline? (3) How will these changes affect education and training needs of purchasing professionals in the year 2000? and (4) What resources are available to fill these needs? In order to answer these questions, the researchers conducted their study in two phases. During the first phase of the study, the researchers interviewed more than 25 purchasing executives in the commercial industry. Through these interviews, the researchers were

able to determine "the knowledge, skills, and abilities that would be required by professional purchasing people to perform effectively in a changing function (Kolchin and Giunipero, 1993: 18). These skills, abilities, and knowledge bases were incorporated into a survey questionnaire which was sent to a larger sample of Chief Purchasing Officers of *Fortune* 1000 companies. During the second phase of the study, respondents from this sample were asked to rate each skill or ability in terms of its importance to the purchasing function (Kolchin and Giunipero,1993:9). Table 1 lists the skills identified in the interview portion of the study in the order of decreasing importance. These skills are not meant to be all inclusive of the skills which may be necessary for a person to perform proficiently in the purchasing function. The PET study identified four basic groups of skills and abilities: management, individual, interpersonal, and technical. Management skills and abilities consist of those skills which are necessary for the overall operation of a business enterprise. These skills become increasingly important as individuals participate on teams. Included within this category of skills and abilities are the ability to understand the entire business operation; the ability to manage both internal and external relations; the ability to effectively manage change; and overall planning and organization skills. The skills in this group indicate an increasing managerial emphasis in the changing purchasing function (Kolchin and Giunipero, 1993:22).

With the increased emphasis on teaming in many organizations. individual and interpersonal skills and abilities are necessary in order that individuals may become more effective team members. Individual skills include time management, salesmanship, risk taking. creativity, tactfulness, and written and oral communication. The interpersonal skills include such things as interpersonal communication, conflict resolution, influence and persuasion. leadership and problem solving. These skills and abilities are not only important for individuals working on teams within their organization but also become

important when dealing with the partnering arrangements that have become more popular in industry and government (Kolchin and Giunipero, 1993:22).

TABLE 1

SKILLS REQUIRED OF PURCHASERS
(Kolchin and Giunipero, 1993:46)

Ability to make decisions
Negotiation
Interpersonal communication
Problem solving
Understanding general business
Conflict resolution
Analytical
Customer focus
Leadership
Tactfulness in dealing with others
Managing change
Planning
Managing internal relations
Being organized/time management
Creativity
Inquisitive nature
Influencing and persuasion
Written communication
Salesmanship
Computer literacy
Computational
Technical
Risk taking

Because of the complex nature of the purchasing field, purchasers are required to become more technically competent. The skills encompassed in this category include such areas as analytical, decision-making, computational, negotiation, computer literacy, and mechanical skills and abilities. In order to provide purchasing professionals with these skills and abilities, it is important that the knowledge base upon which these skills

and abilities are developed changes to meet the increasing complexity in the purchasing function (Kolchin and Giunipero, 1993:22).

Many studies have been conducted to determine the skills necessary for a purchasing professional to perform successfully on the job. In one CAPS study, Eugene W. Muller concluded that the purchasing tasks performed in the manufacturing, services, and food sectors were very similar. This would suggest that the skills and abilities needed to perform these tasks would also be the same. Another CAPS study also found similarities in the buying functions of the industrial, governmental, institutional, and retailing sectors. These similarities would further support the idea that there is a common body of knowledge for the purchasing profession and that these results may be generalized to a larger population of purchasing professionals (Kolchin and Giunipero, 1993:90).

A review of the literature on this subject indicates that the purchasing function has changed dramatically in the last 100 years. In the 1890s, it was viewed as purely a clerical function. Now, in the 1990s, it has become a highly complex world of rules and regulations. With the advent of this increasing complexity in purchasing, individuals desiring to excel in the profession need to be highly trained and educated. In short,

> successful purchasing professionals in the year 2000 will be those who are both technically and interpersonally competent and who have a good grasp of the total business enterprise. It is the challenge for the profession to develop education and training programs that will allow purchasing professionals to acquire the appropriate knowledge and to develop the right skills for success in the next decade (Kolchin and Giunipero, 1993:13).

The skills identified in the Kolchin and Giunipero study answer the first investigative question in this research, "What skills are needed for contracting professionals to perform their jobs?," and provide a springboard for the remainder of the research presented in this thesis.

III. Methodology

Overview

In Chapter I, the researchers introduced the subject of this research effort and formulated the basic research questions. In Chapter II, the researchers conducted an extensive literature review on graduate education as it pertains to contracting professionals both in the DoD and commercial industry. This study required a two-step methodology. The first step was to conduct a comprehensive literature review to determine the important skills needed for Air Force contracting professionals. The second step was to survey contracting professionals and determine what types of graduate education contribute to the development of the skills necessary for contracting professionals. This chapter outlines the procedures used to answer the questions posed by this research effort. The researchers define the sample of interest, develop a survey instrument to gather the necessary data, and describe the statistical and descriptive tests used to analyze the data. This chapter will conclude with the assumptions and limitations of this research effort.

Sample

The sample for the survey mailing included two subsets of the large population of Air Force contracting professionals with graduate degrees. The first subset included 38 active duty military graduates of the AFIT Graduate Contracting Management (GCM) Program since 1988 (the inception of the AFIT GCM Program) through 1993. The supervisors of these graduates were also surveyed. The second subset included a random sample of 183 military and civilian contracting professionals with master's degrees assigned to the AFMC. The immediate supervisors of these graduates were also surveyed.

Upon survey distribution approval by the Air Force Military Personnel Center, the AFMC Contracting Director of Management Resources/Analysis office provided a computer-generated listing of all military and civilian contracting professionals with graduate degrees assigned to AFMC. The sample size for this subset of participants was calculated using the following formula:

$$n = \frac{NZ^2 x\ .25}{(d^2 x\ (N-1)) + (Z^2 x\ .25)}$$

where

n is the sample size, 64

N is the population size, 1073

d is the confidence level, .10

Z is the value for each confidence level, 1.645

The population size (N) was determined by subtracting the AFIT GCM graduates since 1988 and all supervisors from the total population. To meet a 35 percent response rate, the researchers mailed 183 surveys to AFMC contract professionals with master's degrees.

There have been 82 GCM graduates, both military and civilian, since 1988. The AFIT Registrar's Office provided a computer-generated listing of 47 of the 74 military GCM graduates since 1988. All AFIT GCM graduates could not be located because civilian GCM graduates, graduates who went on to obtain a doctorate degree, and those who separated from the Air Force could not be tracked. The researchers were able to locate 38 of the military GCM graduates from the list of 47 graduates provided by the AFIT Registrar's Office.

Instrumentation

Several data collection methods were considered and it was determined that a mail survey would best meet the needs of this research effort. The mail survey is a relatively inexpensive method to collect data from a widely dispersed population (Emory and Cooper, 1991:338). This research required collecting information from a large population of contracting professionals who have master's degrees and their supervisors. The specific information to be collected with this survey was not available elsewhere. A survey questionnaire was the most efficient and complete method of data collection to achieve the objective. In addition, the mail survey allows the respondents adequate time to consider alternatives and make responses that accurately reflect their own views (Emory and Cooper, 1991:338). Respondents were assured that their participation would be anonymous. "Mail surveys are typically perceived as being more impersonal, providing more anonymity than the other communication modes" (Emory and Cooper, 1991:333).

While a survey is the most practical instrument in this case, it does have disadvantages, one of which is non response. In an effort to increase the response rate, the researchers designed a survey which was relatively simple and could be completed in ten to fifteen minutes. The graduate's survey was limited to 72 questions and the supervisor's survey was limited to 48 questions.

Another method to increase the response rate is to employ Dillman's Total Design Method (TDM). In the TDM approach, Dillman suggests that three follow-ups are made after the mailing of the original survey questionnaire. One week after the survey has been mailed, the researchers should send a reminder postcard to all participants thanking them for their returns and reminding others to complete the survey. Three weeks after mailing the original survey, the researchers should send a new questionnaire and a letter to all nonrespondents stating that the questionnaire has not been received. Seven weeks after

original mailing, the researchers should send a third cover letter with a questionnaire by certified mail to the remaining nonrespondents (Dillman, 1978:160). Because of time constraints and the anonymity of the respondents, the researchers elected to use a modified version of Dillman's TDM. Two weeks after the original mailing of the survey, a postcard was sent to all participants thanking them for returns and reminding others to complete and mail the survey questionnaire.

The survey package mailed to each graduate included a survey questionnaire, a scannable answer sheet (AFIT Form 11C), a cover letter, a return envelope, a separate "Request for Results" return envelope, and the supervisor's survey package. In the cover letter, the graduate was instructed to pass the supervisor's survey package to his/her immediate supervisor. The supervisor's package included a survey questionnaire, a scannable answer sheet, a cover letter, a return envelope, and a "Request for Results" return envelope. In the supervisor's cover letter, the supervisor was instructed to complete the questionnaire only on the individual who had given him/her the package. By having the graduate pass the supervisor's survey package on to his/her immediate supervisor, the researchers were able to obtain information from sources which otherwise could not have been located. In order to match graduates with the appropriate supervisor during data analysis and still maintain the anonymity of the respondents, the scannable answer sheets were paired and the pairs were coded with matching numbers.

Questionnaire Development

The draft questionnaire was developed using 22 skills from the Kolchin and Giunipero study discussed previously in Chapter II. In order to answer the research questions, the researchers found it necessary to question graduates on their possession of the skills, development of the skills in their degree program, and use of the skills on the job. Therefore, the draft questionnaire contained questions designed to assess the graduate's

possession, development and use of each of the skills. Before sending this questionnaire to a larger sample of contracting professionals, a draft questionnaire was pretested by all members of the 1994 AFIT GCM class for their review. The comments from these individuals were used to revise the questionnaires that appear in Appendix A and Appendix B.

Questionnaire Structure

Respondents to the mail survey were asked their perceptions regarding their possession, development, and use of various skills which contracting professionals need in the performance of their jobs. The Likert scale was chosen as a means of collecting the desired information to answer the research question. The Likert scale is flexible, reliable and provides a large volume of data (Emory and Cooper, 1991:221). It is also very easily and quickly constructed.

Two similar questionnaires were used in this study, one for the graduate and one for the supervisor. The survey that the graduate received was divided into four sections. Each of the first three sections contained one question with a corresponding Likert scale, followed by a list of professional skills that are required to perform the contracting function effectively. The questions in these sections with their corresponding Likert scales were structured as follows:

1) To what extent do you (the graduate) personally possess the following professional skills?

1) Highly unskilled
2) Moderately unskilled
3) Slightly unskilled
4) Slightly skilled
5) Moderately skilled

6) Highly skilled

II) To what extent did you (the graduate) develop the following skills in your master's degree program?

1) Undeveloped

2) Moderately undeveloped

3) Slightly undeveloped

4) Slightly developed

5) Moderately developed

6) Highly developed

III) To what extent do you (the graduate) use the following skills in the performance of your job?

1) Never

2) Slightly

3) Moderately

4) Extensively

Additionally, the graduate was asked one closed-ended and one open-ended question in Section II in order to determine the type of graduate degree that was received. Section IV of the graduate's survey consisted of five closed-ended demographic questions.

Survey questionnaires were also distributed to the graduates' supervisors to augment the perceptions of the respondents with feedback from the supervisors. The supervisor survey was divided into three sections. Each of the first two sections contained one question with a corresponding Likert scale, followed by a list of professional skills that are required to perform the purchasing function effectively. The questions in these sections with the corresponding Likert scales were structured as follows:

I) To what extent does your employee possess the following professional skills?

1) Highly unskilled

2) Moderately unskilled

3) Slightly unskilled

4) Slightly skilled

5) Moderately skilled

6) Highly skilled

II) To what extent are the following skills necessary in the performance of your employee's job?

1) Never

2) Slightly

3) Moderately

4) Extensively

Section III of the supervisor's survey consisted of four closed-ended demographic questions.

Statistical Tests

The researchers encountered some controversy among academicians as to the appropriateness of parametric versus nonparametric statistical tests on this type of data. The controversy lies in the judgment regarding the extent to which the data meets the assumptions of the two different types of statistical tests. Parametric statistics usually require that the data be continuous in order to approximate a normal distribution. The data in this research are ordinal. Ordinal data are "measurements that enable the units of the sample to be ordered with respect to the variable of interest" (McClave and Benson, 1991:870). While the data are not continuous, some academicians believe that they may be considered continuous for the purposes of this study. Some researchers prefer parametric statistics because they are more powerful and easier to interpret than nonparametric statistics. Nonparametric statistics calculate the ranks of the data and

perform tests on the ranks unlike parametric statistics which make use of the actual data values. In consideration of this controversy, the researchers performed parametric tests as well as nonparametric tests whenever feasible. A comparison can be made by the reader between the results of the parametric tests and those of the nonparametric tests. However, due to time limitations the researchers will only analyze the results of the nonparametric tests.

The Kruskal-Wallis Test, a nonparametric version of analysis of variance (ANOVA), was used to test for differences between groups. The Kruskal-Wallis Test ranks the data and calculates the difference between the ranks. The result, the p-value, can be used to assess whether or not there is a statistically significant difference between groups. The assumptions of the Kruskal-Wallis Test are as follows: 1) the samples are random and independent, 2) there are 5 or more measurements in each sample, and 3) the probability distributions from which the samples are drawn are continuous (McClave and Benson, 1991:975). The data in this research meet the assumptions of the Kruskal-Wallis Test. Once the p-value was obtained for each test, it was compared with a .05 level of significance to determine whether or not there was a statistically significant difference between groups. A .05 level of significance means that the probability of finding a statistically significant difference, if there is a difference, between the groups is 95 percent.

In order to perform statistical tests, the graduates were categorized by degree type. Additionally, the 22 skills were categorized into four separate skill groups (Table 2). The Kruskal-Wallis Test was used to test for differences in the possession, development, and usefulness of specific skills between GCM graduates and six other categories of graduates. The Kruskal-Wallis Test was also used to test for differences in the possession, development, and usefulness of groups of skills between GCM graduates and other graduates.

TABLE 2

SKILL GROUPS

Technical Skills	**Individual Skills**
Ability to make decisions	Tactfulness
Negotiation	Time management
Analytical	Written communication
Computer literacy	Creativity
Computational	Salesmanship
Technical	Risk taking
Management Skills	**Interpersonal Skills**
Customer Focus	Interpersonal communication
Managing change	Problem solving
Planning	Influencing and persuasion
Managing internal relations	Conflict resolution
Understanding general business	Leadership

The parametric one-way ANOVA yields a p-value. The assumptions of the parametric one-way ANOVA are as follows: 1) all population probability distributions are normal, 2) the population variances are equal, and 3) the samples are selected randomly and independently from the respective populations (McClave and Benson, 991:870). The one-way ANOVA calculated the mean square for treatments, "which measures the variability among the treatment means," and divides it by the mean square for error, "which measures the sampling variability within the treatments" (McClave and Benson, 1991:867). The resulting p-value from each test was compared with a .05 level of significance, to determine if there was a statistically significant difference between groups. The researchers did not choose the one-way ANOVA as the primary source of analysis for this data because it could not be determined that the data meet the assumptions. The researchers could not assume the population distributions are normal or if the population variances are equal.

Descriptive statistics were performed on the categories of graduates to obtain the means. The means were then compared among groups which showed statistically significant differences to determine the relationship of the differences. For example, a statistically significant difference between GCM graduates and MA graduates in the development of technical skills could mean that GCMs rated themselves higher or MAs rated themselves higher. The degree category which shows the higher mean in the development of technical skills will be the group which rated themselves higher.

Spearman's Rank Correlation Test, a nonparametric test which "uses the ranks of the measurements to determine a measure of correlation" was used to determine whether or not there was a correlation between the supervisors' answers and the graduates' answers (McClave and Benson, 1991:867). A high positive correlation would be close to one, a low correlation would be close to zero, and a high negative correlation would be close to negative one.

Assumptions

1. The survey instrument used was both valid and reliable. It was valid because it was pilot tested and provided adequate coverage of the subject being studied. It was reliable because it provided consistent results.
2. Survey respondents took the necessary time to adequately respond to the questions and answered them honestly.
3. Survey respondents had a common knowledge of contracting terminology.

Limitations

1. No inferences were made concerning the overall Air Force contracting population. Conclusions were applied only to the population from which the sample was drawn.
2. Researchers did not attempt to define all general and contracting skills which are necessary for contracting professionals to perform on the job. Additionally, researchers

did not define all skills which are learned/developed in a graduate degree program. The skills used in this study were identified from a previous study of industry purchasing executives and may differ from skills used by government contracting professionals.

3. Graduates may have failed to pass the supervisor package on to his/her immediate supervisor, which would affect the supervisors' response rate.

4. Researchers could not mail a reminder postcard to nonrespondents to complete the survey questionnaire because of respondent anonymity.

5. Some addresses obtained for graduates were invalid.

6. Researchers were limited by the accuracy of respondents' perceptions. People tend to overate themselves.

7. Researchers did not define each skill in the survey. Respondents' definition of each skill may have varied.

IV. Data Analysis

Introduction

The purpose of this chapter is to present and analyze the survey data using the research methodology formulated in Chapter III. There are eight major sections in this chapter: Summary of Survey Response, Questionnaire Analysis, Technical Skills Analysis, Management Skills Analysis, Individual Skills Analysis, Interpersonal Skills Analysis, Correlation between Supervisors and Graduates, and Demographics. The four sections on skill analysis are further subdivided into combined skill groups and specific skill groups.

Summary of Survey Response

A total of 221 graduate surveys were mailed and 131 graduates responded (59.3%). A total of 221 supervisor surveys were mailed and 89 supervisors responded (40.3%). The largest number of graduate respondents have a Master of Business Administration (37%). Table 3 summarizes the survey response percentages by type of degree obtained by the graduate. Three graduates could not be categorized into the degree groups, therefore the total at the bottom of the table indicates responses from 128 graduates. The data from two graduates was not analyzed because those respondents did not indicate the type of degree obtained. The data from the remaining graduate was not analyzed because the respondent indicated a degree type which could not be placed in any of the other degree groups chosen for this study.

Sections I, II, III, and IV (Possession of Skills, Skill Development, Skill Use, and Background Information) of 106 returned surveys were completed by graduates in their entirety. Seventeen graduates left one or more questions unanswered. Of the 17 graduates, eight graduates did not answer question number 72, which requested current

job title. Five graduates did not answer any of the questions in Section IV (Background Information). Two graduates did not answer any of the questions in Sections III and IV. One graduate did not answer questions 45 through 72, and one graduate did not answer questions 49 through 72. The data in Section III for an additional eight graduates were not analyzed because those graduates responded outside the range.

TABLE 3

GRADUATE RESPONSE BY DEGREE TYPE

Type of Degree	**Graduates' Total Response**	**Graduates' % Total Response**
AFIT GCM Program	19	15%
Master of Arts	19	15%
Master of Business Administration	47	37%
Master of Education	4	3%
Master of Public Administsration	8	6%
Master of Science	31	24%
Total	128	100%

Sections I, II, and III (Possession of Skills, Skill Use, and Background Information) of 76 returned surveys were completed by supervisors in their entirety. The remaining 13 supervisors completed only parts of the survey questionnaire. Of these 13 supervisors, eight supervisors failed to complete the questions in Section III (Background Information). The remaining five supervisors failed to correctly answer the questions regarding rank or civilian grade.

Questionnaire Analysis

This section analyzes each of the four sections of the graduate's survey questionnaire. The four sections consisted of : Possession of Skills, Skill Development, Skill Use, and

Background. In each of the first three sections, respondents were questioned about the same 22 skills. For the purposes of analysis, these skills were grouped into four categories: technical skills, management skills, individual skills, and interpersonal skills.

In order to facilitate analysis, the researchers divided graduates into six categories by degree type. In addition, a category called "ALL" includes graduates from all degree types except for the GCM graduates (Table 4). The GCM graduate category was compared to the six other graduate categories based on the combined skill groups and the specific skills within each skill group. The nonparametric Kruskal-Wallis and the parametric one-way ANOVA tests were performed on each graduate category to compare GCM graduates with other graduates. The data in the following four sections answer the investigative question, "To what extent did contracting professionals develop the skills necessary for their jobs in their graduate degree program?" In these sections, the results of the Kruskal-Wallis tests will be presented in the following order: possession of the skill, development of that skill in the graduate's degree program, and use of the skill on the job. The results of the one-way ANOVA tests are presented in Tables 6, 13, 20, and 27. The one-way ANOVA test results will not be discussed in the text of this thesis but are presented for the reader's comparison.

Technical Skills Analysis

Combined Technical Skills. This group consists of the following technical skills: ability to make decisions, negotiation, analytical, computer literacy, computational, and technical. The researchers combined these skills into a group called combined technical skills and performed Kruskal-Wallis tests on this group as a whole.

When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the possession of the combined technical skills there was

no statistically significant difference found (Table 5). However, there was a statistically significant difference between GCM graduates and the "ALL" category in the

TABLE 4

DEGREE CATEGORIES

Degree Type	**Acronym**
Graduate Contracting Management	GCM
Master of Arts	MA
Master of Business Administration	MBA
Master of Education	MEd
Master of Public Administration	MPA
Master of Science	MS
All degree types except GCM	ALL

development of technical skills. The means for these groups of graduates reveal that the GCM graduates rated their development of combined technical skills higher in their degree program than the "ALL" category of graduates (Table 7). There were also statistically significant differences between GCM graduates and the MA graduates, and GCM graduates and the MBA graduates in the development of technical skills (Table 5). The means reported for these groups of graduates reveal that the GCM graduates rated their degrees higher in the development of technical skills than MA graduates or MBA graduates (Table 7). When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the use of the combined technical skills, there was no statistically significant difference found (Table 5).

Specific Technical Skills. When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the possession of each of the specific technical skills, statistically significant differences were found among analytical and computational skills. The only statistically significant difference found between GCM graduates and the "ALL" category was in analytical skills (Table 8). There were

TABLE 5

KRUSKAL-WALLIS P-VALUES FOR COMBINED TECHNICAL SKILLS

GCM VS.	**ALL**	**MA**	**MBA**	**MEd**	**MPA**	**MS**
Possession of Tech. Skills	0.2714	0.3037	0.2451	0.5085	0.7369	0.3606
Development of Tech. Skills	0.0159*	0.0001*	0.0445*	0.4581	0.8485	0.0644
Use of Tech. Skills	0.1918	0.1914	0.6254	0.7143	0.2087	0.0807

* Indicates significant values

TABLE 6

ONE-WAY ANOVA P-VALUES FOR COMBINED TECHNICAL SKILLS

GCM VS.	**ALL**	**MA**	**MBA**	**MEd**	**MPA**	**MS**
Possession of Tech. Skills	0.7853	0.4049	0.5435	0.4573	0.5750	0.6978
Development of Tech. Skills	0.0333*	0.0009*	0.0691	0.9366	0.9193	0.0882
Use of Tech. Skills	0.1832	0.1973	0.7042	0.7962	0.1614	0.0453*

* Indicates significant values

TABLE 7

MEANS FOR COMBINED TECHNICAL SKILLS

	GCM	ALL	MA	MBA	MEd	MPA	MS
Possession of Technical Skills	4.9825	5.0107	5.0789	5.0461	5.125	4.8958	4.9301
Development of Technical Skills	4.3596	4.049	3.7632	4.0709	4.3333	4.383	4.0699
Use of Technical Skills	3.2685	3.3765	3.4074	3.3042	3.3333	3.4583	3.4551

also statistically significant differences between GCM graduates and the MA graduates, and GCM graduates and the MBA graduates in the possession of analytical skills (Table 8). The means reported for these groups of graduates reveal that the "ALL", MA, and MBA graduates rated their degree higher in the possession of analytical skills than GCM graduates (Table 11). There was a statistically significant difference between GCM graduates and MEd graduates in possession of computational skills (Table 8). The means reported for these groups of graduates reveal that the MEd graduates rated their possession of computational skills higher than GCM graduates (Table 11).

When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the development of each of the specific technical skills, statistically significant differences were found among negotiation, computer literacy, and computational skills (Table 9). The only statistically significant difference found between GCM graduates and the "ALL" category was in computer literacy skills (Table 9). There were also statistically significant differences between GCM graduates and each of the other categories of graduates in the development of computer literacy skills (Table 9). The means reported for these groups of graduates reveal that the GCM graduates rated their development of computer literacy skills in their degree programs higher than each of the other categories of graduates, including the "ALL" category (Table 11). There was a statistically significant difference between GCM graduates and MBA graduates in the development of negotiation skills (Table 9). The means reported for these groups reveal that GCM graduates rated themselves higher in the development of negotiation skills in their degree programs than the MBA graduates (Table 11). There was a statistically significant difference between GCM graduates and MA graduates in the development of computational skills (Table 9). The means reported for these groups reveal that GCM graduates rated themselves higher in the development of computational skills in their degree programs than the MA graduates (Table 11).

When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the use of each of the specific technical skills, statistically significant differences were found in analytical skills (Table 10). There were statistically significant differences between GCM graduates and the "ALL", MA, MBA, and the MS category of graduates in the use of analytical skills (Table 10). The means reported for these groups of graduates reveal that the "ALL" category and MA, MBA and MS graduates rated themselves higher in the use of analytical skills than GCM graduates (Table 11).

TABLE 8

KRUSKAL-WALLIS P-VALUES FOR POSSESSION OF SPECIFIC TECHNICAL SKILLS

GCM VS.	**ALL**	**MA**	**MBA**	**MEd**	**MPA**	**MS**
Ability to make decisions	0.3054	0.7241	0.2683	0.4917	0.3744	0.2305
Negotiation	0.8521	0.8536	0.7353	0.7771	0.584	0.7292
Analytical	0.0199*	0.0476*	0.0224*	0.669	0.1926	0.0807
Computer literacy	0.3333	0.5133	0.4676	0.2475	0.1395	0.6135
Computational	0.1566	0.641	0.0527	0.0254*	0.5692	0.2192
Technical	0.398	0.4131	0.4723	0.5408	0.4228	0.432

* Indicates significant values

Management Skills Analysis

Combined Management Skills. This group consists of the following management skills: customer focus, managing change, planning, managing internal relations, and understanding general business. The researchers combined these skills into a group called combined management skills and performed Kruskal-Wallis Tests on this group as a whole.

TABLE 9

KRUSKAL-WALLIS P-VALUES FOR DEVELOPMENT OF SPECIFIC TECHNICAL SKILLS

GCM VS.	ALL	MA	MBA	MEd	MPA	MS
Ability to make decisions	0.3943	0.4977	0.3189	0.054	0.4832	0.9574
Negotiation	0.0762	0.1233	0.022*	0.1194	0.6941	0.1443
Analytical	0.741	0.336	0.7418	0.2473	0.4462	0.2908
Computer literacy	0*	0.0001*	0.0002*	0.0083*	0.0417*	0.0039*
Computational	0.2541	0.0042*	0.7448	0.3115	0.3958	0.5062
Technical	0.386	0.9013	0.5417	0.6458	0.4332	0.0616

* Indicates significant values

TABLE 10

KRUSKAL-WALLIS P-VALUES FOR USE OF SPECIFIC TECHNICAL SKILLS

GCM VS.	ALL	MA	MBA	MEd	MPA	MS
Ability to make decisions	0.2192	0.6963	0.6068	0.4696	0.2738	0.3296
Negotiation	0.9777	0.4824	0.4517	0.6391	0.365	0.9651
Analytical	0.0021*	0.0396*	0.0164*	0.1079	0.0743	0.0194*
Computer literacy	0.3127	0.7759	0.1172	0.0691	0.7072	0.3501
Computational	0.1217	0.4044	0.1509	0.8918	0.7558	0.2433
Technical	0.2362	0.3842	0.5835	0.0898	0.532	0.278

* Indicates significant values

TABLE 11

MEANS FOR POSSESSION, DEVELOPMENT, AND USE OF SPECIFIC TECHNICAL SKILLS

	GCM	ALL	MA	MBA	MEd	MPA	MS
POSSESSION							
Ability to make decisions	5.6842	5.4587	5.7368	5.4894	5.5	5.5	5.2258
Negotiation	5.4211	5.2844	5.3684	5.2766	5.5	5.25	5.2258
Analytical	4.7895	5.2661	5.3684	5.3404	5	5.25	5.129
Computer literacy	4.7895	4.4587	4.5263	4.4681	4.25	4.125	4.5161
Computational	4.8421	5.0734	4.9474	5.2128	5.75	4.5	5
Technical	4.3684	4.5229	4.5263	4.4894	4.75	4.75	4.4839
DEVELOPMENT							
Ability to make decisions	3.9474	4.3148	4.3684	4.3404	5.25	4.4286	4.0968
Negotiation	4.2105	3.7706	3.7895	3.5532	5.25	4.5	3.7097
Analytical	4.8947	4.7615	4.4211	4.9787	5.5	5.25	4.4194
Computer literacy	4.8421	3.2294	2.7368	3.1915	2	3.875	3.5806
Computational	4.6316	4.3119	3.6842	4.5745	4.75	4.125	4.2903
Technical	3.6316	3.9083	3.5789	3.7872	3.25	4.125	4.3226
USE							
Ability to make decisions	3.7222	3.7917	3.7778	3.8478	4	4	3.8462
Negotiation	3.6111	3.5208	3.4444	3.4565	3.5	3.875	3.6538
Analytical	3	3.5313	3.5556	3.5652	4	3.625	3.5385
Computer literacy	3.5	3.2188	3.3889	3.2391	2.5	3.375	3.3462
Computational	2.8889	3.1458	3.1667	3.3261	3	2.875	3.1923
Technical	2.8889	3.0521	3.1111	3.0435	3	3.125	3.1538

When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the possession of management skills, there were statistically significant differences between the GCM graduates and MA graduates, and the GCM graduates and MPA graduates (Table 12). The means reported for these groups of graduates reveal that MA and MBA graduates rated their possession of management skills higher than GCM graduates (Table 14).

There were also statistically significant differences between GCM graduates and MPA graduates, and GCM graduates and MS graduates in the development of management skills (Table 12). The means reported for these groups reveal that both MPA and MS graduates rated their development of management skills in their degree programs higher than GCM graduates (Table 14).

In the use of management skills, there was a statistically significant difference between GCM graduates and MPA graduates (Table 12). The means reported for these groups of graduates reveal that MPA graduates rated their use of management skills higher than GCM graduates (Table 14).

Specific Management Skills. When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the possession of each of the specific management skills, statistically significant differences were found among the customer focus, planning, and understanding general business skills (Table 15). In the possession of customer focus skills, there was a statistically significant difference found between GCM graduates and MEd graduates (Table 15). The means for these groups reveal that GCM graduates rated their possession of customer focus skills higher than MEd graduates (Table 18). There was also a statistically significant difference found between GCM graduates and MA graduates in the possession of planning skills (Table 15). The means reveal that MA graduates rated their possession of planning skills higher than GCM graduates (Table 18). In the possession of understanding general business

TABLE 12

KRUSKAL-WALLIS P-VALUES FOR COMBINED MANAGEMENT SKILLS

GCM VS.	ALL	MA	MBA	MEd	MPA	MS
Possession of Mgt. Skills	0.1247	0.0343*	0.1672	0.051	0.0154*	0.4265
Development of Mgt. Skills	0.0517	0.3311	0.196	0.9302	0.0014*	0.0341*
Use of Mgt. Skills	0.2889	0.2502	0.4546	0.0713	0.029*	0.4786

* Indicates significant values

TABLE 13

ONE-WAY ANOVA P-VALUES FOR COMBINED MANAGEMENT SKILLS

GCM VS.	ALL	MA	MBA	MEd	MPA	MS
Possession of Mgt. Skills	0.5296	0.0541	0.3124	0.0475*	0.0148*	0.5217
Development of Mgt. Skills	0.1447	0.4023	0.4308	0.8559	0.0034*	0.0794
Use of Mgt. Skills	0.3752	0.1998	0.6593	0.0728	0.0613	0.4661

* Indicates significant values

TABLE 14

MEANS FOR COMBINED MANAGEMENT SKILLS

	GCM	ALL	MA	MBA	MEd	MPA	MS
Possession of Management Skills	5.1053	5.167	5.3053	5.2	4.75	5.425	5.0194
Development of Management Skills	4.2105	4.4367	4.3684	4.3489	4.15	4.925	4.5226
Use of Management Skills	3.4667	3.5412	3.6	3.5092	3	3.725	3.5391

skills, there was a statistically significant difference found between GCM graduates and MBA graduates (Table 15). The means reported for these two groups of graduates reveal that MBA graduates rated their possession of understanding general business skills higher than GCM graduates (Table 18).

When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the development of each specific management skill, statistically significant differences were found among the customer focus, planning, managing internal relations, and understanding general business skills (Table 16). In the development of customer focus skills, there were statistically significant differences found between GCM graduates and MPA graduates, and GCM graduates and MS graduates (Table 16). The means reveal that both MPA and MS graduates rated their development of customer focus skills in their degree programs higher than GCM graduates (Table 18). In the development of planning skills, there were statistically significant differences between GCM graduates and MBA, MEd and MPA graduates (Table 16). The means reported for each of these groups of graduates reveal that MBA, MEd. and MPA graduates rated their development of planning skills in their degree programs higher than GCM graduates (Table 18). Additionally, there were statistically significant differences between GCM graduates and the "ALL" category of graduates in the development of planning skills (Table 16). The means reveal that the "ALL" category of graduates rated their development of planning skills in their degree program higher than GCM graduates (Table 18). When GCM graduates were compared with other graduates in the development of managing internal relations skills, there was a statistically significant difference between GCM graduates and MPA graduates (Table 16). The means for these groups reveal that MPA graduates rated their development of managing internal relations in their degree programs higher than GCM graduates (Table 18). In the development of general business skills, there were statistically significant

differences between GCM graduates and graduates in the "ALL", MBA, and MS categories (Table 16). The means for these graduate groups reveal that "ALL", MBA, and MS graduates rated their development of general business skills in their degree programs higher than GCM graduates (Table 18).

Only one statistically significant difference was found between GCM graduates and MEd graduates in the use of management skills. This difference was found in the area of managing internal relations (Table 17). The means reported for these groups reveal that GCM graduates rated their use of managing internal relations higher than MEd graduates (Table 18).

Individual Skills Analysis

Combined Individual Skills. This group consists of the following individual skills: tactfulness in dealing with others, being organized/time management, creativity, written communication, salesmanship, and risk taking. The researchers combined these skills into a group called combined individual skills and performed Kruskal-Wallis tests on this group as a whole.

When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the possession of combined individual skills, statistically significant differences were found between GCM graduates and the MA and MPA graduates (Table 19). The means for these groups of graduates reveal that both MA and MPA graduates rate their possession of individual skills higher than GCM graduates (Table 21).

In the development of individual skills, there were statistically significant differences found between GCM graduates and graduates in the "ALL", MPA, and MS categories (Table 19). The means for these graduates reveal that the "ALL", MPA, and MS

TABLE 15

KRUSKAL-WALLIS P-VALUES FOR POSSESSION
OF SPECIFIC MANAGEMENT SKILLS

GCM VS.	**ALL**	**MA**	**MBA**	**MEd**	**MPA**	**MS**
Customer focus	0.4895	0.7613	0.5629	0.017*	0.9766	0.6168
Managing change	0.5812	0.7979	0.3195	0.091	0.2379	0.7741
Planning	0.0598	0.0205*	0.2371	0.4097	0.0506	0.1903
Managing internal relations	0.2211	0.1388	0.2365	0.6746	0.0627	0.695
Understanding general business	0.1069	0.3377	0.0129*	0.2335	0.6391	0.2982

* Indicates significant values

TABLE 16

KRUSKAL-WALLIS P-VALUES FOR DEVELOPMENT
OF SPECIFIC MANAGEMENT SKILLS

GCM VS.	**ALL**	**MA**	**MBA**	**MEd**	**MPA**	**MS**
Customer focus	0.0996	0.2836	0.4092	0.4072	0.0228*	0.0464*
Managing change	0.1872	0.0752	0.6933	0.9005	0.0798	0.1337
Planning	0.0189*	0.3571	0.0075*	0.0324*	0.0278*	0.1913
Managing internal relations	0.1283	0.2117	0.6687	0.4999	0.0174*	0.0546
Understanding general business	0.0075*	0.4832	0.0001*	0.463	0.3942	0.0304*

* Indicates significant values

TABLE 17

KRUSKAL-WALLIS P-VALUES FOR USE OF SPECIFIC MANAGEMENT SKILLS

GCM VS.	ALL	MA	MBA	MEd	MPA	MS
Customer focus	0.1525	0.253	0.2895	0.1514	0.1789	0.5091
Managing change	0.4319	0.9197	0.6302	0.6391	0.365	0.887
Planning	0.1514	0.8228	0.2707	0.8264	0.5958	0.1892
Managing internal relations	0.6588	0.4898	0.8061	0.0263*	0.3479	0.4774
Understanding general business	0.2837	0.68	0.6714	0.944	0.2745	0.3714

* Indicates significant values

graduates rate their development of individual skills in their degree programs higher than GCM graduates (Table 21).

When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the use of individual skills there were no statistically significant differences found (Table 19).

Specific Individual Skills. When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the possession of each of the specific individual skills, statistically significant differences were found among creativity and risk taking skills (Table 22). The only statistically significant difference found between GCM graduates and the "ALL" category was in the possession of creativity skills (Table 22). There were also statistically significant differences between GCM graduates and MPA graduates in the possession of creativity skills (Table 22). The means for these groups reveal that "ALL" and MPA graduates rate their possession of creativity skills higher than GCM graduates (Table 25). In the possession of risk taking

TABLE 18

MEANS FOR POSSESSION, DEVELOPMENT, AND USE OF SPECIFIC MANAGEMENT SKILLS

	GCM	ALL	MA	MBA	MEd	MPA	MS
POSSESSION							
Customer focus	5.3684	5.156	5.2632	5.2128	4.25	5.375	5.0645
Managing change	5.1579	5.0092	5.2105	4.9574	4.5	5.5	4.9032
Planning	4.8947	5.1927	5.4211	5.1277	5.25	5.5	5.0645
Managing internal relations	4.8421	5.0092	5.1579	5.0426	5	5.375	4.7742
Understanding general business	5.2632	5.4679	5.4737	5.6596	4.75	5.375	5.2903
DEVELOPMENT							
Customer focus	3.2632	3.8991	3.7895	3.617	4	4.75	4.1613
Managing change	3.8947	4.3119	4.6316	4	3.75	4.875	4.5161
Planning	4.0526	4.7523	4.3684	4.9149	5.5	5.25	4.5161
Managing internal relations	3.6316	4.055	4.1053	3.7447	4	4.875	4.2903
Understanding general business	4.5789	5.1651	4.9474	5.4681	3.5	4.875	5.129
USE							
Customer focus	3.5	3.6563	3.7778	3.6522	3	3.875	3.6538
Managing change	3.6111	3.625	3.6667	3.6739	3.5	3.875	3.6154
Planning	3.5	3.6458	3.5556	3.7391	3.5	3.625	3.7308
Managing internal relations	3.3333	3.2813	3.5	3.413	1.5	3.5	3.1154
Understanding general business	3.3889	3.4896	3.5	3.5	3.5	3.75	3.5769

TABLE 19

KRUSKAL-WALLIS P-VALUES FOR COMBINED INDIVIDUAL SKILLS

GCM VS.	**ALL**	**MA**	**MBA**	**MEd**	**MPA**	**MS**
Possession of Ind. Skills	0.0895	0.0052*	0.361	0.2467	0.0013*	0.33
Development of Ind. Skills	0.0221*	0.1157	0.2612	0.5768	0*	0.0134*
Use of Ind. Skills	0.9327	0.1964	0.7139	0.2454	0.1674	0.6213

*Indicates significant values

TABLE 20

ONE-WAY ANOVA P-VALUES FOR COMBINED INDIVIDUAL SKILLS

GCM VS.	**ALL**	**MA**	**MBA**	**MEd**	**MPA**	**MS**
Possession of Ind. Skills	0.3376	0.0279*	0.5180	0.31	0.0009*	0.8669
Development of Ind. Skills	0.0090*	0.0994	0.1711	0.6410	0*	0.0040*
Use of Ind. Skills	0.9703	0.2759	0.6139	0.3343	0.2093	0.6380

*Indicates significant values

TABLE 21

MEANS FOR COMBINED INDIVIDUAL SKILLS

	GCM	ALL	MA	MBA	MEd	MPA	MS
Possession of Individual Skills	4.9035	5	5.1754	4.9681	4.7083	5.375	4.8817
Development of Individual Skills	3.8246	4.2043	4.1518	4.0461	3.6667	5.0833	4.3189
Use of Individual Skills	3.3241	3.3208	3.4444	3.2748	3.0833	3.5	3.2756

skills, there was a statistically significant difference between GCM graduates and MBA graduates (Table 22). The means for these groups reveal that GCM graduates rated their possession of risk taking skills higher than MBA graduates (Table 25).

When GCM graduates were compared with graduates from each of the other degree types in the development of each specific individual skill, there were statistically significant differences found among tactfulness, creativity, written communication, salesmanship, and risk taking (Table 23). In the development of tactfulness, creativity, written communication and salesmanship skills, there were statistically significant differences found between GCM graduates and MPA graduates in each skill (Table 23). The means reveal that MPA graduates rated their development of tactfulness, creativity, written communication, and salesmanship skills in their degree programs higher than GCM graduates (Table 25). There was also a statistically significant difference found between GCM graduates and MS graduates in the development of risk taking skills (Table 23). The means for these two groups of graduates reveal that MS graduates rated their development of risk taking skills in their degree programs higher than GCM graduates (Table 25).

There was only one statistically significant difference found in the use of individual skills. This difference was found between GCM graduates and MPA graduates in the use of creativity skills (Table 24). The means for these two groups reveal that MPA graduates rated their use of creativity skills higher than GCM graduates (Table 25).

Interpersonal Skills Analysis

Combined Interpersonal Skills. This group consists of the following interpersonal skills: interpersonal communication, problem solving, influencing and persuasion, conflict resolution, and leadership. The researchers combined these skills into a group

TABLE 22

KRUSKAL-WALLIS P-VALUES FOR POSSESSION
OF SPECIFIC INDIVIDUAL SKILLS

GCM VS.	**ALL**	**MA**	**MBA**	**MEd**	**MPA**	**MS**
Tactfulness in dealing w/others	0.6601	0.2041	0.3865	0.1288	0.1007	0.5495
Being organized/Time mgt.	0.3215	0.0785	0.5527	0.926	0.4327	0.5636
Creativity	0.0409*	0.1507	0.1273	0.8638	0.015*	0.0528
Written communication	0.3667	0.3571	0.2866	**	0.5531	0.7427
Salesmanship	0.289	0.2378	0.432	0.6941	0.1107	0.6484
Risk taking	0.2374	0.6063	0.0323*	0.1244	0.5733	0.5124

* Indicates significant values
** Indicates there were too many ties to perform the test

TABLE 23

KRUSKAL-WALLIS P-VALUES FOR DEVELOPMENT
OF SPECIFIC INDIVIDUAL SKILLS

GCM VS.	**ALL**	**MA**	**MBA**	**MEd**	**MPA**	**MS**
Tactfulness in dealing w/others	0.6918	0.3545	0.4975	0.8974	0.0318*	0.3088
Being organized/Time mgt.	0.8886	0.3207	0.7739	0.468	0.0933	0.6558
Creativity	0.1464	0.2312	0.4105	0.7397	0.0013*	0.1501
Written communication	0.6245	0.9756	0.781	0.5806	0.0298*	0.5709
Salesmanship	0.108	0.1891	0.1188	0.4066	0.0483*	0.2531
Risk taking	0.0785	0.063	0.3553	0.2988	0.1093	0.0464*

* Indicates significant values

TABLE 24

KRUSKAL-WALLIS P-VALUES FOR USE OF SPECIFIC INDIVIDUAL SKILLS

GCM VS.	ALL	MA	MBA	MEd	MPA	MS
Tactfulness in dealing w/others	0.1496	0.3135	0.4232	0.3663	0.0679	0.4696
Being organized/Time mgt.	0.2721	0.0744	0.0801	0.7389	0.1602	0.2574
Creativity	0.0772	0.0661	0.2645	0.5926	0.0435*	0.5972
Written communication	0.9159	0.6347	0.6546	0.1544	0.3744	0.6659
Salesmanship	0.9418	0.8944	0.8937	0.1062	0.6349	0.7564
Risk taking	0.4477	0.1551	0.8252	0.7746	0.4745	0.7765

* Indicates significant values

called combined interpersonal skills and performed Kruskal-Wallis tests on this group as a whole.

When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the possession of combined interpersonal skills, statistically significant differences were found between GCM graduates and the MA and MPA graduates (Table 26). The means for these groups of graduates reveal that both MA and MPA graduates rate their possession of interpersonal skills higher than GCM graduates (Table 28).

When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the development of interpersonal skills, statistically significant differences were found between GCM graduates and the "ALL", MA, MBA, MEd, MPA, and MS categories of graduates (Table 26). The means reported for each of these groups of graduates reveal that "ALL", MA, MBA, MEd, MPA, and MS graduates rate their development of interpersonal skills in their degree programs higher than GCM graduates (Table 28).

TABLE 25

MEANS FOR POSSESSION, DEVELOPMENT, AND USE OF SPECIFIC INDIVIDUAL SKILLS

	GCM	ALL	MA	MBA	MEd	MPA	MS
POSSESSION							
Tactfulness in dealing with others	5.1579	5.2018	5.4211	5.2979	4.5	5.625	4.9032
Being organized/Time management	5	5.1009	5.3158	5.0851	5	5.25	4.9677
Creativity	4.4737	4.9266	4.9474	4.8298	4.5	5.5	4.9677
Written communication	5.2632	5.4128	5.5263	5.5106	5.25	5.5	5.1935
Salesmanship	4.4737	4.6239	4.8421	4.5745	4.5	5.125	4.4516
Risk taking	5.0526	4.7156	5	4.5106	4.5	5.25	4.7419
DEVELOPMENT							
Tactfulness in dealing with others	3.9474	4.0833	4.1667	3.7021	3.75	5	4.4194
Being organized/Time management	4.5789	4.5505	4.1579	4.5319	4.25	5.375	4.6452
Creativity	3.4211	4.0367	4	3.8298	3.25	5.5	4.0968
Written communication	4.6316	4.9633	4.8421	4.9149	4.25	5.75	5
Salesmanship	3.1579	3.6514	3.6316	3.6809	2.5	4.5	3.5484
Risk taking	3.2105	3.9346	4.111	3.617	4	4.375	4.2
USE							
Tactfulness in dealing with others	3.6667	3.7292	3.7778	3.7609	3	4	3.7308
Being organized/Time management	3.9444	3.6875	3.6667	3.6957	4	3.75	3.7308
Creativity	2.7222	3	3.2778	3.0435	3	3.5	2.8077
Written communication	3.8889	3.7708	3.8333	3.8261	3.5	3.75	3.7692
Salesmanship	2.8889	2.8229	2.8889	2.8913	2	3	2.8462
Risk taking	2.8333	2.8854	3.2222	2.9565	3	3	2.7692

In the use of interpersonal skills, there were statistically significant differences found between GCM graduates and MPA graduates (Table 26). The means for these groups reveal that MPA graduates rate their use of interpersonal skills higher than GCM graduates (Table 28).

TABLE 26

KRUSKAL-WALLIS P-VALUES FOR COMBINED INTERPERSONAL SKILLS

GCM VS.	**ALL**	**MA**	**MBA**	**MED**	**MPA**	**MS**
Poss. of Interpersonal Skills	0.2831	0.0027*	0.9305	0.5483	0.0083*	0.7857
Dev. of Interpersonal Skills	0.0008*	0.0051*	0.0292*	0.0366*	0*	0.0067*
Use Of Interpersonal Skills	0.4591	0.1447	0.6482	0.6954	0.0143*	0.7021

* Indicates significant values

TABLE 27

ONE-WAY ANOVA P-VALUES FOR COMBINED INTERPERSONAL SKILLS

GCM VS.	**ALL**	**MA**	**MBA**	**MEd**	**MPA**	**MS**
Poss. of Interpersonal Skills	0.8784	0.0023*	0.8831	0.4617	0.0076*	0.2166
Dev. of Interpersonal Skills	0.0006*	0.0076*	0.0192*	0.0285*	0*	0.0054*
Use of Interpersonal Skills	0.4154	0.2201	0.7300	0.6570	0.014*	0.8970

* Indicates significant values

Specific Interpersonal Skills. When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the possession of each of the specific individual skills, statistically significant differences were found among interpersonal communication, conflict resolution, and leadership (Table 29). There was a statistically significant difference between GCM graduates and MA graduates in the

TABLE 28

MEANS FOR COMBINED INTERPERSONAL SKILLS

	GCM	ALL	MA	MBA	MEd	MPA	MS
Possession of Interspersonal Skills	5.2211	5.2353	5.4947	5.2085	5.1	5.5385	5.0581
Development of Interpersonal Skills	3.8737	4.356	4.3684	4.2298	4.55	5.025	4.3419
Use of Interpersonal Skills	3.5111	3.5764	3.6413	3.5434	3.4	3.825	3.5231

possession of interpersonal communication skills (Table 29). The means for these two groups reveal that MA graduates rate their possession of interpersonal communication skills higher than GCM graduates (Table 32). In the possession of conflict resolution skills, there was a statistically significant difference between GCM graduates and MPA graduates (Table 29). The means reveal that MPA graduates rate their possession of conflict resolution skills higher than GCM graduates (Table 32). There was also a statistically significant difference between GCM graduates and MEd graduates in the possession of leadership skills (Table 29). The means for these two groups reveal that GCM graduates rate their possession of leadership skills higher than MEd graduates (Table 32).

When GCM graduates were compared with graduates from each of the other degree types and the "ALL" category in the development of each of the specific individual skills, statistically significant differences were found among problem solving, conflict resolution, and leadership (Table 30). There were statistically significant differences between GCM graduates and the "ALL" category of graduates, and GCM graduates and MBA graduates in the development of problem solving skills (Table 30). The means for these graduates reveal that the "ALL" and MBA graduates rate their development of problem solving skills in their degree programs higher than GCM graduates (Table 32). In the development of conflict resolution skills, there was a statistically significant difference between GCM graduates and MPA graduates (Table 30). The means for these groups reveal that MPA graduates rate their development of conflict resolution skills in their degree programs higher than GCM graduates (Table 32). There were also statistically significant differences between GCM graduates and the "ALL" category of graduates, and GCM graduates and MPA graduates in the development of leadership skills (Table 30). The means for the GCM, "ALL", and MPA graduates reveal that both

"ALL" and MPA graduates rate their development of leadership skills in their degree programs higher than GCM graduates (Table 32).

There was only one statistically significant difference found in the use of interpersonal skills. This difference was found between GCM graduates and MA graduates in the use of leadership skills (Table 31). The means for these two groups reveal that MA graduates rated their use of leadership skills higher than GCM graduates (Table 32).

TABLE 29

KRUSKAL-WALLIS P-VALUES FOR POSSESSION
OF SPECIFIC INTERPERSONAL SKILLS

GCM VS.	**ALL**	**MA**	**MBA**	**MEd**	**MPA**	**MS**
Interpersonal communication	0.3292	0.0174*	0.7517	0.5253	0.182	0.7109
Problem solving	0.3434	0.2707	0.249	0.7763	0.4654	0.6605
Influencing and persuasion	0.9082	0.3153	0.6299	0.8606	0.3193	0.9033
Conflict resolution	0.1879	0.0702	0.6249	0.4145	0.0138*	0.3052
Leadership	0.6649	0.234	0.5026	0.0247*	0.451	0.4883

* Indicates significant values

Correlation between Supervisors and Graduates

This section presents data that answers research question three, "To what extent do the supervisors' responses agree with the graduates' responses in the possession and use of these skills?" The results of the Spearman's Rank Correlation indicate a coefficient of 0.5961 between graduates and their supervisors across all skill groups. The correlation coefficients between graduates and their supervisors for groups of skills are as follows: Technical 0.6107, Management 0.6071, Individual 0.5776, Interpersonal 0.5951. These coefficients suggest a moderate positive association between graduate and supervisor responses.

TABLE 30

KRUSKAL-WALLIS P-VALUES FOR DEVELOPMENT
OF SPECIFIC INTERPERSONAL SKILLS

GCM VS.	ALL	MA	MBA	MEd	MPA	MS
Interpersonal communication	0.1605	0.2159	0.4101	0.2193	0.0641	0.1869
Problem solving	0.0382*	0.3221	0.0181*	0.2531	0.0571	0.1438
Influencing and persuasion	0.3138	0.288	0.5978	0.3721	0.0637	0.4957
Conflict resolution	0.4371	0.4587	0.7022	0.0519	0.007*	0.3184
Leadership	0.0476*	0.0641	0.1379	0.7035	0.0165*	0.0794

* Indicates significant values

TABLE 31

KRUSKAL-WALLIS P-VALUES FOR USE
OF SPECIFIC INTERPERSONAL SKILLS

GCM VS.	ALL	MA	MBA	MEd	MPA	MS
Interpersonal communication	0.6418	0.1515	0.9803	0.6286	0.9601	0.5681
Problem solving	0.1352	0.4437	0.3061	0.3483	0.07	0.4641
Influencing and persuasion	0.3445	0.8706	0.3063	0.9428	0.3282	0.7708
Conflict resolution	0.7743	**	0.4419	0.765	0.2524	0.2144
Leadership	0.1155	0.046*	0.2857	0.1101	0.1689	0.6035

* Indicates significant value

** Indicates there were too many ties to perform the test

TABLE 32

MEANS FOR POSSESSION, DEVELOPMENT, AND USE OF SPECIFIC INTERPERSONAL SKILLS

	GCM	ALL	MA	MBA	MEd	MPA	MS
POSSESSION							
Interpersonal communication	5.2632	5.367	5.7368	5.3191	5.5	5.625	5.129
Problem solving	5.3158	5.4037	5.5263	5.4894	5.25	5.5	5.1935
Influencing and persuasion	5.1053	5.0642	5.3158	5	5	5.375	4.9355
Conflict resolution	4.9474	5.1193	5.3158	5.0426	5.25	5.625	4.9677
Leadership	5.3684	5.1944	5.5789	5.1915	4.5	5.5714	4.9677
DEVELOPMENT							
Interpersonal communication	4.1053	4.5872	4.6842	4.4255	5	5.125	4.5806
Problem solving	4.2105	4.8624	4.6842	4.9574	5	5.125	4.7419
Influencing and persuasion	3.7895	4.1835	4.2105	4.0851	4.5	4.875	4.0968
Conflict resolution	3.7895	4.0092	3.9474	3.6596	5	5.125	4.1613
Leadership	3.4737	4.1376	4.3158	4.0213	3.25	4.875	4.129
USE							
Interpersonal communication	3.8333	3.875	4	3.8696	4	3.875	3.8462
Problem solving	3.5556	3.7292	3.7222	3.7826	4	4	3.7308
Influencing and persuasion	3.5	3.5313	3.5	3.587	3.5	3.75	3.5
Conflict resolution	3.5556	3.4063	3.5556	3.413	3.5	3.875	3.3077
Leadership	3.1111	3.3646	3.6667	3.413	2	3.625	3.2308

Demographics

This section presents the demographics of both the graduate and supervisor respondents to provide general information about the sample. Of the total number of military graduates that responded to the survey questionnaire, the largest percentage were Captains (28%). Table 33 summarizes the military rank of respondents for both the graduates and the supervisors. Of the total number of civilian graduates that responded to the survey questionnaire, the largest percentage were GS-12s (48%). Table 34 summarizes the civilian grade of respondents for both graduates and supervisors. Table 35 presents the response percentages for both graduates' and supervisors' Air Force Specialty Codes (AFSC) and job series. Thirty-seven percent of the graduates that responded held the position of procuring contracting officer. Table 36 summarizes the job titles of graduates that responded to the survey questionnaire.

TABLE 33

RESPONSE BY MILITARY RANK

RANK	PARTICIPANTS' TOTAL RESPONSE	PARTICIPANTS' % TOTAL RESPONSE	SUPERVISORS' TOTAL RESPONSE	SUPERVISORS' % TOTAL RESPONSE
O-2 or below	0	0%	0	0%
O-3	23	49%	1	8%
O-4	13	28%	6	46%
O-5	11	23%	6	46%
O-6 or above	0	0%	0	0%
TOTAL	47	100%	13	100%

TABLE 34

RESPONSE BY CIVILIAN GRADE

GRADE	PARTICIPANTS' TOTAL RESPONSE	PARTICIPANTS' % TOTAL RESPONSE	SUPERVISORS' TOTAL RESPONSE	SUPERVISORS' % TOTAL RESPONSE
GS-5 or GS-7	2	3%	2	4%
GS-9	1	1%	0	0%
GS-11	4	5%	0	0%
GS-12	38	48%	4	8%
GS/GM-13	25	32%	25	49%
GS/GM-14	6	8%	20	39%
GS/GM-15 and above	3	4%	0	0%
TOTAL	79	100%	51	100%

TABLE 35

RESPONSE BY AFSC AND JOB SERIES

CURRENT AFSC/JOB SERIES	GRADUATES TOTAL RESPONSE	GRADUATES % TOTAL RESPONSE	SUPERVISORS TOTAL RESPONSE	SUPERVISORS % TOTAL RESPONSE
64PX (formerly 65XX)	43	36%	20	25%
1102	77	64%	53	65%
OTHER	1	1%	8	10%
TOTAL	121	100%	81	100%

TABLE 36

RESPONSE BY JOB TITLE

Job Title	**Graduates' Total Response**	**Graduates' % Total Response**
Procuring Contracting Officer	40	37%
Administrative Contracting Officer	4	4%
Terminating Contracting Officer	0	0%
Specialist/Buyer/Negotiator	26	24%
Other	38	35%
Total	108	100%

V. Summary, Conclusions, and Recommendations

Introduction

The purpose of this chapter is to present the results of the authors' research effort. First, the researchers restate the basic research questions identified in Chapter I and summarize the basic methodology used in this study. Second, the researchers present the conclusions drawn from this project. Finally, the researchers make recommendations for future follow-on research efforts and conclude with final thoughts on this research study.

Summary

This study was u lertaken to assess the usefulness of graduate education to contracting professionals as perceived by those professionals and their supervisors. Graduate degrees are becoming increasingly important as contracting becomes accepted as a profession. Such an assessment is necessary because of the increasing complexity of contracting. Also, cutbacks in the government budgetary system have resulted in a higher scrutiny of the need for DoD and Air Force sponsored graduate education programs. Such close scrutiny warrants further studies on the usefulness of graduate education to contracting professionals to justify expenditures. The 22 skills investigated in this study address only a small facet of the total usefulness of graduate education for contracting professionals.

The main objective of this study was to determine the extent to which the graduates developed skills necessary for their jobs in their graduate degree programs. In accomplishing this, the researchers identified three research questions which provided the overall framework for this effort:

1. What skills are needed for contracting professionals to perform their jobs?
2. To what extent did contracting professionals learn the skills necessary for their jobs

in their graduate degree program?

3. To what extent does the supervisors' responses agree with the graduates' responses on the possession and use of these skills?

In order to answer the first research question, the researchers identified 22 contracting skills from a previous study commissioned by the Center for Advanced Purchasing Studies. To answer the second question, the researchers wanted to determine graduates' perceptions in several different areas. These areas included the graduates' possession of each skill, the graduates' development of that skill in their degree program, and the graduates' use of that skill on the job. In an effort to answer the third question, researchers wanted to determine the supervisors' perceptions on their graduates' possession of each skill and their graduates' use of that skill on the job. After establishing these objectives, the methodology for accomplishing them was developed.

Air Force Institute of Technology GCM Graduates since 1988 and contracting professionals with master's degrees within the AFMC were identified for this study. Additionally, graduates' supervisors were also surveyed. Of the 221 graduate surveys mailed, 131 surveys were returned--a rate of 59.3 percent. Of the 221 supervisor surveys mailed, 89 surveys were returned--a rate of 40.3 percent.

The researchers analyzed the data in accordance with the research methodology outlined in Chapter III. The Kruskal-Wallis Test and one-way ANOVA Test were used to assess whether there were differences in responses between the GCM graduates and graduates from other degree programs relative to their possession, development, and use of the 22 skills. Descriptive statistics were performed to determine the means of graduate responses. Means were used to compare groups which showed statistically significant differences. The Spearman's Rank Correlation Test was performed to determine the association between graduate responses and supervisor responses.

Conclusions

The final conclusions of this research effort are contained in three sections: Development, Possession and Use, and Supervisor Association with Graduate Responses. Prior to accepting the conclusions of this research, the reader should review the assumptions and limitations listed in Chapter II. In addition, the research questions apply only to the 131 graduates and 89 supervisors who responded to the survey questionnaire.

Development. In the context of this research, the usefulness of graduate education is contingent upon the development of the skills identified in this study. Upon examination of the data which relate to the development of skills in a graduate degree program, the researchers found that the AFIT GCM Degree Program contributes slightly more to the development of technical skills than the other degrees examined in this study. While these results are in keeping with AFIT's emphasis on technical skills, it should be noted that the mean response for the "ALL" category of graduates corresponds with "slightly developed" on the scale of possible answers. The mean response for GCM graduates is only 0.3 higher, falling between "slightly developed" and "moderately developed" on the scale of possible answers. The means for these groups lie fairly close together, which indicates that both groups judeged that they only slightly developed technical skills in their graduate degree programs.

Among the specific technical skills, the AFIT GCM Degree Program contributed to the development of computer literacy skills to a greater extent than all the other categories of graduate degree programs. The mean response for the GCM graduates corresponded closely with "moderately developed" on the scale of possible responses. The mean response for the "ALL" category of graduates corresponded closely with "slightly undeveloped" on the scale of possible responses. An explanation for this conspicuous difference may be that only AFIT graduates since 1988 were surveyed, while many graduates from other degree programs may have graduated well before the

widespread use of computers in colleges and universities. Therefore, graduates who graduated prior to the widespread use of computers would not have had the opportunity to develop computer literacy skills in their graduate degree programs.

There is no difference in the development of the combined management skills among the degree types. The mean responses for all the categories of graduates, including GCM graduates, indicate that graduates slightly developed combined management skills in their graduate degree programs. In the specific skills of planning and understanding general business, the other graduate degree programs seem to contribute to the development of these skills to a greater extent than the AFIT Contracting Management Degree Program. GCM graduates slightly developed planning skills in their graduate degree program, while the "ALL" category of graduates moderately developed planning skills in their degree programs. In understanding general business skills, the mean of the GCM graduates fell halfway between "slightly developed" and "moderately developed". The mean for the "ALL" category of graduates indicated that these graduates moderately developed their understanding of general business skills in their graduate degree programs. The difference may be explained by the difference in the purposes of the institutions. Generally, the purpose of civilian institutions is to prepare students for careers in private industry where there is a greater emphasis on the need to possess general business skills. The AFIT is an institution which prepares students for careers in the military where the emphasis is on national defense rather than profit.

All other degree programs seem to develop combined individual and combined interpersonal skills to a greater extent than the AFIT GCM Degree Program. In both the combined individual and combined interpersonal skills, the mean of the GCM graduates is slightly below slightly developed and the "ALL" category of graduates is slightly above slightly developed. Even though there are statistically significant differences

between the groups, the means indicate that both groups slightly developed their combined individual and combined interpersonal skills in their graduate degree programs.

The GCM graduates rated their development of leadership and problem solving skills lower than graduates from other degree categories. An explanation for the lower rating for development of leadership and problem solving skills in the AFIT GCM Degree Program may be attributable to the fact that Professional Military Education (PME) develops many interpersonal skills such as problem solving and leadership skills. The results show that there is no difference between the AFIT graduates and "ALL" other graduates in the possession of interpersonal skills. Therefore, AFIT graduates may have developed these skills in PME prior to attending AFIT.

Possession and Use. There were very few differences in the possession and use of skills among the groups. The means from all of the categories of graduates from the possession section of the survey indicate that graduates are moderately skilled in all of the combined skill categories. In general, graduates rated their possession of these skills higher than their development of these skills in their graduate degree programs. Therefore, graduates must have supplemented their development of these skills through avenues other than graduate education. Because the graduates surveyed are all members of the contracting profession, the researchers expected there to be little or no difference in the use of skills on the job. With a few minor exceptions, the results supported the researchers' expectations.

Supervisor Association with Graduate Responses. The close association between graduates' responses and their supervisors' responses in Chapter IV indicate that supervisors generally agree with their graduate's perceptions of their possession and use of the skills identified in this study. The agreement between the graduates' responses and their supervisors' responses further validates the graduates' perceptions of themselves.

Recommendations

The researchers have identified several areas in which future research could be conducted:

1. Repeat the research methodology outlined in Chapter II using different measures of usefulness of graduate education. For example, usefulness could be measured in terms of defense industry applications, other skills gained from graduate degree programs, the extent to which a graduate degree contributed toward an individual's promotion, or a variety of these measures.
2. Repeat the research methodology outlined in Chapter II for other graduate education programs within the AFIT School of Logistics and Acquisition Management.
3. Examine all of the data gathered in this research effort to determine which skills were developed to the greatest extent in each degree type.
4. Investigate areas other than graduate education, such as PME, on-the-job training, and Professional Continuing Education, in which a person may develop the skills identified in this research.
5. Repeat the research methodology outlined in Chapter II controlling for factors such as age of degree, position, military versus civilian, PCE courses completed, and Acquisition Professional Development Program certification level.

Final Thoughts

Upon consideration of the data, the researchers conclude that overall an AFIT GCM degree is not significantly more useful in terms of the skills used in this study than any other degree type in this study. However, an AFIT GCM degree may be more useful in developing a graduate's technical skills than any other degree type in this study.

Appendix A: Participant's Survey

USAF Survey Control Number SCN 94-43a

9 June 1994

MEMORANDUM FOR SURVEY PARTICIPANTS

FROM: AFIT/LAS

SUBJECT: Contracting Graduate Education Survey

1. You have been carefully selected from contracting personnel in the Air Force to participate in this study sponsored by SAF/AQCX. The purpose of this study is to investigate the skills necessary in the performance of your day-to-day job. Your participation is vital to the successful completion of this study.

2. If you are **not** currently in the contracting career field, please do **not** complete this survey. Return the entire package, including the supervisor's package, in the enclosed pre-addressed envelope immediately. If you have **not** completed a Master's degree or a professional degree, such as a law degree, then please do **not** complete this survey. Return the entire package, including the supervisor package, in the enclosed pre-addressed envelope immediately.

3. If you are currently in the contracting career field and have a Master's and/or professional degree, please complete the enclosed survey marked "SURVEY PARTICIPANT" according to the instructions. Pass the package marked "Supervisor" to your **immediate** supervisor. The supervisor's survey contains questions similar to those that you will be asked. The supervisor will be instructed to mail his/her completed survey separately from yours. Upon completion, return your survey and answer sheet in the enclosed pre-addressed envelope no later than 30 Jun 94. Your participation is entirely voluntary. Your answers will be kept completely confidential. Please be candid in your responses! The number found in the "identification number" block on the computer-scored answer sheet is for tracking purposes only and will not be used for identifying respondents.

4. This survey has been approved by Air Force Military Personnel Center (AFMPC), Randolph AFB, Texas. The survey control number is USAF SCN 94-43a. If you wish to know more about the outcome of this study, you may request that a copy of the results be

sent to you by completing the enclosed address card and returning it separately in the envelope marked "Request for Results." Survey results will be available no later than 20 Sep 94.

5. Your participation in this survey is sincerely appreciated. If you have any questions, please call Captain Ursula Woodson at DSN 785-7777, ext. 2406, or commercial (513) 255-7777, ext. 2406.

T. SCOTT GRAHAM, Maj, USAF
Director,
Graduate Contracting Management Program

Attachments:
1. Survey
2. AFIT Form 11C
3. "Survey Return" envelope
4. Address card
5. "Request for Results" envelope
6. Supervisor Package

PARTICIPANT'S SURVEY

The purpose of this survey is to obtain information about skills that you have developed in your Master's degree program and skills that you use in your current job. Completion of this survey should take approximately 15 to 20 minutes.

Please be assured that all information you provide will be held in the strictest confidence. Your individual responses will **NOT** be provided to management or to any other agency. Results will only be reported in the aggregate.

Thank you for your cooperation in participating in this valuable study.

INSTRUCTIONS

This questionnaire contains 72 numbered items. All numbered items must be answered by filling in the appropriate spaces on the **computer-scored response sheets** provided. If for any item you do not find a response that fits your situation exactly, use the one that is the closest to the way you feel.

Please use a "soft-lead" (No. 2) pencil, and observe the following:

1. **Make heavy** black marks that fill in the entire space (of the response you select).

2. **Erase cleanly** any responses you wish to change.

3. **Make no** stray markings of any kind on the response sheet.

4. **Do not** staple, fold, or tear the response sheet.

You have been provided an answer sheet. Do **NOT** fill in your name - we want to ensure your responses remain anonymous.

I. POSSESSION OF SKILLS

Questions 1 through 22 refer to skills used by contracting personnel. Read each item carefully and choose the response that best represents your opinion. Be sure to place all your responses to the following items on the computer-scored answer sheet.

1 = ***Highly unskilled***
2 = ***Moderately unskilled***
3 = ***Slightly unskilled***
4 = ***Slightly skilled***
5 = ***Moderately skilled***
6 = ***Highly skilled***

To what extent do you personally **POSSESS** the following professional skills...

1. Ability to make decisions
2. Negotiation
3. Interpersonal communication
4. Problem solving
5. Influencing and persuasion
6. Conflict resolution
7. Analytical
8. Customer focus
9. Leadership
10. Tactfulness in dealing with others
11. Managing change
12. Planning
13. Managing internal relations
14. Being organized/time management
15. Creativity
16. Understanding general business
17. Written communication
18. Salesmanship
19. Computer literacy
20. Computational
21. Technical
22. Risk taking

II. SKILL DEVELOPMENT

This section refers to skills developed in a masters degree program.

23. What type of graduate degree did you receive?

    1. M.B.A
    2. M.S.
    3. Law
    4. M.A.
    5. Other (please specify) _____

What was your field of study? (If you have received more than one master's degree, choose
the one that most closely relates to your current position.)
(please specify) _____

Answer questions 24 through 45 based on the master's degree which you specified above. Read each item carefully and choose the response that best represents your opinion. Be sure to place all your responses to the following items on the computer-scored answer sheet.

1 = ***Undeveloped***
2 = ***Moderately undeveloped***
3 = ***Slightly undeveloped***
4 = ***Slightly developed***
5 = ***Moderately developed***
6 = ***Highly developed***

To what extent did you **DEVELOP** the following skills in your masters degree program...

24. Ability to make decisions
25. Negotiation
26. Interpersonal communication
27. Problem solving
28. Influencing and persuasion
29. Conflict resolution
30. Analytical
31. Customer focus

1 = ***Undeveloped***
2 = ***Moderately undeveloped***
3 = ***Slightly undeveloped***
4 = ***Slightly developed***
5 = ***Moderately developed***
6 = ***Highly developed***

To what extent did you **DEVELOP** the following skills in your masters degree program...

32. Leadership
33. Tactfulness in dealing with others
34. Managing change
35. Planning
36. Managing internal relations
37. Being organized/time management
38. Creativity
39. Understanding general business
40. Written communication
41. Salesmanship
42. Computer literacy
43. Computational
44. Technical
45. Risk taking

III. SKILL USE

Questions 46 through 67 refer to skills used by contracting personnel. Read each item carefully and choose the response that best represents your opinion. Be sure to place all your responses to the following items on the computer-scored answer sheet.

1 = ***Never***
2 = ***Slightly***
3 = ***Moderately***
4 = ***Extensively***

To what extent do you **USE** the following skills in the performance of your job...

46. Ability to make decisions
47. Negotiation
48. Interpersonal communication
49. Problem solving
50. Influencing and persuasion
51. Conflict resolution
52. Analytical
53. Customer focus
54. Leadership
55. Tactfulness in dealing with others
56. Managing change
57. Planning
58. Managing internal relations
59. Being organized/time management
60. Creativity
61. Understanding general business
62. Written communication
63. Salesmanship
64. Computer literacy
65. Computational
66. Technical
67. Risk taking

IV. BACKGROUND INFORMATION

68. If military, what is your current **rank**?

1. O-2 or below (includes all enlisted ranks)
2. O-3
3. O-4
4. O-5
5. O-6 or above

69. If civilian, what is your **grade**?

1. GS-5 or GS-7
2. GS-9
3. GS-11
4. GS-12
5. GS/GM-13
6. GS/GM-14
7. GS/GM-15 and above

70. What is your **current** AFSC/job series?

1. 64PX (formerly 65XX)
2. 1102
3. Other (please specify) _____

71. What is your **highest** level of education?

1. Master's degree
2. Doctorate
3. Other (please specify)_____

72. What is your **current** job title?

1. Procuring Contracting Officer (PCO)
2. Administrative Contracting Officer (ACO)
3. Terminating Contracting Officer (TCO)
4. Unwarranted contract specialist/buyer/negotiator
5. Other (please specify) _____

Thank you for your time and effort in completing this survey. Please place the completed survey in the return envelope and place it in outgoing mail.

Appendix B: Supervisor's Survey

USAF Survey Control Number SCN 94-43b

9 June 1994

MEMORANDUM FOR SURVEY PARTICIPANT'S SUPERVISOR

FROM: AFIT/LAS

SUBJECT: Contracting Graduate Education Survey

1. The employee who passed this survey package to you has been carefully selected from Air Force contracting personnel to participate in this graduate education survey sponsored by SAF/AQCX. The purpose of this study is to investigate the skills used by contracting personnel in the performance of their day-to-day job. The supervisor's completion of this survey is critical to obtain a complete and accurate assessment of your employee's skills. Your participation is entirely voluntary. Your answers will be kept completely confidential. Please be candid in your responses!

2. Please complete the enclosed survey marked "participant's supervisor" according to the instructions. Keep in mind that your responses apply only to the individual who gave you this survey package. Upon completion, return the survey in the enclosed pre-addressed envelope no later than 30 Jun 94. The number found in the "identification number" block on the computer-scored answer sheet is for tracking purposes only and will not be used for identifying respondents.

3. This survey has been approved by Air Force Military Personnel Center (AFMPC), Randolph AFB, Texas. The survey control number is USAF SCN 94-43b. If you wish to know more about the outcome of the study, you may request that a copy of the results be sent to you by completing the enclosed address card and returning it separately in the envelope marked "Request for Results." Survey results will be available no later than 20 Sep 94.

4. Your participation in this survey is sincerely appreciated. If you have any questions, please call Captain Ursula Woodson at DSN 785-7777, ext. 2406, or commercial (513) 255-7777, ext. 2406.

T. SCOTT GRAHAM, Maj, USAF
Director,
Graduate Contracting Management Program

Attachments:
1. Survey
2. AFIT Form 11C
3. "Survey Return" envelope
4. Address card
5. "Request for Results" envelope

SUPERVISOR'S SURVEY

The purpose of this survey is to obtain your opinion regarding skills which your **EMPLOYEE** possesses and skills which your **EMPLOYEE** uses on his/her current job. Remember your responses apply only to the employee who gave you this package. Completion of this survey should take approximately 10 to 15 minutes.

Please be assured that all information you provide will be held in the strictest confidence. Your individual responses will **NOT** be provided to your employee, management or to any other agency. Results will only be reported in the aggregate.

Thank you for your cooperation in participating in this valuable study.

INSTRUCTIONS

This questionnaire contains 48 items. All items must be answered by filling in the appropriate spaces on the **computer-scored response sheets** provided. If for any item you do not find a response that fits your situation exactly, use the one that is the closest to the way you feel.

Please use a "soft-lead" (No. 2) pencil, and observe the following:

1. **Make heavy** black marks that fill in the entire space (of the response you select).

2. **Erase cleanly** any responses you wish to change.

3. **Make no** stray markings of any kind on the response sheet.

4. **Do not** staple, fold, or tear the response sheet.

You have been provided an answer sheet. Do **NOT** fill in your name - we want to ensure your responses remain anonymous.

I. POSSESSION OF SKILLS

Questions 1 through 22 refer to skills used by contracting personnel. Read each item carefully and choose the response that best represents your opinion. Be sure to place all your responses to the following items on the computer-scored answer sheet.

1 = ***Highly unskilled***
2 = ***Moderately unskilled***
3 = ***Slightly unskilled***
4 = ***Slightly skilled***
5 = ***Moderately skilled***
6 = ***Highly skilled***

To what extent does your employee **POSSESS** the following professional skills...

1. Ability to make decisions
2. Negotiation
3. Interpersonal communication
4. Problem solving
5. Influencing and persuasion
6. Conflict resolution
7. Analytical
8. Customer focus
9. Leadership
10. Tactfulness in dealing with others
11. Managing change
12. Planning
13. Managing internal relations
14. Being organized/time management
15. Creativity
16. Understanding general business
17. Written communication
18. Salesmanship
19. Computer literacy
20. Computational
21. Technical
22. Risk taking

II. SKILL USE

Questions 23 through 44 refer to skills used by contracting personnel. Read each item carefully and choose the response that best represents your opinion. Be sure to place all your responses to the following items on the computer-scored answer sheet.

1 = ***Never***
2 = ***Slightly***
3 = ***Moderately***
4 = ***Extensively***

To what extent are the following skills necessary in the performance of your **employee's** job...

23. Ability to make decisions
24. Negotiation
25. Interpersonal communication
26. Problem solving
27. Influencing and persuasion
28. Conflict resolution
29. Analytical
30. Customer focus
31. Leadership
32. Tactfulness in dealing with others
33. Managing change
34. Planning
35. Managing internal relations
36. Being organized/time management
37. Creativity
38. Understanding general business
39. Written communication
40. Salesmanship
41. Computer literacy
42. Computational
43. Technical
44. Risk taking

III. BACKGROUND INFORMATION

45. If military, what is your current **rank**?

    1. O-2 or below (includes all enlisted ranks)
    2. O-3
    3. O-4
    4. O-5
    5. O-6 or above

46. If civilian, what is your **grade**?

    1. GS-5 or GS-7
    2. GS-9
    3. GS-11
    4. GS-12
    5. GS/GM-13
    6. GS/GM-14
    7. GS/GM-15 and above

47. What is your **current** AFSC/job series?

    1. 64PX (formerly 65XX)
    2. 1102
    3. Other (please specify) _____

48. Does your employee have a master's or other professional degree?

    1. Yes
    2. No
    3. Unknown

Thank you for your time and effort in completing this survey. Please place the completed survey in the return envelope and place it in outgoing mail.

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Vita

Captain Ursula J. Woodson was born on 17 September 1967 in Smithtown, New York. She graduated from Buford High School in Buford, Georgia, in 1985. She graduated from the University of Georgia, Athens, Georgia with a Bachelor of Science Degree in Statistics in 1989. Upon graduation, Captain Woodson began her first tour of duty as a Contract Negotiator in the Commodities Branch of the Operational Contracting Division of the Sacramento Air Logistics Center, McClellan Air Force Base, California. After nine months, she was assigned to the Provisioning Branch of the Support Division of the Contracting Directorate, where she remained until assigned to the Microelectronics Technology Support Program and the Design Engineering Program, engineering services contracts in the Commodities Directorate. Before being assigned to the School of Systems and Logistics, Air Force Institute of Technology, in May 1993, Captain Woodson was a Contracting Officer for the Command Control and Switching System, a contractor logistics support contract in the Space and Command, Control, and Communications Directorate for one year.

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Vita

Captain Kimberly L. Yoder was born on 13 February 1961 in Newport, Rhode Island. She attended the University of New Mexico and graduated in 1984 with a Bachelor of Science degree in Biology. After graduation, she received her commission through Officer Training School. She was then assigned to Charleston Air Force Base, South Carolina where she was Chief, Contract Airlift. In April 1989, Captain Yoder was assigned to the 13AF Contracting Center, Clark AB, Republic of the Philippines. At Clark AB, she was the contracting officer in charge of all construction projects on base. In April 1991, she was then assigned to the Greece Regional Contracting Office, Iraklion Air Station, Crete, Greece. While assigned to Iraklion, Captain Yoder filled two positions - Deputy Commander and Procuring Contracting Officer for the Greece Base Maintenance Contract. In December 1992, she was deployed to OPERATION PROVIDE COMFORT, Incirlik AB, Turkey, where she worked as the Staff Contracting Officer for the Joint Task Force. Captain Yoder was selected to attend AFIT in May 1993. Upon graduation from AFIT, she will be assigned to the Tri-Service Standoff Attack Missile Systems Program Office, Wright-Patterson AFB, Ohio.

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	September 1994	Master's Thesis

4. TITLE AND SUBTITLE

AN ANALYSIS OF THE USEFULNESS OF GRADUATE EDUCATION TO CONTRACTING PROFESSIONALS AS PERCEIVED BY GRADUATES AND THEIR SUPERVISORS

5. FUNDING NUMBERS

6. AUTHOR(S)

Ursula J. Woodson, Captain, USAF
Kimberly L. Yoder, Captain, USAF

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Air Force Institute of Technology,
WPAFB OH 45433-6583

8. PERFORMING ORGANIZATION REPORT NUMBER

AFIT/GCM/LAS/94S-9

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

SAF/AQCX
1060 Air Force Pentagon
Washington DC 20330-1060

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The purpose of this research was to assess the usefulness of graduate education to contracting professionals as perceived by graduates and their supervisors. Based on a list of 22 skills used by contracting professionals, graduates and their supervisors were surveyed to determine to what extent graduates possess these skills, developed these skills in their graduate degree program, and use these skills in the performance of their jobs. Air Force Institute of Technology Contracting Management Graduates since 1988 and contracting professionals with master's degrees within the Air Force Materiel Command were identified for this study.

As a result of this study, the researchers found that AFIT Contracting Management Graduates developed technical skills in their degree program to a greater extent than graduates with other types of degrees. Even though there were differences in the development of skills between different degree types, the researchers found few differences in the possession and use of skills among graduates. Graduates rated their possession of skills higher than their development of those skills in their graduate degree program. Therefore, the researchers conclude that graduates must have supplemented their development of these skills through avenues other than graduate education.

14. SUBJECT TERMS

Graduate Education, Contracting Professionals, Training, Contract Management, Contract Administration, Education

15. NUMBER OF PAGES

92

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL