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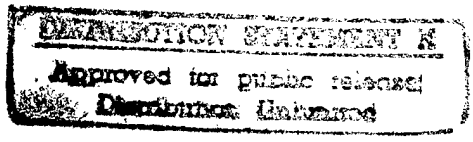

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STUDENT OUTCOMES ASSESSMENT OF AIR COMMAND AND STAFF COLLEGE: AN EVALUATIVE STUDY

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A Dissertation Presented to the Graduate Faculty of the University of Virginia in Candidacy for the Degree of Doctor of Philosophy

Department of Education
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May 1996

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ABSTRACT

In the mid-1980s, the assessment movement began to spread throughout academia as colleges and universities created programs to address the issues of accountability and program improvement. A multitude of comprehensive institution-wide assessment programs emerged from the movement which brought about change on many campuses. The purpose of this study was to develop a comprehensive assessment program at an Air Force professional military education institution, Air Command and Staff College (ACSC), based on the perceptions of recent Air Force officer graduates of the program.

Graduates (n=395) were asked to rate the quality of program elements (teaching methods and program activities) and to disclose their perceived competence on outcome variables. Based on the data from a 90-item questionnaire titled, "Student Perceptions of Program Effectiveness Questionnaire," the researcher analyzed student perceptions on three types of variables--inputs (demographics and student expectations), environment (teaching methods and program activities), and outcomes (program goals). Information from returned questionnaires was collected and analyzed using descriptive (means, standard deviations, and percentages), correlational (cross-tabulations and Pearson "r"s), predictive (multiple regression) statistics, and qualitative analysis.

The results of the correlational and predictive analyses show that ACSC graduates generally perceived their competencies on outcome variables and the quality of environmental variables as high. The most important results emerged from the predictive analysis. After controlling for the effects of inputs, which accounted from three percent of the variance in Command and Leadership to nine percent in Critical Thinking outcome

Leadership to fifteen percent in Joint Campaign outcome variables. These data suggest that after controlling for inputs, respondents who rated Curriculum as high were more likely to perceive their competence as high on outcome variables. After Curriculum, a small amount of the explained variance (from two percent in Air/Space Power and Critical Thinking to three percent in Joint Campaign) came from Teaching Methods. The only exception to this pattern was in the Command and Leadership variable where Faculty became predictive along with Curriculum, accounting for four percent of the explained variance over that accounted for by Curriculum.

The Center for the Study of Higher Education

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APPROVAL OF THE DISSERTATION

This dissertation, Student Outcomes Assessment of Air Command and Staff College: An Evaluative Study, has been approved by the Graduate Faculty of the Curry School of Education in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

Samuel E. Kellams

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Dedication

This dissertation is dedicated to my parents, Harvey and Patricia King, who taught me the value of an education, the rewards of hard work, and the joys of a loving family, and to my husband, Tim Roth, who makes all things possible through his unwavering faith and loving support.

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There are numerous people and organizations to whom I am extremely grateful for assistance in putting together the various parts of this dissertation. First, I would like to thank my dissertation committee, Sam Kellams, Jay Chronister, Elizabeth Flanagan, and John Bunch, for their support and friendship over the past three years. Without their timely comments and review of my work, not to mention their moral support, I would not have had the courage to tackle such an immense project. Dr. Kellams, who served as my major advisor through this process, was always candid, providing valuable comments and direction while allowing for independent thought. I would also like to acknowledge the members of my dissertation support group, my fellow students who shared every step of this process with me: Jenifer Blair, Lorri Cooper, Alan Leffers, and Checka Leinwall. These unselfish friends patiently listened to the details of my dissertation while providing comments about its content without judgment. I am also deeply in debt to my statistical consultant, Jim Martindale. Jim's expertise and patience helped me pull together a number of diverse elements of this project.

A great many people at Air Command and Staff College were instrumental in the completion of this dissertation. Lt Colonel Larry Weaver, former Dean of Faculty at the College, gave me access and encouragement throughout the study. Without his help and guidance, this project would still be in the planning stages. I am also extremely grateful to Lt Colonel Steve Torrence, the Assistant Dean of Faculty, for his advice during this study and to Lt Colonels Gary Myers and Rick Huhn from the Evaluation Section for their

inputs to my evaluation instrument and for sharing their knowledge about ACSC evaluation procedures and practices. Ms. Carolyn Brown, the Dean's secretary, and Ms. Debbie Clow, from the Evaluation Section, also provided invaluable assistance to me when I needed additional information or advice on administrative issues. I would also like to acknowledge Ms. Cheryl Monday, Air University's Program Evaluation Advisor, for her advice on devising a suitable questionnaire to evaluate ACSC. Finally, I would like to thank the current Dean of Faculty, Colonel Tommy Dickson, for his interest and support of this project.

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CHAPTER ONE

INTRODUCTION

In the mid-1980s the term "assessment" began to appear in the higher education literature with increasing regularity. Educators referred to the "movement" in their articles and books about assessment purposes, concepts, and techniques. Although educational programs and the students who enrolled in them have always been subjected to some type of scrutiny, the assessment movement of the 1980s took on new meaning. Assessment was inexorably linked to another movement, the accountability movement, which called for educators to prove they were accomplishing their goals and doing it efficiently. Reports such as William J. Bennett's monograph, *To Reclaim a Legacy: A Report on the Humanities in Higher Education* (1984) and the Association of American College's report, *Integrity in the College Curriculum* (1985), criticized the quality of American higher education and called for reform and assessment. Educators, like Derek Bok (1992), former president of Harvard, and Henry Rosovsky (1992), former dean of the faculty of arts and sciences at Harvard, chastised America's leading institutions for not making education a priority. In addition, the American public began to question the value of higher education as tuitions continued to rise even as state and federal funds available for higher education decreased. One source (Wallace, 1993) claimed that in the 1980s, state and local government expenditures for higher education were placed 21st in a list of 25 top government priorities (p. 26). As available funds decreased and public criticism

increased, it became paramount that colleges and universities provide empirical evidence of quality and effectiveness.

To answer these criticisms, colleges and universities created assessment programs to meet their individual institutional needs while addressing issues of accountability. The external push to create assessment programs came largely from state governments. In some states, direct legislative actions forced colleges and universities to adopt assessment measures on their campuses (Terenzini, 1989). While some institutions, such as James Madison University and the University of Colorado at Boulder, created institution-wide assessment programs without state intervention (Ewell, 1987), the assessment movement was largely activated by external sources (Sims, 1992; Terenzini, 1989). While accountability-driven assessment responded to the public's needs and concerns, institutions found that mandated assessment reporting could also be beneficial for self-review, renewal, and improvement (Banta and Moffett, 1987; Aper, Cuver, & Hinkle, 1990). As institutions began to tie their efforts to the teaching and learning process on their campuses, they found they could address both accountability and improvement (Banta, 1993).

The dichotomy between designing programs for improvement versus accountability created a multitude of assessment efforts on college campuses. A thorough and thoughtful review of the literature revealed that there were numerous examples of assessment programs throughout academe. The most widely discussed and used method of assessment ties excellence in education to student outcomes (El-Khawas, 1993). Student outcomes assessment, as developed by Alexander Astin (1993) and others

(Halpern, 1987; Jacobi, Astin, and Ayala, 1987) describes assessment as determining the impact of college on students. According to Astin (1993), "the most excellent colleges and universities are those that 'add the most value' to the student's knowledge and personal development" (p. 7). While student outcomes assessment is not a new concept, the current movement encompasses the whole process of evaluating educational programs, including establishing goals, gathering data, providing feedback, and improvement measures as well as the overall issue of accountability (Ewell, 1987). The "talent development" or "value-added" model of assessment uses data to establish causal relationships between the college environment and observed student outcomes or simply documents students' performance at a single point in time (Jacobi, Astin, and Ayala, 1987, p. 19).

The purpose of this study was to adapt assessment concepts and principles that educators have used successfully in higher education to develop a comprehensive assessment program at an Air Force professional military education institution, Air Command and Staff College (ACSC). ACSC is located at Maxwell Air Force Base in Montgomery, Alabama. It is a ten-month in-residence program designed for officers recently promoted to the rank of Major (at about the twelve-year point in their careers). For Academic Year (AY) 1994-1995, ACSC's curriculum consisted of ten academic courses: Campaign Introduction (20 hours), Command and Leadership (55 hours), War Objectives (26 hours), Military Theory (48 hours), Strategic Structures (87 hours), Operational Structures (90 hours), Joint Operations and Campaign Concepts (67 hours),

Air Campaign (136 hours), War Termination (21 hours), and Campaign 2000+ (51 hours). (For a complete description of these courses, please see appendix B).

Air Force professional military education (PME) spans an officer's career and consists of three Colleges, Squadron Officers' School (SOS), Air Command and Staff College (ACSC), and Air War College (AWC). As the mid-level course, ACSC is of particular interest because it serves as the linchpin in the overall system. ACSC students will be the backbone of the officer corps for decades to come. Determining how best to assess and improve this program will undoubtedly lead to improvements in the quality and strength of future Air Force leadership.

Problem Description

Several visits to ACSC at Maxwell Air Force Base in Montgomery, Alabama coupled with discussions with faculty, students, and key leaders at the College revealed a concern about program effectiveness and how well the College is accomplishing its goals. The program evaluation concerns of senior leaders revolved around two major issues: How can program effectiveness be measured and how can the results of such measures be used to change and/or improve the program?

The current ACSC evaluation system is a multi-tiered method. It consists of an end-of- program questionnaire administered to students before their departure from the school, and both a graduate and a graduate's supervisor surveys, which occur three years after graduation. ACSC evaluators compile and report the data from these instruments as statistical descriptive data, consisting largely of percentages. They highlight negative

trends and distribute the reports to the ACSC Commandant's and Dean of Faculty's offices and to anyone else who wants a copy.

While the evaluation methods currently being used at ACSC provide decision makers with some information about the overall effectiveness of the program, they consist of largely descriptive and anecdotal evidence. In addition, response rates tend to be low. According to ACSC evaluators, the response rate for graduates' surveys in the past was around twenty percent (20 %). This low rate may be attributable to the long period of time between graduates' departure from the school and when they received the surveys (a period of three years). An evaluation plan to send a one-year follow-up survey to graduates and their supervisors is in draft format but it has yet to be implemented. There is definitely a need for improved instruments and survey methodology at ACSC.

This dissertation went beyond descriptive evidence by also providing quantitative correlational and predictive data. Through a quantitative methodology, this study examined the perceived quality of ACSC's teaching methods and program activities. It also addressed which elements of the program contributed most to students' perceptions of their competence on outcome variables. This dissertation also provided evaluators at ACSC with an improved survey instrument while creating a statistical data base which could be used for future longitudinal studies. Finally, by pinpointing which elements of the program contributed most to students' perceptions of competence on outcomes, this study will lead to program improvement. By giving decision-makers at ACSC specific information about the program, it is more likely that they will use the results to bring about changes.

These issues are of interest to all stake holders at ACSC. Senior Air Force leaders want to know if the resources expended to make ACSC a first-rate professional development program are worth the cost and if they can justify future expenditures. Program administrators and developers want to know how to improve the course from year to year while instructors seek innovative ways to facilitate learning in the classroom. Students who attend ACSC hope that the value of the experience is worth the time expended and how it can help them be better Air Force officers.

In summary, current assessments of ACSC may lead to program improvement, but because the evaluation methods are largely subjective and descriptive, the information is incomplete. This study will provide key stake holders at ACSC with objective correlational and predictive data that will indicate connections between program elements.

Research Questions

The major question this study addressed was an evaluation question.

How effective was ACSC in meeting its goals and what contributed to this effectiveness as perceived by the students who graduated from the program?

This question revolved around the overall effectiveness of ACSC. Effectiveness was the extent to which students rated their competencies on outcome variables. The question also involved determining if students' perceptions of the quality of environmental variables affected their perceived competencies on outcome goals.

To answer the above question, the researcher divided the subsidiary questions into four categories: descriptive, relational, predictive, and implications. First, the researcher statistically described all three categories of variables. Specific descriptive questions were:

1. What were the demographic factors and student expectations (inputs) of ACSC graduates in academic year (AY) 1994-1995?

2. How did students rate the quality of the teaching methods and program activities (environmental factors) at Air Command and Staff College?

3. How did students rate their competency on outcome measures at the time they completed Air Command and Staff College?

Second, the researcher wanted to know the relationships between the independent and dependent variables. Specific correlational questions were:

4. Was there a relationship between input variables (demographics and student expectations) and student outcomes?

5. Was there a relationship between environmental variables (teaching methods and program activities) and student outcomes?

Third, the researcher wanted to make predictive/causal claims about the relationship between environmental factors and outcomes. To ensure that claims made about the effect of certain environmental factors on outcomes were accurate, the researcher "controlled" for other variables that might affect outcomes. Since input variables may affect the relationship between environmental variables and outcomes, the next question was:

6. Holding the input variables (demographics and student expectations) constant, was there a relationship between environmental variables (teaching methods and program activities) and student outcomes?

Finally, based on the quantitative data compiled from the questions above and from open-ended questions posed to academic year 1994-1995 graduates, the researcher made recommendations about program changes and/or improvements. The final question addressed this issue:

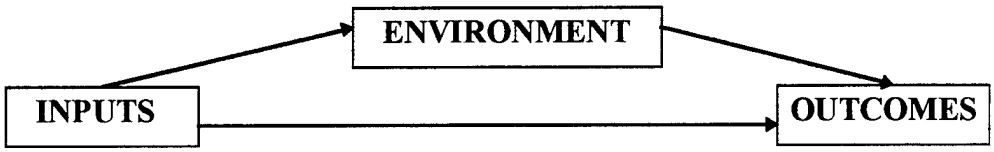
7. What were the implications of the results of this study for Air Command and Staff College?

Conceptual Framework

This dissertation adapted a model created and implemented by Alexander Astin (1993, first published in 1991), the director of the Higher Education Research Institute of the University of California at Los Angeles. Astin refers to his model of assessment as the input-environment-outcome (I-E-O) model which he has used largely to assess students in college and university settings. According to Astin, program evaluation and assessment can be used to inform decision-makers about the overall effectiveness of their program if it focuses on student talent development (outcomes). Student talent development refers to the extent students change as a result of their educational experience. Talent development can consist of cognitive and/or affective changes. Such a model links student outcomes to inputs and to environmental factors occurring in the learning environment.

Educational assessment, according to Astin, must include "data on student inputs, student outcomes, and the educational environment to which the student is exposed" (p. 18). Within the I-E-O model, inputs (I) refer to the qualities that students bring with them as they enter the educational environment. The environment (the E in the model) consists of everything that happens to a student while he or she is part of the program. Outcomes

(O) are the talents the educational program will develop in its students. Most educators look at the relationship between "E" and "O," the effects of the environmental variables on outcome variables. The researcher who uses Astin's model, however, also looks at the relationship between "I" and "O." Represented graphically, the I-E-O model looks like this:



In this study, the input and environmental variables were the independent variables and the outcome variables were the dependent variables.

Overall Design

This study was a cross-sectional study designed to evaluate an Air Force educational program, ACSC, based on the perceptions of graduates of the program in AY 1994-1995. The researcher devised a 90-item questionnaire titled, "Student Perceptions of Program Effectiveness Questionnaire" (Appendix A), to collect data on the three categories of variables-- inputs, environment, and outcomes. These variables are defined as followed:

Input Variables

Input variables were those characteristics that students brought with them to the program. ACSC students, unlike traditional college students, come from a homogeneous population. They enter the program at roughly the same point in their careers and bring

with them many of the same experiences. In choosing input variables for this study, the researcher was concerned with those characteristics on which the students were more likely to vary. Input variables were also chosen based on their potential for having an effect on student perceptions of their competence on outcomes. This study focused on two categories of student input characteristics: demographics (age, gender, race, career field, Master degree concentration, and commission source) and student expectations. Student expectations consisted of nine items on which students were asked to choose all that apply (see question 88 on the questionnaire, Appendix A).

Environmental Variables

Environmental variables were the program elements and teaching methods that students experienced while at ACSC. The environmental variables fell into six categories: Teaching Methods, Technology, Curriculum, Research, Faculty, and Grading. These variables were derived through discussions with principle stake holders at ACSC about what variables they deemed important to be included in this evaluation.

Outcome Variables

Outcome variables were the talents that the program claimed to instill in its students. Talents, in this case, were defined as the course goals outlined by the faculty and staff at ACSC in their course syllabi. By distilling information from the nine course syllabi, the researcher identified four major divisions of outcome variables: Joint Campaign Planning Process, Air/Space Power Applications, Command and Leadership, and Critical Thinking.

The Questionnaire

The questionnaire consisted of six sections corresponding to the three categories of variables in the model (inputs, environment, or outcomes) except section "A" that consisted of four questions required by Air University. These four questions were "quality" questions referring to Total Quality Management principles adopted by the Air Force and results from this section were not analyzed or reported in this study. Input variables, consisting of demographics and student expectations, were measured by students' responses on Section "D" and "E" (questions 82-88). Environmental variables corresponded to Section "C," "Program Activities and Teaching Methods" (items 50-81). Graduates were asked to rate the quality of program elements used at ACSC on a five-point scale ranging from "unsatisfactory" to "outstanding." Outcome variables were measured by students' responses to the question: "How would you rate your competency on the following items at the point in time when you completed Air Command and Staff College" (items 5-49)? Items were rated on a five-point scale, ranging from "no competence" to "great competence."

The initial questionnaire packets were mailed on November 3, 1995 to all 395 Air Force officer graduates of AY 1994-1995. This date for the initial mailing served two purposes. It allowed time for the researcher to conduct a pilot study of the instrument which was accomplished during the week of August 14-18, 1995. (For a detailed description of the pilot study, please see Chapter 3, "Methodology"). In addition to providing time for a pilot study, by waiting until November to mail out the questionnaires, the researcher hoped that graduates would have a chance to complete their moves from

ACSC and settle into their jobs. Most ACSC graduates go to new positions upon graduation from the College and it takes several months for them to make the transition.

Study Group

The AY 1994-1995 student body consisted of approximately 580 students, but this figure included international students, US civilians, and individuals from the other services. This study was only concerned with the perceptions of United States Air Force officers which totaled 395 students. Mailing labels were obtained from the Air Force Personnel Center and questionnaires were mailed to all 395 Air Force officer graduates from the AY 1994-1995 Class. A total of 228 usable questionnaires were returned for a return rate of fifty-eight percent (58 %). However, out of the original 395 questionnaires mailed, 107 were returned "undeliverable as addressed," bringing the total number of questionnaires to reach participants to 288. Based on this figure, the return rate was seventy-eight percent (78 %).

Data Analyses

After receiving and scoring the questionnaires, the researcher approached data interpretation in four steps. First, descriptive statistics such as the mean, standard deviation and percentages characterized each category of variable. These statistics answered questions 1-3. Second, the researcher used correlational statistics to determine the relationships between the independent (inputs and environment) and dependent (outcomes) variables. To look at the relationship between demographic characteristics/student expectations (inputs) and outcome variables, the researcher used

the cross tabulation method. This method summarized the degree of relationship between inputs and outcomes and data were reported as percentages. The Pearson product-moment correlation coefficient (Pearson "r") was used to determine to what extent environmental variables correlated with outcome variables. These statistical methods answered questions 4 and 5. Third, along with descriptive correlational data, the researcher used multiple regression analysis to predict which environmental variables most affected perceived student competency on outcome variables after the effects of input variables were controlled. By holding constant the input variables, the researcher was able to identify the environmental factors that most affected student perceived competency on any given outcome measure. This method answered question 6. Finally, the answer to question 7 came from an overall analysis of the data based on results from the above methods and open-ended items from the questionnaire. This question involved the researcher making recommendations about change to or improvements in the program. This was the least objective part of the study. Although the researcher was subjective when making recommendations, the objective data presented in this study suggested the necessary steps that stake holders may take. In addition to the quantitative data, the researcher also reported results of the open-ended questions on the questionnaire (questions 89 and 90). These data were analyzed and placed in "like" categories to determine patterns. The results of this content analysis were reported in a separate section after the quantitative data.

Expected Outcomes and Limitations

ACSC made significant changes to its curriculum in the last two years. They attempted to alter their philosophical approach to education while upgrading their image as an educational institution. The "revolution" at the College created much discussion, not to mention controversy, about the role of professional military education (PME) in the modern military. Innovations in technology, research, and teaching methodology brought ACSC accolades from senior Air Force leaders and civilian educators alike. It also brought money and prestige to the College as a military institution. However, most of the existing evidence about the success of ACSC is anecdotal and descriptive and has yet to make its way into the mainstream of higher education literature. By tying this study to important issues in higher education, the researcher brought a research element to ACSC's primary stake holders of which they were unaware.

This dissertation produced three major outcomes. It provided objective quantitative data that supplemented existing anecdotal, descriptive results from previous evaluations. Quantitative evidence gave key Air Force leaders and stake holders at ACSC additional information they will need to make judgments about the value of their programs and professional military education as a whole. While supplying objective data to supplement existing research, this study also built a foundation on which to base additional research. The researcher believes that this work will create discussions, debates, and shared scholarship about the uses and limitations of professional military education. Presently, the literature lacks any significant discourse about military education scholarship. Finally, this dissertation brought significant higher education issues and research methodology to

the attention of military educators. Assessment issues and accountability, for example, are presently important topics in the higher education literature. Educators at ACSC should concern themselves with the same issues and problems that are occurring throughout academia. However, military organizations tend to rely on the professional opinions of a few when facilitating change. This study illuminated some important educational theories and practices that will aid military educators at ACSC in creating an educational environment based on seminal issues in the field.

While the researcher expected this dissertation to provide ACSC with quantitative objective data that will lead to program improvement, there were limitations to the study as well. First, the research was limited by time and proximity to the College which made a longitudinal study impractical. While student outcomes assessment works best when the researcher can rely on longitudinal data based on the results spanning several years, it was not possible for this study to implement such a plan. The study also may be hindered by a design decision relating to the scope of the study. This dissertation was designed to provide a comprehensive evaluation of ACSC. As a result, every element of the program could not be investigated in depth. The researcher had to make decisions about what elements should and should not be included in the evaluation. Finally, this study utilized students' perceptions rather than measuring outcomes directly through a pretest/posttest design. However, future studies should consider a longitudinal design based on pretest as well as posttest data.

These limitations notwithstanding, the researcher believes that the data gathered in this study will provide decision makers at ACSC with a valuable and timely assessment of their

program. While student perceptions of program effectiveness is only one way in which to measure outcomes, it offers an important perspective about what elements of ACSC work best in facilitating high competence on outcome variables, leading to program improvement.

CHAPTER TWO

LITERATURE REVIEW

In the higher education literature the terms "assessment and "evaluation" are often used interchangeably. This may cause confusion, but it is often hard to draw a distinction between the two terms (Sims, 1992). A review of the literature reveals that there is no consensus on what the terms "assessment," or "evaluation" mean or what processes they comprise. The term "assessment" first emerged in the late 1930s when Henry Murray used it to refer to the appraisal of individuals. Conversely, educators often use the term, "evaluation," to define program and group assessments (Madaus, Stufflebeam, & Scriven, 1983; Sims, 1992). Some writers (Boyer and Ewell, 1988; Lenning, 1980) make the distinction between assessment and evaluation by defining "assessment" as what occurs when measurements are analyzed, while "evaluation" occurs when judgments are made about assessment results. While others (Conrad and Eagan, 1989; Gardner, 1990) use the words to mean the same thing. For the purposes of this study the two terms of "assessment" and "evaluation" will mean "a common effort to understand and judge the merit or worth of teaching and learning within a course, curriculum, educational program, sequence of study, department, unit, or institution" (Davis, 1989, p. 8). Since the overall goal of this dissertation was to determine the effectiveness (the merit or worth) of ACSC and what contributed to that effectiveness as perceived by graduates of the program, this broad view of assessment and evaluation was appropriate.

This study was grounded in the literature that emerged out of the assessment movement which began in the mid 1980s. This literature review will begin by focusing on the comparisons between the assessment and evaluation movements. It will then discuss state level mandates and some important "impact studies." Next, the discussion will highlight some institutional assessment programs, and finally, it will review ACSC evaluation programs and policies.

The Evaluation and Assessment Movements Compared

While there does not appear to be a consensus about what one means when referring to "evaluation" or "assessment," the two terms represent separate movements with distinct methodologies, processes, and literatures. The roots of educational evaluation can be traced back to the early nineteenth century and the Industrial Revolution. This period in American society was marked by attempts to reform educational and social programs. The first processes designed to evaluate performance of schools in the United States occurred in Boston in 1845 with the use of student test scores to evaluate school effectiveness. A few years later, Samuel Gridley Howe and Horace Mann advocated written essays as evaluation tools. Between 1887 and 1898, Joseph Rice conducted what is viewed as the first formal educational evaluation in America by using test scores to evaluate spelling instruction. By the turn of the century, famous researchers such as Ayers and Thorndike were using standardized tests to yield normative data which enabled one school system to compare itself with another (Madaus, Stufflebeam, & Scriven, 1983).

By the 1930s, the focus of school evaluation changed with the work of Ralph W. Tyler. Tyler coined the term "educational evaluation" and his methods centered on the extent to which objectives were achieved as part of an instructional program. Tyler approached evaluation by comparing intended objectives with actual outcomes. As a result of his work in the 1930s and 1940s, evaluators and educators began to view evaluation in a much broader sense, covering a wider range of outcome variables than those measured by standardized tests (Madaus, Stufflebeam, & Scriven, 1983).

Although Tyler's methods brought innovation to educational evaluation practices, the use of standardized tests did not disappear. In fact, in the 1950s and 1960s, the use of standardized tests increased as new technological advances allowed researchers to machine score tests. Many new nationally standardized tests were developed during this period and schools purchased them in large numbers. As a result of the increased use of standardized tests to measure effectiveness, professional organizations imposed steps to regulate test taking activities. In addition, the principles of experimental design and statistical analysis would become the most popular methods used in education evaluation. Evaluators during this period also attempted to regulate Tylerian methods by developing taxonomies, such as the taxonomy created by Bloom, in order to help guide which objectives were worthy of evaluation (Madaus, Stufflebeam, & Scriven, 1983).

Educational program evaluation in the 1960s looked much like it did in the early part of the century, relying on standardized tests and quantitative data collection techniques. What had changed by the mid-1960s, however, was the scope of evaluations. With the Soviet launching of Sputnik in 1957 and the subsequent federally enacted National

Defense Education Act of 1958, large scale curriculum evaluation efforts were underway. These evaluations were designed to look at the curriculum of the new educational programs in science, mathematics, and foreign language that the National Defense Act created. In addition to the National Defense Act of 1958, further federal legislation in the 1960s spurred on by the efforts of Senator Hubert Humphrey and Presidents Kennedy and Johnson, led to more large-scale evaluative efforts (Madaus, Stufflebeam, & Scriven, 1983). The educational evaluators of the 1960s were responding to a national need to evaluate new curricula. At first they were not so much concerned about the relevance and utility of their findings, but were reacting to federal pressure to provide information, regardless of its quality or meaning. Even those who were technically competent in quantitative research methods found the task of evaluating their programs difficult. Meeting local objectives while, at the same time, providing Congress with information about the extent to which their programs were accomplishing national objectives proved to be a formidable task. (Worthen and Sanders, 1991). It soon became evident that new approaches to educational evaluation were needed. Cronbach (1963) was perhaps one of the first to argue that educational evaluation should take a new direction. He claimed that comparisons between programs were not as important as gathering and reporting data that would help program managers develop new curriculum. Scriven (1967) followed with a paper on the methodology of evaluation. Guba (1967) voiced dissatisfaction with the traditional quantitative methods of evaluating educational programs. Articles by Stake (1967) and Stufflebeam (1968) also added to the emerging literature on educational evaluation.

During the 1970s and continuing to the present time, the field of evaluation evolved into a distinct profession. A number of journals such as *Educational Evaluation and Policy Analysis*, *Evaluation Review*, and *New Directions for Program Evaluation*, to name but a few, were begun. There were numerous books and monographs dealing with evaluation and many universities began to offer courses in evaluation methodology. Several universities now offer graduate programs in evaluation and professional organizations like the American Evaluation Association provide vehicles for communicating information. (Madaus, Stufflebeam, & Scriven, 1983). As the literature expanded and the discussions became more open, the practice and theories of evaluation became more divergent. Models of evaluation proliferated as more and more evaluators attempted to develop new and better ways to define and describe the nature of educational evaluation. Worthen and Sanders (1987) explained why there are so many different approaches to evaluation when they wrote, "(l)ike so many other young, emerging fields, evaluation is troubled by definitional and ideological disputes. Those who write about evaluation differ widely in their views of what evaluation is and how one should go about doing it" (p. 43). Worthen and Sanders claim that there have been over 50 different evaluation models developed in the past twenty years.

Although evaluators have become more professionalized and numerous models have emerged, there is still little consensus about evaluation methods and techniques. The continuing debate between quantitative and qualitative approaches is one example of the kind of polarization that can be found among evaluators. In spite of the sustained debates, educational evaluation as a field suffers from the lack of innovation. According to

Madaus, Stufflebeam, and Scriven (1983), "there is a need for expanded efforts to educate evaluators to the availability of new techniques, to try out and report results of using the new techniques, and to develop additional techniques" (p. 18). Currently, popular approaches to program evaluation do not center around a single dimension. Rather, program evaluations can take many forms. Michael Scriven writes (1993) that "different evaluation designs are usually required for ranking, grading, scoring, and apportioning" (p. 68). Although methodological debates dominate the evaluation literature, there is an increasing concern about the utilization of evaluation results. Evaluators like Ernest House (1972), Michael Patton (1986), and Carol Weiss (1972) write that utilization is one of the central problems facing evaluators today. Undoubtedly, with increased demands for accountability and continued government control of educational evaluations, discussions about what is being done with evaluation results will necessarily frame the debate well into the twenty-first century.

Like the literature on educational evaluation, the assessment literature deals largely with the issue of accountability versus utility of results. However, unlike educational evaluation, those involved in assessment efforts in higher education have not become professionalized, although much has been written about the "assessment movement." Because the assessment movement has recently taken a front seat in American higher education, it may appear as if it is a new concept. In reality, student assessment initiatives and the debates over accountability have always been a part of the history of American higher education. As already stated, the term "assessment" began appearing in the late 1930s and has often been used to refer to the appraisal of individuals (Sims, 1992). A

great deal of the early literature on assessment revolves around the use of achievement tests. However, the early use of the word "assessment" to mean measurement was radically altered in the mid 1980s as the accountability crisis gained momentum. The call for increased accountability, coupled with externally mandated assessment initiatives during that period, brought about more comprehensive assessment measures. These new measures encompassed the whole process by which one evaluates educational programs in higher education, including establishing goals, gathering data, providing feedback, and improvement measures as well as the overall issue of accountability (Ewell, 1987).

The Assessment Movement and Accountability

In 1974, Howard Bowen commented that "[t]he call for accountability has been heard throughout the land" (p. xi). Accountability, he says, refers to the obligation that institutions and their members have to produce outcomes that are consistent with their goals. Bowen made these comments a decade before the assessment movement began in earnest, but even then, he called for improvements in the evaluation of performance in higher education. "The benefits," he said, "lie not only in satisfying the demands of interested outsiders. . . [but] also extend to improving the effectiveness and efficiency of internal operations" (p. 119-120).

A decade after Bowen made these statements, the Southern Regional Education Board (1984) concluded that accountability should be based on the "demonstrated achievement of students, not just on financial criteria" (p. 42). According to one writer (Folger, 1984), this conclusion was representative of the concern of legislators and the public that

education should do a better job and be able to show that they are doing a better job (p. 75). This report largely directed its criticisms toward public education but the movement quickly spread to higher education. The pressure to present evaluative evidence came from inside as well as outside academia. Reports such as *Involvement in Learning* (Study Group on the Conditions of Excellence in American Higher Education, 1984) and William J. Bennett's monograph, *To Reclaim a Legacy: A Report on the Humanities in Higher Education* (1984) dealt with the quality of American higher education. In addition, the Association of American College's report, *Integrity in the College Curriculum,* called for assessment procedures as well as curricular reform. In 1986, the National Governor's Association (NGA) formed a Task Force on College Quality to look at how colleges and universities could demonstrate student learning outcomes. The NGA made its first report in 1987, indicating that thirteen states had formal college quality assessment programs. By 1989, according to the NGA, that number had increased to twenty-eight (National Governors Association, 1989, p. 42).

While educators and legislators began to look seriously at the quality of American educational programs, the American public brought another dimension to the argument. Faced with media reports about students who graduate but could not read and professors who do not teach, public opinion of higher education turned sour. They began to question not only "What am I getting for my money?" but "What are students learning?" Educators found themselves in the position of defending what they do to the public at large (Erwin, 1991, p. 5).

The assessment movement has become synonymous with the accountability movement, calling for higher education to examine itself and to report the findings to its many constituencies (V. McMillan, 1994). This "New Accountability" (Ewell and Jones, 1985) expects colleges to develop comprehensive student outcomes assessment programs and to implement change on their campuses. By 1993, 97 percent of institutions had some type of assessment activity and 43 percent described their programs as "extensive" (El-Khawas, 1993). This evidence indicates that the assessment movement is here to stay and will continue to facilitate change on college campuses across the country.

Externally Mandated Assessment

Although the idea of accountability and assessment are not new to higher education, what makes the current assessment movement significant is that it largely has been activated by external sources (Sims, 1992; Terenzini, 1989). While the federal government and regional accrediting agencies have indirectly pressed colleges and universities to create assessment programs, the largest impetus for change has come from state authorities. In some states, governors, such as Thomas Kean of New Jersey, John Ashcroft of Missouri, and Lamar Alexander of Tennessee, were influential in carrying the assessment movement forward. (Aper, Cuver, & Hinkle, 1990). In some states, such as Colorado (House Bill 1187), Virginia (Resolution 196) and California (Concurrent Resolution 141), direct legislative action spurred assessment measures and institutional reform. Other state actions originated at the coordinating or governing board level independent of explicit legislation, such as in the case of New Jersey or Maryland (Ewell,

1991). This external push is significant because it forced colleges and universities to create systematic, campus-wide assessments that encompassed a wide range of activities (Terenzini, 1989).

Some colleges and universities created institution-wide assessment procedures without direct state intervention. In these institutions, it was the faculty or administrative committees who created assessment programs, procedures and policies. For example, at James Madison University (JMU), four different assessment models were tried in the departments of nursing, economics, Russian language, and theatre. Those responsible for assessment at the school compared experiences from each department to learn the strengths and weaknesses of various models of assessment. Similarly, at the University of Colorado, Boulder, individual departments developed their own assessment programs, centering on disciplinary concerns (Ewell, 1987).

Just as states vary in their level of state mandated assessment, they also vary widely on their assessment policies. Some states mandate statewide standardized testing while others require institutional reporting of different indicators of effectiveness. South Dakota, for example, requires that all public institutions test students for their demonstrated performance in their major as a criterion for successful completion (Ewell, 1985). In Missouri, legislators instituted state mandated sophomore testing at the University of Missouri, Columbia, to attend to perceived problems at that campus alone. The mandated testing, in this case, was institution-specific, leaving the other campuses of the University system alone (Ewell, 1991). Private colleges have not been immune from state mandated testing. For example, at Xavier University in Louisiana, the state requires

that the college administer a "rising junior" exam (Ewell, 1987). While some states call for mass testing as evidence of effectiveness, the most common procedure is for states to set guidelines for institutional reporting that provides a plan and an assessment of effectiveness measures. South Carolina requires each university to submit a report covering eighteen categories of outcome data. In Virginia, the state mandated assessment guidelines require that institutions report quantifiable data on four outcome measures: outcomes in the major and general education; basic skills proficiency; remediation in verbal and quantitative skills; and alumni follow-up (Sims, 1992).

Institutions have largely responded to externally mandated assessment by designing and implementing assessment procedures geared toward accountability. Because states demand that colleges produce evidence that they are accomplishing what they say they are, it makes sense that institutions tie their assessment measures to the accountability movement. This action, however, creates a dichotomy between state-mandated accountability and campus improvement efforts (Aper, Cuver, & Hinkle, 1990). Accountability-driven assessment responds to the public's needs and concerns and it improves communication between state governments, governing boards, and institutions (Banta and Moffett, 1987). However, the data generated from mandated assessment reporting also can be beneficial to colleges and universities for self-review and self-renewal. It provides opportunities for administrators, faculty, and students to discuss the purpose of their programs and avenues of improvement (Aper, Cuver, & Hinkle, 1990). According to one report (El-Khawas, 1989), sixty-one percent of institutions surveyed used assessment results for program and curriculum evaluation and changes. El-Khawas'

study also revealed that although assessment activities on many campuses were a result of external mandates, fifty percent of those surveyed believed that assessment will " 'significantly improve' " undergraduate education (p. vii). Institutions that tie their assessment results, even those that are externally mandated, to the teaching and learning process on their campuses can be assured of both accountability and improvement (Banta, 1993).

Student Outcomes Assessment and College Impact Studies

According to Alexander Astin (1993a) there are two traditional approaches to evaluating the value of educational programs: resources and reputational. The resources model of assessment is based on the idea that excellence in education can be measured by how many resources an institution possesses. The resources can be financial in terms of endowment, state funding, or the things money can buy like libraries or the physical plant. Resources can also include high-quality faculty and students. The reputational view of excellence is based on the kind of reputation an institution enjoys. Astin argues that within academic circles, there is a myth that a hierarchy of institutions exists in which a few prestigious universities, such as Harvard, Yale, and Stanford occupy the top positions. He refers to the reputational view as a "myth" because he says that the "pecking order" is not based on systematic study or analysis (p. 5-6).

Astin has been critical of these traditional models of excellence and has written often about a third model he calls the "talent development" model.

> The fundamental premise underlying the talent development concept is that true excellence lies in the institution's ability to affect its students and faculty favorably, to

> enhance their intellectual and scholarly development, to make a positive difference in their lives (Astin, 1993, p. 6-7).

This view, according to Astin, measures educational excellence in terms of "impact." In other words, "the most excellent colleges and universities are those that 'add the most value' to the student's knowledge and personal development" (p. 7).

The "talent development" view of educational excellence, often called the "value-added" model, requires that assessment activities be based on outcomes rather than resources or reputation (Astin, 1985; Astin, 1993a, Terenzini, 1989). Student outcomes assessment is not a new concept. Student evaluations have always been a part of academia since the first Harvard University graduating class was subjected to oral examinations and senior declamations (Sims, 1992, p. 3). However, the recent accountability and assessment movements have called for more comprehensive and systematic assessments to the questions: "What do students get out of their educations?" and "What should students get out of attending college?" By looking at the impact of colleges on students as defined by Astin's talent development model one can use the data to establish causal relationships between the college environment and observed student outcomes or simply document students' performance at a single point in time (Jacobi, Astin, and Ayala, 1987, p. 19). Outcomes-focused assessment allows institutions to compare the differences between student talents when they begin their educations and at the end. This is a better measure of a university's effectiveness than traditional measures that rely on the number of students who graduate or on the amount of money spent (Halpern, 1987, p. 6).

Student outcomes assessment, as developed by Astin (1993) and others (Halpern, 1987; Jacobi, Astin, and Ayala, 1987) describes assessment as determining the impact of college on students. A number of impact studies have been done and reviews of such studies provided synthesis of the empirical data. In 1969, Feldman and Newcomb, summarized 1,500 studies and reported on largely affective outcomes such as "values," "attitudes," and "interpersonal adjustments" to name but a few. Similarly, Howard Bowen (1977) synthesized studies dealing with cognitive development, emotional and moral development, as well as societal outcomes. Pascarella and Terenzini (1991) referred to the work of Feldman and Newcomb and Bowen as "narrative," and "explanatory literature" (p. 9). They adopt this method in their 1991 book, *How Colleges Affect Students*, where they deal with cognitive development, personal growth dimensions, and the long-term impact of college on the quality of life. These two authors were also concerned about the implications of their findings to state and federal policy. In 1993, Astin wrote, *What Matters in College?: Four Critical Years Revisited*, in which he updated his 1977 study by drawing on longitudinal data of over 500,000 students and 1,300 institutions compiled by the Cooperative Institutional Research Program (CIRP). Astin states that "[t]he size and scope of CIRP make it possible to employ highly sophisticated multivariate controls over a large number of potentially biasing variables--in particular, the characteristics of the entering students that might predispose them to pick particular types of colleges or program" (p. 4). Astin seeks to not only focus on the differences among the different types of institutions but also focuses on differences in students' experiences while they attend these institutions (p. 7).

These impact studies reveal that there has been significant interest in how college affects students. These studies deal with both cognitive and affective outcomes, covering a broad range of student outcomes. Institutions must determine for themselves what levels of outcomes they want to assess. It is important to remember, however, that no matter what institutions assess or why they embark on assessment innovations, institutional improvement is the underlying reason to embark on a campus-wide assessment effort.

Institutional Assessment Programs

There is no consensus among institutions about what outcomes to assess or how best to assess them. Some writers (Ewell, 1983; Terenzini, 1989) state that institutions must decide individually for themselves how best to assess student outcomes by tying assessment efforts to goals and objectives of the institution. Others (Marchese, 1988) believe that the major question of assessment should be: "What do we do with the information?" Regardless of one's opinions about the nature and focus of assessment, there are many examples of institutional assessment programs in the literature. While it is not possible to numerate all of them here, a sampling of programs is helpful so that the reader can see the complexity and diversity of student outcomes assessment programs.

Peter Ewell (1985) grouped institutional programs into two categories that he calls "first wave" and "second wave" programs. The "first wave" of programs were early pioneers in the assessment movement. These programs rose gradually in the 1970s and the early 1980s and served as examples to those that followed. "Second wave"

institutions are those that instituted assessment programs in the mid-1980s as the movement gained momentum. Three schools that fall into the "first wave" category and are cited often in the literature are Alverno College, the University of Tennessee, Knoxville; and Northeast Missouri State University.

Alverno College is a four-year liberal arts college for women in Milwaukee, Wisconsin with a student population of about 2,500. In 1973, faculty and administrators at Alverno decided that graduation at their institution should be contingent upon student achievement in eight specific areas: communication, analysis, problem solving, valuing in decision making, social interaction, global perspectives, effective citizenship, and aesthetic responsiveness (Erwin, 1991; Loacker and Mentkowski, 1993; Marchese, 1988). At Alverno College, students play a significant role in their own learning and assessment. This "assessment-as-learning" approach requires that students collaborate with faculty and trained assessors from the Milwaukee business and professional community to assess their knowledge and abilities as they progress through school (Erwin, 1991). Although assessment at Alverno focuses largely on individual students, the college also looks at the impact, value, validity, and effectiveness of Alverno's programs through its Office of Research and Evaluation (Hutchings and Marchese, 1990; Loacker and Mentkowski, 1993).

At the University of Tennessee, Knoxville (UTK), legislators tied assessment results to funding to promote institutional improvement and to respond to state mandated requirements for accountability (Banta, 1988). In 1979, the Tennessee Higher Education Commission began an experiment by instituting a performance funding feature that

awarded up to five percent of UTK's annual state allocation based on its performance in five areas (Banta and Fisher in Folger, 1984). The achievement areas targeted by UTK included general education, the major, and opinions about the quality of academic programs and services (Erwin, 1991; Hutchings and Marchese, 1990).

Northeast Missouri State University was a regional comprehensive college that became a public university. By 1981 it had a comprehensive assessment system that required students to take a nationally normed test upon entry to and completion of a general education program, a writing assessment, and a student survey (Young and Knight in Banta, 1993). Northeast Missouri's assessment program is perhaps best known for its advocacy of Astin's "value-added" approach to assessment. Information on demographics, standardized achievement scores, and attitudinal data are collected. Data on these variables combined to document Northeast Missouri's improvement efforts to satisfy public accountability (Erwin, 1991).

In the mid-1980s, a multitude of institutional assessment programs emerged as calls for accountability increased. The "second wave" of institutions followed Alverno, UTK, and Northeast Missouri with active programs (Ewell, 1987; Hutchings and Marchese, 1990). These institutions include Kean College, James Madison University, King's College, Miami-Dade Community College, Mt. Hood Community College, South Dakota State University, Ohio University, Clayton State College, and the State University of New York College at Plattsburgh, to name but a few. All of these institutional assessment programs evolved differently but space does not permit a summary of all of them. Only the first three will be summarized here.

In 1985, Kean College in New Jersey began using a variety of assessment tools to promote improvement, as well as academic and personal growth for its students. Assessment devices included analyzing student information data and test scores, evaluating portfolios and senior projects, surveys and exit interviews, focus groups, and requiring a variety of performances specific to the major (Young and Knight, 1993). Kean College stresses skills, subject matter knowledge, and human and professional values in its assessment program (Erwin, 1991). When Hutchings and Marchese visited Kean College in 1990 they found that the model used there "minimizes institution-wide measures and focuses on self-assessment within majors and programs, some forty in all, with each faculty unit at liberty to devise its own approach" (Hutchings and Marchese, 1990).

Like Kean College, James Madison University (JMU) also stresses knowledge, skills, and human values in its assessment program. JMU was supported by a $125,000 grant from the State Council of Higher Education for Virginia, which resulted in a collaborative effort among administrators, faculty, and students, to develop an institution-wide assessment program. The approach used by JMU was unique in that four models of assessment were pilot tested in different departments: nursing (the Alverno model), Russian language department (Northeast Missouri model), economics (the Tennessee performance model), and theater (the discrepancy evaluation model). At the end of a year, the assessment committee proposed seven dimensions of student assessment: general education, objectives across the curriculum, functional skills, affective development, degree of student challenge, assessment in the major, and alumni follow-up (Ewell, 1987; Erwin, 1991; Hutchings and Marchese, 1990; Marchese, 1988). JMU, like Kean College,

established an office of student assessment and appointed a full-time director for its assessment program that helped faculty and administrators design and analyze assessment data (Ewell, 1987; Erwin, 1991).

King's College in Wilkes-Barre, Pennsylvania is a private liberal arts college with a full-time student body of approximately 1,750. At King's, the assessment program is "course embedded," where assessment is located within courses, run by the faculty, and focuses on individual students (Hutchings and Marchese, 1990). In 1985, King's College implemented a core curriculum that is required by everyone and constitutes 50% of graduation requirements. The core curriculum revolves around eight "transferable" skills of critical thinking, creative thinking and problem solving, writing, oral communication, quantitative analysis, computer literacy, library and information technology, and values awareness (Erwin, 1991; Hutchings and Marchese, 1990). Because assessment at King's is decentralized and directed by faculty, student assessment exercises and exams are part of regular course requirements and are included in their final grades. In this approach, faculty must decide what outcomes they expect and what criteria they will use to measure them. (Hutchings and Marchese, 1990). King's College also developed a "rising junior essay" to assess writing and critical thinking. This essay is graded by faculty members and students are provided with feedback on their performance (Ewell, 1987).

The six institutions highlighted above are only a small portion of examples found in the literature. Many more examples exist but space limitations make it impossible to list them all. Perhaps Peter Ewell (1985) expressed it best when he wrote, "The assessment of student outcomes is a large, complex, and currently much-debated topic--one that no

single volume can expect to cover adequately" (p. 5). However, the six illustrations mentioned provide an overview of the student outcomes assessment possibilities that exist and are colleges that appear in the literature repeatedly.

In summary, colleges and universities have responded to external pressures for accountability in a variety of ways. In the 1993 volume of *Campus Trends*, El-Khawas reported that three major types of improvement efforts were taking place on college campuses throughout the country. While 70% of those surveyed reported that they engage in Total Quality Management Groups and Procedures, and 82% revealed that Program Review was important on their campuses, fully 98% of respondents claimed that their institutions engaged in student outcomes assessment as an improvement mechanism (p. 16). Clearly, outcomes assessment has become the principle mechanism by which institutions assess their effectiveness. El-Khawas attributes this to the fact that accrediting agencies now expect institutions to have comprehensive assessment programs tied to student outcomes (p. 17). However, critics of state mandated assessment claim that results are not being used for improvement. States must balance between being too limited or too inclusive in their definitions of what should be examined. The results of assessment, after all, can be only as good as the data upon which they are based (McMillan, 1994).

While many of the same assessment issues exist in the mid 1990s that existed in the 1980s, those involved in assessment are much more concerned today about whether their efforts are making a difference on campus. Trudy Banta's recent (1993) edited volume

concludes that the assessment movement has instilled new enthusiasm for teaching on campuses throughout the country. Not only have faculty and staff become more familiar with the literature on student growth but they have begun to use some of the recommendations in their own work. According to Banta, "there are so many examples of assessment- based changes in the environment for learning. . .that it seems quite appropriate to assume that student learning is increasing or will increase as the changes have time to achieve their intended purposes" (p. 373). This optimistic viewpoint notwithstanding, the major challenge facing those involved in institutional assessment efforts as the movement approaches the twenty-first century is to prove that assessment measures are addressing educational problems. In other words, not only will educators be required to prove that their educational programs are effective, but they will also have to prove that their assessment programs work as well.

Although ACSC is not a traditional institution of higher education, it contains elements that make comparisons possible. The College is interested in creating a challenging, learning environment where students will grow intellectually. Faculty and staff at the College have ten months to do this as well as to assess general student abilities. Because of the short duration of the program, overall assessment of program elements and how well they are meeting the needs of their students becomes central to improvement efforts at the College.

Air Command and Staff College and Assessment

The official mission statement of ACSC is "to educate midcareer officers to develop, advance, and apply air and space power in peace and war" (Curriculum Plan, 1995, p. 1). Although this mission statement is much too broad to express the totality of ACSC's curriculum, it does illuminate the central focus of the overall program--the application of air and space power. The 1995 Curriculum Plan elaborates on this mission by stating:

> ACSC's resident curriculum emphasizes the analytical and practical tools students need as future military leaders. . . .It remains a book and technology-based curriculum exploring the works of many great thinkers and strategists--military and civilian. The students begin their studies addressing the large conceptual issues of air campaigning and end with a practicum applying their knowledge of air and space power in a practical application.
>
> This challenging educational environment fosters teamwork and team building between faculty and students and students themselves. The faculty helps students reach higher levels of creative, analytical thought and a deeper understanding of the requisites of command and the application of air and space power. (p. 1)

To meet the above goals, the current ACSC approach to learning involves a team concept. Faculty teams develop and teach the curriculum, largely in seminars with lectures comprising only 15 percent of the total curriculum hours. In addition, through a comprehensive research program, student/faculty teams contribute to the growing body of knowledge about aerospace applications and theoretical constructs, while learning to think critically and creatively. According to the 1995 Curriculum Plan, "The college expects students and faculty to chart new waters, and look at war and conflict from the perspective of rapidly developing technologies, capabilities, and theories" (p. 4). Many of

these research projects are publishable works and often become part of the required reading for later ACSC classes. While research projects comprise much of the ACSC curriculum, instructors also integrate simulations, case studies, and computer war games throughout their courses. A multi-million dollar "space lab," the Combat Applications Facility, allows students and faculty to become familiar with space technology through hands-on practice and applications. In addition, every student receives a notebook computer and software to help them synthesize information more efficiently. ACSC's curriculum is also enhanced through a distinguished leader guest speakers' program and field trips. The program also makes use of a reciprocal exchange program with the Royal Air Force Staff College, the German Armed Forces Staff College, the Canadian Forces Command and Staff College, and more recently, the Gagarin Military Air Academy in Moscow, Russia (Curriculum Plan, 1995).

In order to evaluate the courses and the methods used at the College, ACSC evaluators use a multi-tiered method administered by the Evaluation Section at the College. At the end of the program, students fill out an end-of-program questionnaire. This questionnaire consists of seven sections that include multiple-choice, rating scale, and open-ended questions. Through a competency rating scale, students are asked to rate themselves on knowledge and understanding in each area of instruction prior to attending ACSC and after completing the course. In addition, students rate the curriculum and presentation methodologies used at the College. ACSC evaluators compile and report the data from the end-of-program survey as statistical descriptive data, consisting largely of percentages. They highlight negative trends and distribute the reports to the ACSC Commandant's and

Dean of Faculty's offices and to other interested parties (ACSC Office of Evaluation, 1994).

Besides the end-of-program survey, ACSC evaluators also administer a graduate survey and a graduate's supervisor survey. They mail these two instruments to graduates and their supervisors three years after students have graduated from the program. Evaluators are currently working on a refined graduate and graduate's supervisor surveys that they anticipate administering one year after graduation but these instruments are still under revision at this writing. The prototype graduate survey that is being developed uses Likert-type response sets to ask students to rate ACSC's value as well as curriculum content and structure. As with the end-of-program data, graduate survey data is reported as descriptive information and distributed to key leaders at the College.

Along with internal evaluations, external evaluators from various agencies also visit ACSC. Two agencies that annually assess the programs at Air University and ACSC are the Board of Visitors (BOV) and the Office of the Inspector General (IG). The BOV convenes at Maxwell Air Force Base once every year, usually in the spring. They receive numerous briefings, make observations, and read detailed reports. Their reports ordinarily consist of general comments about each AU agency followed by recommendations. The last BOV visit was April 10-11, 1995. In their report, the BOV commented about the "unique and exciting military educational experience" at ACSC and lauded the College for developing "computer-based instructional material" (Air University, 1994, p.17). While the BOV is responsible for policy issues and the overall value of PME to the Air Force, the IG inspections focus on compliance to regulations and operational readiness. The IG

inspectors, like the BOV, conduct their investigation once a year and look at each AU agency separately. The IG examiners place each organization into one of five categories: outstanding, excellent, satisfactory, marginal, or unsatisfactory. The performance categories rated by the IG inspectors in 1995 included supervision and operations, education and faculty, students and support, and research (Inspector General, 1995). The 1995 IG inspection of ACSC rated the College with an overall "excellent." The IG praised the Commandant for implementing revolutionary changes in instructional methodology and mission, which increased the "efficiency and quality of the education, and enhanced the school's reputation as a world-class practical and theoretical research organization" (p. 72). While the IG team looks at ACSC's curriculum, they are mainly interested in administrative functioning and do not attempt to assess the quality of teaching methods or pedagogy.

In addition to the formal methods of evaluation conducted by ACSC evaluators and external agencies like the BOV and IG, records maintained at the Air University library revealed that several individuals have been interested in the effectiveness of ACSC's programs and practices. However, most of the studies found in the archives were done as student research projects in partial fulfillment of ACSC requirements. It is important to summarize a few of these studies to show what kind of evaluation research has been done at ACSC in the past.

Several studies (Holmes, 1987; Mason, 1988; Quintanilla, 1986) analyzed ACSC graduate surveys in different years and reported quantitative data as percentages, means, and modes. The purpose of all three of these studies was to determine if ACSC was

accomplishing its mission and to report on the degree of student satisfaction of ACSC's program and curriculum. All three studies were negative toward the ACSC research component but offered overall positive comments about the program. The descriptive reports, however, did not attempt to make inferences about what elements of the program contributed to the success of ACSC. One study (McNally, 1979) used correlational statistics (Kendall Rank Correlation Coefficient) to compare student competencies prior and post training in one section of the program, the Command and Management Section. McNally found that the program did not significantly change student attitudes and recommended minor changes in instructional methods at ACSC. One study (Smith, 1978) compared the instructional methods at ACSC with those used in civilian institutions and other PME schools. Smith recommended that the school retain its written structure and oral critiques but that it shorten its evaluation periods. A great number of studies (Davis, 1991; Griffin, 1995; Macomber, 1966; Orleans, 1949) used qualitative and historical methods to address criticisms of ACSC and its programs and offered suggestions about the future of ACSC and officer PME in the Air Force. Davis' historical approach addressed specific criticisms of Air University and its programs, concluding that they have evolved into a "doctrine" of PME. One of these studies (Griffin, et.al., 1995) traced the history of the Air Corps Tactical School (ACTS), the first Air Force PME program which was phased out in the 1940s. Griffin's research concluded that PME should look at the historical precedent set by ACTS to adequately deal with the future. Macomber (1966) and Orleans (1949) used qualitative methods to evaluate ACSC, offering no statistical analysis. Neither study found any serious problems with teaching methods used at ACSC.

Macomber suggested changes to the speaking and writing programs and voiced concern about instructor competency to teach those skills. Orleans found, through interviews with faculty and students, direct observations, and examination of teaching materials, that although there was a positive attitude of faculty and staff, the curriculum and texts needed further development. A more quantitative study (Welton, 1976) attempted to compare student success at ACSC with other PME schools and methods. This study was interested in establishing a relationship between success at Squadron Officers' School (SOS) and success at ACSC. Welton concluded that there was a positive relationship between success at SOS and success at ACSC and that attendance had a greater impact on students in non scientific careers than on those in scientific careers. Finally, two studies (Hammell, 1987; Wiese, 1977) were concerned with the validity and reliability of ACSC survey instruments. Both studies validated the instruments in use at ACSC. However, Wiese recommended that the survey instrument be revised, while Hammell suggested the continued use of the survey instrument and methods.

In addition to the internal studies summarized above, a few external studies were uncovered as a result of this literature review. Two of them (Shelburne, 1953; Dolan, 1984) were dissertations and reflected the style and requirements of their respective universities and the time period in which they were writing. Shelburne's dissertation (1953) for the University of Chicago was a qualitative historical report on the Air Corps Tactical School. Shelburne concluded that the relevance of ACTS was evident in the World War II experience and that advanced training was justified to sustain the Air Force's capability. Dolan's 1984 dissertation for the University of Southern California

was an analysis of ACSC's nonresident correspondence program (now the distance learning program). This quantitative study revealed that correspondent graduates felt that ACSC's utility was limited as compared to resident graduates. Dolan recommended that more emphasis be placed on the professional development aspect of the correspondence program to compensate for the differences in utility scores. Two additional external studies (Getzels and Guba, 1956; Davis and Donnini, 1991) stand out in the literature. Egon Guba, who is perhaps most well known for his advocacy of qualitative methodology and naturalistic inquiry, collaborated with Jacob Getzels in 1956 to conduct a study titled "Role Conflict and Instructor Effectiveness at the Air Command and Staff School." This study was sponsored by the Air Force Personnel and Training Research Center and was the first report in a broader research project. Guba and Getzels studied the effect of role conflict on teaching effectiveness at ACSC, postulating the theory that the possible inconsistency among the various roles that an officer must play while on faculty would affect job performance. The study found that there is a relationship between role conflict and teaching effectiveness, with high conflict scores correlating significantly with teaching ineffectiveness. Although this study was done almost forty years ago, it is the only examination of ACSC conducted by a well-known researcher and educator and the only investigation that specifically focuses on faculty effectiveness. Finally, research by Davis and Donnini resulted in a 1991 book titled, *Professional Military Education for Air Force Officers: Comments and Criticisms*. Both authors were active-duty Air Force officers assigned to the Air University Center for Aerospace Doctrine, Research, and Education. Although this book did not focus solely on ACSC, it is an important monograph because it

traces the history of Air Force PME between 1946 and 1987. Davis and Donnini examined over 345 documents--letters, regulations, manuals, studies, reports, catalogs, histories--and summarized the history of Air Force PME as seen through the eyes of its critics.

The above studies distilled from the literature add to data available about the effectiveness of ACSC and its programs. However, it is impossible to know the extent to which these studies have contributed to changes in ACSC's curriculum without further investigation. Utilization of evaluation results is a continuing issue. Although ACSC evaluators compile and disseminate information to key leaders at the College, there are no measures in place to link improvement efforts to evaluation results. It is even less doubtful that research projects such as those summarized above are used to any extent as they are filed away in the archives after completion.

In summary, assessment methods currently used at ACSC only provide stake holders with descriptive, anecdotal, and largely subjective information. Research does not go far enough to make predictions about what areas of the program affected student competence on outcome variables. While assessment efforts at the College look at student outcomes to some extent, they do not offer targeted evidence about why certain methods work while others do not. This dissertation went beyond descriptive information and filled a gap in the literature by indicating those connections. This will allow stake holders at ACSC to pinpoint the strength and weaknesses of their program, moving their assessment efforts beyond accountability and into program improvement.

CHAPTER THREE

METHODOLOGY

Overall Research Design

This study adapted the input-environment-output (I-E-O) model developed by Alexander Astin and detailed in his 1993 book, *Assessment for Excellence* (first published in 1991). Astin states that "the basic purpose of assessing students is to enhance their educational development" (p. 4). The I-E-O model provides information about how different educational activities and practices affect outcomes, leading to program and faculty improvement (Astin, p. 37). The researcher can examine each component of the model separately --inputs, environment, and outcomes-- but according to Astin, it is important to always evaluate outputs in terms of inputs to get an accurate picture of how effective the educational program was in developing student talents. Astin defines inputs as the personal qualities that students bring with them to the educational program; environment consists of the students' experiences during the program; and the outcomes refer to the talents that the program intends to develop in its students (p. 18). In research design terms, input and environmental variables are the independent variables, and the outcome variables are the dependent variables. The I-E-O design allows the researcher to control for potentially biasing input variables, therefore, getting a more accurate estimate of the effects of different environments on outcomes (p. 19).

The major research question of this study was: "How effective was Air Command and Staff College in meeting its goals and what contributed to this effectiveness as perceived by the students who graduated from the program?" In this study, effectiveness was the extent to which students *perceived* their competencies in student outcome goals. ACSC's outcome goals were defined as those things that the program purports to instill in its students. The researcher used a 90-item questionnaire called "Student Perceptions of Program Effectiveness Questionnaire," to collect data for the study. The survey asked students to rate the quality of the teaching methods and program activities at ACSC and to assess their competency on selected student outcome measures (see Appendix A for the questionnaire). The researcher then analyzed the relationships between the inputs, environment, and outcomes at Air Command and Staff College and identified which environmental variables were most predictive of students' perceived competence on outcome variables. Descriptive data were analyzed and reported using means, standard deviations, and percentages. Relational data were reported using cross tabulations and Pearson product-moment correlation coefficients (Pearson "r"s). Finally, multiple regression analysis was used to control for potentially biasing input data so that the researcher could make predictions about which environmental variables most affected student outcomes.

Study Institution

The institution chosen for this study was Air Command and Staff College, a major Air Force professional military education program located at Maxwell Air Force Base in

Montgomery, Alabama. Students are chosen to attend ACSC in conjunction with their selection to the rank of Major at about the ten-year point in their careers. Although attendance at the College is not mandatory, those who are chosen and decline to attend may jeopardize their opportunity for future promotions. The researcher chose Air Command and Staff College to evaluate because of its importance in developing Air Force leaders who will be affecting Air Force policy for the next ten to twenty years. For the Academic Year (AY) 1994-1995 class, ACSC's curriculum consisted of nine academic courses (for a complete description of these courses, please see Appendix B). These courses were grouped into three different departments within the ACSC structure: Command/Strategic Studies Department, War/Theater Level Studies Department, and War Theory/Campaign Studies Department. Besides these major academic components. For AY 1994-1995, the ACSC structure also supported a Distance Learning Department, a Joint Warfare Studies Department, an Academic Support Department, a Wargaming Department and an Evaluation Component (Curriculum Plan, 1995).

Population and Study Group

In addition to active duty Air Force officers, each ACSC class, consisting of close to 600 students, also hosts selected US civilians (approximately 100), international officers (approximately 80) from several different countries, and exchange officers from the other services (ACSC Curriculum Plan, 1995; Air University Catalog, 1995). Each class begins in August and graduates the following June, a total of ten months. For AY 1994-1995, the ACSC graduating class began with 584 members including civilians, international

officers, and exchange officers. However, the researcher was only interested in measuring the perceptions of active duty Air Force officers. This subpopulation consisted of 395 students. These officers graduated in June, 1995 and returned to their Air Force jobs at bases located in the United States, Europe, Panama, and the Far East. Mailing labels were obtained from the Air Force Personnel Center at the end of September and questionnaires were mailed to the entire subpopulation on November 3, 1995. The five months between graduation and the first mailing provided ample time for participants to move to new locations and settle into their new jobs.

Out of the original 395 questionnaires sent, 228 usable questionnaires were returned. These figures represent a return rate of 58 percent. However, after accounting for the first and second mailing, 107 questionnaire packets were returned as "undeliverable as addressed" mail. Of those 107 packets, 75 (70 percent) were returned from Air Command and Staff College. Although some graduates remained at ACSC as faculty and staff members, this large number of returned ACSC mail indicates bad addresses rather than a postal delivery problem. One possible reason for the number of bad addresses at ACSC is the number of graduates who received their assignments late. Another reason may be that some graduates went to follow-on training or schools which are considered temporary duty. In both situations, graduates' last known assignment and work address would be carried in personnel records until they arrived at their permanent location. While it is possible to trace individuals within the personnel system, the researcher did not feel that this would be necessary. There is no reason to believe that the 107 individuals who could not be reached because of bad addresses were different from those who returned

questionnaires. In other words, the fact that these individuals could not be contacted did not have a significant impact on survey responses and did not skew the results of this study. However, if one deducts the 107 bad addresses from the total number of questionnaires sent (395), the response rate increases to 78 percent (78 %).

Research Questions

The major question this study addressed was an evaluation question.

How effective was ACSC in meeting its goals and what contributed to this effectiveness as perceived by the students who graduated from the program?

This question revolved around the overall effectiveness of ACSC. Effectiveness was the extent to which students rated their competencies on student outcome variables. The question also involved determining if students' perception of the quality of environmental variables affected their perceived competencies on outcome goals.

To answer the above question, the researcher divided the subsidiary questions into four categories: descriptive, relational, predictive, and implications. First, specific descriptive questions were:

1. What were the demographic factors and student expectations (inputs) of ACSC graduates in academic year 1995?

2. How did students rate the quality of the teaching methods and program activities (environmental factors) at Air Command and Staff College?

3. How did students rate their competency on outcome measures at the time they completed Air Command and Staff College?

Second, the researcher wanted to know the relationships between the independent and dependent variables. Specific correlational questions were:

4. Was there a relationship between input variables (demographics and student expectations) and student outcomes?

5. Was there a relationship between environmental variables (teaching methods and program activities) and student outcomes?

Third, the researcher wanted to make predictive/causal claims about the relationship between environmental factors and outcomes. To ensure that claims made about the effect of certain environmental factors on outcomes were accurate, the researcher "controlled" for other variables that might affect outcomes. Since input variables may affect the relationship between environmental variables and outcomes, the next question was:

6. Holding the input variables (demographics and student expectations) constant, was there a relationship between environmental variables (teaching methods and program activities) and student outcomes?

Finally, based on the quantitative data compiled from the questions above and from open-ended questions posed to academic year 1995 graduates, the researcher made recommendations about program changes and/or improvements to senior ACSC leaders and faculty members. The final question addressed this issue:

7. What were the implications of the results of this study for Air Command and Staff College?

Rationale for Chosen Variables

To understand fully the rationale for the variables chosen for this study, it is necessary to describe the student selection process at ACSC. ACSC students meet a special selection board in conjunction with their Majors' promotion board that centrally convenes

at the Air Force Personnel Center at Randolph Air Force Base, Texas each year. An officer's demonstrated potential for key field grade (Majors and above) command and staff assignments is the criterion used for selection to ACSC. No one at the College-- faculty, staff, or senior leaders, is responsible for selecting students (Air University Catalog, 1994). Very few officers turn down the opportunity to attend ACSC in residence. Those who decline to attend ACSC in residence do so "with prejudice," which gravely jeopardizes their future promotion potential.

This discussion about the selection process was presented to illustrate the difference between incoming students to ACSC and students who attend traditional institutions of higher education. This presents a unique methodological problem for the researcher when it comes to determining which input and environmental variables to choose for the study. Since there are no pretest measures or incoming grade point averages or GRE scores to consider, the researcher must determine which input variables should be used. Similarly, choosing environmental variables at ACSC also presents a methodological problem for the researcher. In traditional educational institutions, students are free to choose their courses of study or to determine how long or to what extent they will be involved in pursuing their education. The ACSC student does not have such choices. All ACSC students attend the same courses in the same sequence. For the most part, they are exposed to the same pedagogical techniques presented by the same faculty members. On the surface, it appears as if all ACSC students have the same experiences while participating in the program. However, it is unlikely that students *perceived* the program activities in exactly the same

way nor were their attitudes toward the learning environment identical. For this reason, the researcher used student perceptions as a means of data collection.

The following discussion about the variables used to evaluate ACSC provides a rationale and framework for the overall study and places them in context with the I-E-O model.

Input Variables. Input variables were those characteristics that students brought with them to the program. This study focused on two types of input characteristics, demographic data and student expectations. Although the College currently collects and reports demographic data on each incoming class, they do not look at the relationship between demographic data and student outcomes. The researcher believed that it was important to know if ACSC was meeting the needs of all of its students. For example, it was not enough to know that seventeen percent of the students were female, but a more pertinent question was "What was the relationship between gender and student outcomes?" In addition, by controlling for the input bias of demographic variables through multiple regression, the researcher was able to predict with greater certainty the environmental variables that most affected students' perceptions of competence on outcomes. Operational definitions and categories of input variables are as follows:

Demographic data. It was important to know if ACSC met the needs of all of its students. Demographic variables were important determiners of the College's ability to reach all members of their student body. The following variables made up the

demographic data (please refer to questions 82-87, Section "D" of the "Student Perceptions of Program Effectiveness" Questionnaire at Appendix A):

a. Age: Although ACSC students were close in age, the researcher was interested in how age affected their perceived competence on outcome variables. The age variable was divided into four categories and perceived student perceptions of competence on outcomes were compared across age categories.

b. Gender: Given the predominance of male officers over female officers in the Air Force as a whole, the researcher was certain that ACSC students were predominantly male. However, by looking at differences in perceived competence across gender lines, the researcher provided senior ACSC leaders with valuable information about how well their program met the needs of its female officers as well as identified program activities that contributed most to their perceived competence on outcomes.

c. Race: Because of Air Force demographics, the researcher was certain that the racial makeup of ACSC students was primarily Caucasian. What was unknown was how well the methods and processes used at ACSC affected the perceived competence of minority students. By including race as a demographic variable, this issue was addressed.

d. Career Field: ACSC students came from a variety of career fields with different backgrounds and experiences. The researcher was interested in how students' career fields affected their perceived competence and what elements of the program best met the needs of the majority of Air Force specialties. This is important because ACSC wants to provide an educational environment that not only addresses the technical aspects of

military service. The professional military education of mission support, logistics, and medical/legal officers was just as important as that of pilots and navigators.

e. Master Degree Concentration: By the time officers reach the rank of Major, the Air Force expects that they will have earned Master Degrees. Obviously, different educational backgrounds provide students with different mindsets and opinions. For example, engineers do not see the world in the same way as political scientists. The researcher wanted to know how Master Degree concentration and Education Level affected students' perceived competence and which elements of ACSC's program best met the needs of students from different educational backgrounds.

f. Commission Source: There are three major ways in which Air Force officers can receive commissions: Reserve Officer Training Corps (ROTC), United States Air Force Academy (USAFA), and Officer Training School (OTS). Each avenue provides different educational backgrounds and pedagogical experiences. Students' perceptions will undoubtedly vary depending on their commission source. By looking at those differences, the researcher was able to pinpoint program elements that provided the best learning environment and pedagogy for the majority of students.

Student expectations were measured by presenting students with a list of choices from which they were to choose all of the expectations that applied to them. The following is a list of student expectation choices (question 88, Section "E" of the questionnaire at Appendix A):

1. ACSC would improve my chances for future promotions.
2. ACSC's curriculum would make me a better Air Force officer.
3. I would meet other people and learn about other career fields.
4. I would improve my golf game.

5. I would get to spend more time with my family.
6. I would spend a great deal of time socializing.
7. I would learn very little while a student at ACSC.
8. I would be academically challenged while a student at ACSC.
9. Other (please specify)

The list of expectations was compiled as a result of anecdotal data from students and expressed stake holder concerns. ACSC students have been in the Air Force for several years and have been exposed to other professional military education experiences. Over the years, they have acquired a set of assumptions about what the ACSC experience would do for them. For example, anecdotal information revealed that many officers view ACSC as a time to relax away from their jobs and spend time with their families or play golf. Attitudes such as these may affect students' perceptions of their competence on outcomes. Senior leaders at the College wanted to understand what expectations students possessed when they entered the program and how these expectations related to student competence on outcomes.

Environmental Variables. Environmental variables were those things in the educational environment that students experienced while at ACSC. As already stated, environmental variables at ACSC did not vary considerably. Students may have experienced different things as a result of being assigned a morning versus an afternoon seminar or they might have been exposed to different material because of their faculty instructor's work experiences. For all intents and purposes, however, ACSC students were exposed to very similar learning environments. What did vary in the environment were student

perceptions. The thirty-two items that made up Section "C" on the questionnaire (items 50-81) were grouped into the following six categories of environmental variables.

Teaching methods. ACSC uses primarily two types of teaching method; lecture (in-house and outside lecturers), and seminars (informal lectures and colloquia-style forums). Items 50-53, Section "C" of the questionnaire refer to teaching methods (Appendix A).

Technology. The use of computers has become central to ACSC's overall teaching methodology. Students use their laptop computers to access their daily schedules, communicate through electronic mail, and do much of their reading from on-line articles. In addition, ACSC extensively uses an interactive computer software called Toolbook© to supplement readings and to aid students in their research efforts. Items 54-58, 74, and 81, Section "C" of the questionnaire refer to Technology (see Appendix A).

Curriculum. ACSC's current curriculum is book-based, consisting of over 100 books and supplemented by current articles. It was important to know how effective this approach was in facilitating student learning. Besides curricular content, of equal value was the structure (curricular flow, course lengths, etc.). Items 59-62, 67, 75, and 76, Section "C" of the questionnaire refer to Curriculum (see Appendix A).

Research. The Research component at ACSC is an important element of the College's curriculum. ACSC leaders wanted to know to what extent this approach was effective for their students. Items 63, 68, 69, and 77, Section "C" of the questionnaire refer to Research (see Appendix A).

Faculty. Because faculty members receive evaluations from their supervisors and from student critiques, this study did not attempt to evaluate ACSC faculty members to any

length. However, the researcher wanted to know how students' perceptions of the quality of ACSC faculty related to their perceptions about their competence on outcomes. Items 64, 65, 70, 78, and 79, Section "C" of the questionnaire refer to Faculty (see Appendix A).

Grading. Before 1994, the grading system at ACSC was pass/fail. Currently, students receive letter grades for their work. Since anecdotal evidence revealed that students were unhappy with the new grading system, the researcher added it as an environmental variable. Items 66, 71, 72, 73, and 80, Section "C" of the questionnaire refer to Grading (see Appendix A).

The above six categories of environmental variables used in this study were chosen as a result of formal and informal discussions and interviews with members of the faculty and staff at ACSC. Stake holders at the College determined that these items were central to their program and wanted to know how these items affected student competence on outcomes. Students were asked to rate the quality of program elements at ACSC using a five-point rating scale. The items contained in Section "C" corresponded to the environmental variables listed above in the following manner:

Variable	Questions
Teaching Methods	50, 51, 52, 53
Technology	54, 55, 56, 57, 58, 74, 81
Curriculum	59, 60, 61, 62, 67, 75, 76
Research	63, 68, 69, 77
Faculty	64, 65, 70, 78, 79

Grading	66, 71, 72, 73, 80

Students rated each question from one to five (1-5) and a score for each variable was compiled. Note that items 75-81 are not on the same five-point scale as the other items. Rather, they were grouped into discrete categories and were intended to be reported as descriptive information only. They were not used in the correlational analyses or the regression equations. For the relational and predictive analyses, the individual items that made up each environmental variable were added together to create "collapsed" values. For example, the Teaching Methods variable was created by adding together items 50-53. Correlations between environmental and outcome variables were reported using Pearson "r"s based on collapsed values. However, for the convenience of the reader, correlations for each item that made up the collapsed values, were reported in table format and are found in Appendix D. Collapsed values for variables were also used in the regression analysis. Descriptive data were reported on each item individually rather than on collapsed values.

Outcome Variables. Outcome variables were the talents that the program claimed to instill in its students. The official mission of ACSC is "to educate midcareer officers to develop, advance, and apply air and space power in peace and war" (Curriculum Plan, 1995, p. 1). This mission statement was too broad to be of any use in determining measurable student outcomes. The researcher, faced with the problem of what outcomes to measure, distilled information from the nine course syllabi through a content analysis. The content analysis involved collecting syllabi, extracting stated goals from them, and

putting them in "like" categories. This method yielded forty-four items (questions 5-49 on the questionnaire) that the College hoped to instill in its students. These items fell into one of four categories of outcome variables which are defined as follows:

Joint Campaign Planning Process. Joint campaigns are military operations that involve more than one branch of the service. Because many military theorists and strategists believe that modern warfare involves cooperation and coordination among all the services, a major objective at ACSC is to teach students about joint doctrine and war applications. Items 35-45, Section "B" on the questionnaire were designed to gather student perceptions on how competent they were in this area (see Appendix A).

Air/Space Power Applications. Although joint campaigns will, more than likely, be commonplace in modern warfare, Air Force officers must learn the theories, uses, and limitations of aerospace power. Future air campaign planners must understand how to employ airpower as part of the overall operation while working in concert with the other services. Items 46-49, Section "B" on the questionnaire were designed to gather data on student competence on this variable (see Appendix A).

Command and Leadership. One goal of ACSC is to mold mid-level officers into commanders. The Command and Leadership variable deals with commanders' roles and responsibilities (i.e., people skills, administrative duties, etc.) and teaches students about the unique leadership role of a military professional. The Command and Leadership items of the questionnaire are 5-16, Section "B" (see Appendix A).

Critical Thinking. One of the major threads running through all the courses at ACSC was critical thinking. At ACSC, a person who thinks critically can use concepts, theories,

and principles of war to solve problems and make decisions. In other words, critical thinking involves using problem-solving skills to synthesize concepts, applying them in new and different situations. Items 17-34, Section "B" of the questionnaire cover the Critical Thinking variable (see Appendix A).

As was the case with environmental variables, outcome variables were also based on "collapsed" values. For example, items 35-45 comprise the Joint Campaign outcome variable and are added together to create that variable. Relational and predictive analyses were based on collapsed values for the most part. Descriptive information, however, was reported on each item individually to provide more detail. Questions that comprise Section "B" on the questionnaire corresponded to the above variables in the following manner:

Variable	Questions
Joint Campaign Planning Process	35-45
Air/Space Power Applications	46-49
Command and Leadership	5-16
Critical Thinking	17-34

Students were asked to respond to the question: "How would you rate your competency on the following items at the point in time when you completed Air Command and Staff College (see Appendix A, Section B, Questions 5-49)?" Using a five-point rating scale, students rated their competency on outcomes. Notice that students were not asked to make connections between their competency and ACSC. Causal connections between program elements and student perceived competency on outcomes were made through

multiple regression analysis based on data collected from the questionnaire. Because of the nature of the design of this study and the researcher's time frame for completion, it was not possible to ascertain student competency on outcome measures *prior* to their attendance at ACSC. Therefore, this study did not include any pretest measures of student competency as input data. Pretest measures would have provided data that could be compared to posttest data and then used to make inferences about the overall effectiveness of ACSC based on a pretest/posttest design. This study, however, was a cross sectional study that was concerned with choosing variables that would optimize prediction. In other words, the researcher chose the input variables (demographics and student expectations) that were expected to have the most effect on students' perceptions of their competence on outcomes. Given the design of this study and the constraints placed on the data by the researcher, the data showed which combination of variables (input and environmental) best predicted students' perceptions of their competence on the aforementioned outcome variables.

Instrumentation and Measurement

The researcher developed a "Student Perceptions of Program Effectiveness Questionnaire" which was mailed to all 395 Air Force officer students from the AY 1994-1995 graduating class on November 3, 1995 (please refer to Appendix A). The questionnaire contained six sections. Section "A", "Overall Effectiveness," consisted of four questions required by Air University, ACSC's parent organization. These four questions were "quality" questions referring to Total Quality Management principles

adopted by the Air Force. The questions in Section "A" did not directly correspond to any of this study's variables and data from this section were not reported. This information, however, could be used by ACSC as descriptive data in compliance with Air University's guidelines. Section "B", "Course Objectives," was designed to gather data on students' perceptions about their competency on outcome measures (outcome variables). Section "C", "Program Activities and Teaching Methods," asked students to rate the quality of program activities and teaching methods (environmental variables). Section "D", "Demographic Data," asked students to report their individual backgrounds and characteristics, while Section "E", "Student Expectations," asked them to provide information about their expectations before attending ACSC. Together, Sections "D" and "E" made up the input variables. Section "F", "Open-Ended Questions," provided students with an opportunity to give written feedback about the program.

The questionnaire was scored primarily using a five-point rating scale. In some instances, students were asked to place a check mark next to the most appropriate item (such as in the demographic section). In addition to the numerically scored items, the open-ended questions provided further substance to the results of the study and helped to interpret some of the quantitative data.

The initial questionnaire was mailed on November 3, 1995. This mailing went to all members of the sub-population of Air Force officers from the AY 1994-1995 class at ACSC (n=395). The mailing consisted of a personalized cover letter, the questionnaire, and a self-addressed stamped return envelope. A week after the questionnaire was mailed, a follow-up postcard was sent to all members of the sub-population. The purpose of the

postcard was to remind those who had not sent a response to return the questionnaire. Finally, approximately three weeks after the first questionnaire was mailed, another mailing was sent to those who had not yet responded. The second mailing contained another personalized cover letter, a replacement questionnaire, and a self-addressed, stamped return envelope. This three-step procedure was used to ensure that a majority of the population was contacted and was designed to improve the survey response rate. The cover letters, post card, as well as the questionnaire are at Appendix A.

Pilot Study. The researcher visited ACSC during the week of August 14-18, 1995 to conduct a pilot study of the survey instrument. Because seventeen members of the AY 1994-1995 graduating class remained at the College as faculty, they were chosen as participants for the pilot study. The researcher placed sealed envelopes in staff mail boxes for the chosen participants, each containing a questionnaire and a rating sheet. Instructions directed the participants to complete the questionnaire as if they had just received it in the mail and to comment on the instrument's structure, content, and questions on the rating sheet. To facilitate return of the pilot survey, a box was set up in the Dean's office and electronic mail reminders were sent to all of the participants. Twelve of the seventeen (70 percent) questionnaires were returned.

Because student experiences at ACSC did not appear to vary significantly, the researcher was concerned that student responses on the questionnaire would not vary either. After the pilot study questionnaires were completed and returned, the researcher computed means and standard deviations on every 5th question of the instrument in order

to determine variability on the responses. This method confirmed that student perceptions did vary across the scale ranges. The researcher also was concerned about the length of the questionnaire and the participants' ability to understand and interpret the questions. The pilot study revealed that it took between 15 and 20 minutes to complete the instrument and that the instructions and questions presented no problem for those who participated in the pilot. As a result of the pilot study, the researcher was able to refine the instrument and meet the survey mailing deadline of November 3, 1995.

Validity and Reliability. Because of the unique nature of ACSC and this study, no existing survey instrument was available. The pilot survey aside, the "Student Perceptions of Program Effectiveness Questionnaire" was used for the first time when it was mailed as part of this study. However, every effort was made to improve measurement quality. The pilot study provided information about the instrument's structure and organization as well as its content and wording. In addition, the researcher worked closely with program administrators and senior leaders at ACSC to ensure that only pertinent questions were addressed. A systematic content analysis of course syllabi to determine outcomes also enhanced measurement quality of the instrument. To minimize measurement error, each variable on the questionnaire contained several items rather than relying on a single-item response set. For example, the questionnaire contains four items (questions 50-53) to measure the quality of teaching methods, an environmental variable. According to Light, Singer, and Willett (1990), this strategy reduces measurement error while increasing the reliability of the total score (p. 173). Similarly, by combining multiple indicators (both

multiple-choice and open-ended questions) on the questionnaire, measurement error was minimized and the measurement quality improved.

Data Analysis

The researcher coded the questionnaires before they were mailed so they could be tracked for the follow-up mailing. Although these codings were associated with student names and addresses, the information was used for tracking purposes only. Respondents were guaranteed complete confidentiality as the data were reported in aggregated form.

As the questionnaires arrived in the mail, the researcher entered the data into a computerized statistical package. Computer software used to analyze the data for this study was the Statistical Package for the Social Sciences (SPSS). SPSS is a flexible statistical tool that can provide descriptive, relational, and predictive information.

Descriptive statistics consisted of two types: single-variable-descriptive analyses and relational. Simple descriptive statistics such as means, standard deviations, and percentages were reported on each item on the questionnaire. Relational statistical analyses consisted of two types: cross tabulations and correlations. Cross tabulations were used to describe the relationship between demographics/student expectations (inputs) and outcome variables and were reported in percentages. The Pearson product-moment correlation coefficient (Pearson "r") was used to report the relationship between environmental variables and outcomes. The correlation coefficient described the strength and direction of those relationships.

Univariate correlations between variables are mainly associational and descriptive. A more powerful statistical tool for determining causation is multiple regression analysis. This study used multiple regression analysis to identify the effect of environmental variables at ACSC on students' perceptions of competence on outcomes, while controlling for potentially biasing input variables (demographics and student expectations). This method allowed the researcher to make causal claims about the perceived quality of the environmental variables at the College on student perceptions of their competence on outcomes. For both the relational and predictive analyses, individual items that made up each variable (environment and outcomes) were added together to create a single value for the variables. For example, for Teaching Methods, an environmental variable, items 50-53 were added together to create that variable. Similarly, for Joint Campaign, an outcome variable, items 35-45 were added together to create that variable. These "collapsed" values were reported in table format. Cross-tabulations were used to report the relationship between inputs and outcomes, while Pearson "r"s were used to report the relationship between environment and outcomes. Cross-tabulations and Pearson "r"s between individual items that made up each variable were reported in Appendices C and D. The researcher highlighted patterns in the tables in a short narrative that accompanied the tables.

Finally, the researcher analyzed the open-ended portions of the questionnaire through a content analysis. The content analysis consisted of extracting students' key comments and phrases and the data were reported in aggregated form. Students were asked to contribute information about how ACSC could be improved. They were also asked to

comment on any specific items on the questionnaire that they deemed appropriate. These data were used to provide feedback to ACSC senior leaders and faculty about specific items on the questionnaire.

Limitations

The first limitation in designing a comprehensive evaluation revolved around the scope of the study. Since it was not possible to study everything, the researcher/evaluator must decide what to study and, perhaps most importantly, what not to study. This project contained a number of variables on which it concentrated. Some important questions remain: "Were these the right variables?" "Should others have been included?" "How many variables were enough to make judgments about the perceived effectiveness of this program?" To minimize this concern, the evaluator attempted to work as closely as possible with the program stake holders--senior ACSC leaders, faculty, and students. These individuals will use the results of the study to make changes in their program and it was important for them to be involved in determining which variables were critical. In addition, by involving principle stake holders, the researcher ensured that their needs were met and important variables were included. While this dissertation focused on the program as a whole, sacrificing depth for breadth, this is only one approach to evaluation of ACSC. In-depth studies of every variable included in this study are clearly warranted and should be considered when future evaluations are planned.

Another limitation of the study was a design issue. A longitudinal study consisting of a pretest and a posttest would have been ideal. Such a study would have compared pretest and posttest scores to determine the extent to which students changed as a result of the program. It was not possible, given the time constraints and resources available, for this study to design and conduct a longitudinal study of this nature. While a pretest/posttest design would have brought together all the elements of classic experimental research methods, it was not the intention of this dissertation to provide empirical evidence in support of a theory. Rather, this dissertation was interested in analyzing variability in students' perceptions on outcome variables based on information available on a number of independent variables. The independent variables deemed important to this study were the input and environmental variables previously discussed. The researcher, based on student perceptions of their competence in several outcome variables and their overall rating of program elements, wanted to determine which elements of the program best predicted students' perceptions of their competence on outcomes. According to Elazar Pedhazur (1982), in predictive research "any procedure that meets the specific needs and inclinations of the researcher (economy, ready availability of some variables, ease of obtaining specific measurements) will do" (p. 9). A countervailing principle, however, is the constraint that "when variables are selected for the purpose of optimizing prediction, all one can say is, given a specific procedure and specific constraints placed by the researcher, which combinations of variables best predicts the criterion" (p. 10). This study was a predictive study and was interested in making judgments about the program based on available data. Future research efforts conducted

at ACSC should include longitudinal data using experimental designs which can then be compared to the results of this study.

A third limitation of the study involved the issue of self reporting. Again, because of time constraints and other factors, it was not possible to do a longitudinal study in which a pretest/post test design could be implemented. In addition, because of the ACSC selection process, a control group could not be identified and used. Therefore, the researcher asked the students to rate themselves on their competence in outcomes. The credibility of student self-reports has been often debated but some evidence exists (Pace, 1985) to suggest that questionnaire survey research on which students self-report their competence is as valid as other measures. Pace analyzed the College Student Experiences Questionnaire (CSEQ), a standardized questionnaire designed for undergraduates and intended to be filled out at the end of the school year. The CSEQ asks students to rate their experiences on 142 activities, their impressions of the college environment, and their estimates of gains on 21 goals and objectives. Based on test-retest comparisons on the CSEQ, Pace concluded that student self reports were stable and reliable. In addition, he compared self-reported gains with known achievement testing and concluded that "the ratings are totally congruent with what we know from achievement test scores" (p. 42).

A fourth limitation of this study was that all ACSC students were exposed to the same teaching methods and program elements. In other words, the environment for every ACSC student was the same with minor variations. Students were divided into morning and afternoon seminars and they were exposed to different faculty members, who undoubtedly used different approaches. However, ACSC is a standardized course

designed to meet the needs of a majority of its students. Basing this study on student perceptions was one way in which the lack of variation could be addressed. Student perceptions do vary, according to the pilot study, and revealed strengths and weaknesses in the program.

Although this study did not attempt to address every issue at ACSC, it will serve as a building block upon which future studies can be built. There are several implications for future study. First, a longitudinal study is clearly warranted. Such a study would possibly administer student tests at the beginning of the ten-month period and follow through with a post test at the end. Second, research needs to be done on the selection process. Differences between those selected for ACSC and those not selected should be measured to determine the value of the program. In this case, the non-selectees would serve as a control group which would bring more validity to any causal claims made about student achievement. Finally, in-depth studies could be done on any number of the variables. For example, the technology element described as an environmental variable in this study, deserves more attention than this study could give to it. The same could be said for any of the variables mentioned in the study.

In conclusion, the limitations and ideas for future research notwithstanding, this study served to provide information about the overall perceived quality of ACSC's program activities and predict which elements contributed to students' perceptions of competence on outcomes. It will hopefully solicit discussions and conversations among faculty, students, and staff and serve to bring about program change and/or improvements.

Finally, the researcher hopes that this dissertation will be a building block upon which future research can be built. By providing useful information to stake holders and by developing a comprehensive evaluation methodology, this study will provide long-term benefits for Air Command and Staff College and to those who care about its central role in professional military education.

CHAPTER FOUR

RESULTS AND FINDINGS

This chapter covers the results and findings of the data analysis. To best present the results of this study, the analysis is divided into three separate categories: descriptive, relational, and predictive/causal. Each category is covered separately and data analysis results correspond to the research questions posed in chapters one and three of this dissertation. For the reader's convenience, the research questions are repeated at the beginning of each section. Following the research questions, results are summarized in tables and patterns are highlighted in a brief narrative. In each section, items from the questionnaire that correspond to the analysis are indicated. After the quantitative data are presented, the qualitative, open-ended questions (89 and 90 on the questionnaire) are summarized in a final section.

Before turning to the in-depth analysis of the data, it is important to understand to what extent the respondents mirror the population from which they came. A discussion on representativeness will give the reader confidence that those who responded to the questionnaire were characteristic of the study population, thereby making generalizations from the data possible.

Representativeness

The study group chosen for this study consisted of all 395 Air Force officer graduates from the ACSC Academic Year (AY) 1994-1995 class. Of the 395 questionnaires sent to

alumni, 228 were returned (58 percent) and 107 came back as "undeliverable as addressed" mail (27 percent). Seventy percent of the undeliverable questionnaires (75) were returned from the same address--Air Command and Staff College. While a few graduates remained at the College as faculty and staff, the large number of undeliverable mail to ACSC reflects a time lag in the assignment process rather than a qualitative difference in recipients. Graduates who, for one reason or another, received late assignments or attended other courses after ACSC, would possibly be listed incorrectly in the personnel system. There is no reason to believe that graduates who could not be reached because of bad addresses are significantly different than those who responded to the survey.

Although the response rate is important because of the possibility of nonresponse error, of greater importance is the representativeness of the returned surveys. Nonresponse error occurs when a significant number of people do not respond to the survey and they are different from respondents in ways that are important to the study (Salant and Dillman, 1994, p. 20). Representativeness refers to the extent that the characteristics of people who respond to the survey are similar to the characteristics of the population. This is important because in order to make generalizations based on data provided by respondents, the researcher must have confidence that those who participated in the study represented the study group as a whole.

The data comparison on representativeness of respondents to study group is summarized in Table 1. Data on the study group were provided by ACSC and were listed in their *AY96 Curriculum Plan* (March 1995, 14-15). Totals and percentages of

respondents in each category were a result of compiling demographic data from returned questionnaires. The figures reported do not include responses checked in the "other" category. The number of respondents checking "other" in every demographic variable were too small to be of any use in the comparisons. Some respondents left demographic data blank so the figures reported represent only valid responses.

Table 1

Representativeness of Respondents to Study Group

	STUDY GROUP (395)	RESPONDENTS (228)
Age (yrs.)	**37.1**	**35-under 24.5%** **36-39 52.3 %** **40-over 23.2%**
Gender Male Female	 **318 (81%)** **77 (19%)**	 **179 (81.4%)** **41 (18.6%)**
Race Caucasian African-American Other	 **339 (86%)** **36 (9%)** **20 (5%)**	 **181 (83%)** **17 (7.8%)** **24 (8.2%)**
Career Field Rated (pilots, navigators) Non-rated (all others)	 **128 (32%)** **267 (68%)**	 **70 (32%)** **135 (66%)**
Education Bachelor Master Doctorate	 **39 (10%)** **339 (86%)** **8 (2%)**	 **4 (1.8%)** **207 (90.8%)** **13 (5.9%)**

A comparison of demographic data between the study group and the respondents reveal that those who responded to the study were very similar to the population from which they came. The mean age of Air Force officer graduates was reported by ACSC as

37 years old. The majority of respondents (52.3 percent) to the survey fell in the 36-39 year old category on the questionnaire. Comparisons of gender and race between the two groups show extreme similarities. Males in the study group made up 81 percent of the population while females consisted of 19 percent. Respondents' totals were almost identical to the study group figures with males consisting of 81.4 percent and females, 18.6 percent. Figures for race were not as close in comparison as gender but are still representative. ACSC reported that 86 percent of Air Force students for AY 1994-1995 were Caucasian, nine percent were African-American, and five percent were listed as "other minorities." Data compiled from the questionnaire on race show that 83 percent of respondents were Caucasian, while 7.8 percent were African-American, and 8.2 percent fell in the "other minorities" category. These figures show that a lower percentage of African-American students responded to the survey than occurred in the population. Conversely, a higher percentage of respondents listed themselves as "other minorities" on the questionnaire than those in the study group. This may have occurred because the way ACSC defined "other minorities" and the way they were defined on the questionnaire could have been different. Comparatively, combined percentages of all minorities between the study group and respondents were very close overall (14 vs.16 percent).

Although gender and race were the most important categories in determining representativeness, other interesting demographic data emerged from the comparison. The data show almost identical statistics between the study group and the respondents in the career field category. For both the study group and respondents, thirty-two percent (32 %) of the study group were rated officers (pilots and navigators), while the difference

between the two groups in the non-rated (all others) category was only two percent (2 %). Statistics in the education category revealed an interesting comparison. While Air Force officers who reach the rank of Major are expected to have earned Master Degrees, figures provided by ACSC on education revealed that ten percent (10 %) of Air Force officer graduates had Bachelor Degrees only. Eighty-six percent (86 %) had Master Degrees and only two percent (2 %) indicated that they had earned Doctorates. Conversely, fewer respondents (1.8 percent) had only Bachelor Degrees, while almost ninety-one percent (90.8%) had Master Degrees and nearly six percent (5.9%) had earned Doctorates. Overall, the respondents were better educated than the study group. The larger number of respondents with Doctorates may be partially explained by the fact that they may be more appreciative of the research process and do not hesitate participating. While the questionnaire asked participants to list their Master Degree concentration, ACSC does not report that information, therefore, a one-on-one comparison was not possible. However, a comparison of the educational level shows a high degree of representativeness in the education category. ACSC also does not report Air Force officer only commissioning sources. Rather, they group all military branches (Army, Navy, Air Force, Marines, etc.) together and report commissioning source of all officers. Therefore, a one-on-one comparison of commissioning source was not possible either.

This comparison between study group demographics and respondents reveals close similarities in the two groups. Across all categories examined, those who responded to the questionnaire were representative of the study group population. As a result, the possibility of nonresponse error was lessened. In addition, the researcher and those

interested in this research can have greater confidence in the findings as representativeness has been established, making generalizations possible.

Descriptive Analysis

Specific descriptive research questions are as follows: "What were the demographic factors and student expectations of ACSC graduates in academic year 1994-1995?" "How did students rate the quality of the teaching methods and program activities at Air Command and Staff College?" and "How did students rate their competency on outcome measures at the time they completed ACSC?" The first question concerned demographic data and student expectations. Demographic data were compiled from student responses on the questionnaire, items 82-87, and student expectations from question 88. To answer the second question concerning the quality of ACSC's teaching methods and program activities, the researcher compiled data from items 50-81 on the questionnaire. Similarly, to answer question three concerning student perceptions on their competency on outcome measures, items 5-49 were used.

Demographic Factors and Student Expectations (Input Variables)

A complete breakdown of demographic data from the questionnaire is summarized in Table 2. Although much of this information was already presented in the earlier discussion on representativeness, the data covered in Table 2 are more detailed and correspond to Section "D" on the questionnaire.

Table 2:

Demographic Data Summary

Item	Percentages
Age (yrs.)	35-under 24.5% 36-39 52.3 % 40-over 23.2 %
Gender	
Male	179 (81.4%)
Female	41 (18.6)
Race	
African-American	17 (7.8%)
Asian	4 (1.8%)
Hispanic	10 (4.6%)
Native-American	4 (1.8%)
White	181 (83%)
Career Field	
Operations	82 (37.3%)
Mission Support	75 (34.1%)
Logistics	42 (19.1%)
Medical/Legal	6 (2.7%)
Master Degree	
Humanities	11 (5.0%)
Social Sciences	108 (49.3%)
Math and Science	52 (23.7%)
Engineering	34 (15.5%)
Medical/Legal	6 (3.2%)
Commissioning Source	
ROTC	
USAFA	91 (42.2%)
OTS	44 (19.9%)
	78 (35.3%)

The average ACSC graduate from AY 1994-1995 was a white male between the ages of 36-39. A higher percentage of respondents worked in the Operations Career Field (pilots, navigators, space systems, missileers, air weapons and air traffic controllers) than in any other career field. A breakout of career fields is provided to show specific job-related duties that might have an effect on outcomes. The information on the table, however, may be somewhat misleading. While it appears as if the greatest percentage of survey

respondents were "operators," in reality, most ACSC graduates were non-operational. This fact is calculated by adding the other career field totals together to determine the percentage of those who work outside the Operations career field (55.9 %). One can conclude from these data that the majority of respondents did not directly participate in the war making capability of the Air Force. Rather, they were involved in duties that supported that mission. Educationally, more graduates were commissioned through the Reserve Officer Training Corps (ROTC) than either Officer Training School (OTS) or the Air Force Academy. Finally, when they sought advanced degrees, more chose to major in the Social Sciences than all other majors combined.

Student expectations refer to Section "E" on the questionnaire and provide information about what students expected ACSC to do for them before they attended the College. Students were asked to respond to the question: "When I found out that I was selected to attend ACSC, I expected that:. . . ." There were nine possible expectations from which students could choose. The list consisted of positive and negative statements that were chosen based on anecdotal information from students (past and present), faculty, and staff. Choices covered both personal and professional expectations. Although the list was not meant to be exhaustive, it provided students with choices that, in the researcher's opinion, formed the core of possibilities. Student expectations are summarized in Table 3.

Table 3:

Student Expectations Summary

Student Expectations (in percentages)	
When I found out that I was selected to attend ACSC, I expected that:	
1. ACSC would improve my chances for future promotions.	86.0
2. ACSC's curriculum would make me a better Air Force officer.	85.5
3. I would meet other people and learn about other career fields.	88.3
4. I would improve my golf game.	16.2
5. I would get to spend more time with my family.	46.8
6. I would spend a great deal of time socializing.	18.9
7. I would learn very little while a student at ACSC.	2.7
8. I would be academically challenged while a student at ACSC.	64.4
9. Other	11.7

This summary of student expectations reveals that ACSC graduates expected the College to be a professional school in which they would be academically challenged. They appeared to understand the value of networking skills as is evidenced by their responses to expectation three (88.3 %). Similarly, they seemed to realize the value of ACSC to their career progression based on their responses to questions one and two (86 % and 85.5 % respectively). On the personal level, a few responded that they expected to spend a great deal of time socializing and/or playing golf. Of greater import, on a personal level, was the expectation that graduates could spend more time with their family which was reflected in their responses to expectation five (46.8 %). Expectation nine provided respondents with an opportunity to add to the list. Of the 11.7 percent who checked the "Other" block, the majority of comments fell in the professional arena. Many expected that ACSC would give them skills that would make them better commanders, while others saw ACSC as a place to learn about current Air Force issues and to set up professional

networks. Personal comments from the "Other" block were few but revolved around student expectations that they would have time while at ACSC to complete their Master Degree. One student actually attended classes at Auburn University while a student at ACSC.

The descriptive summary compiled from demographic and student expectations data reveals that those who responded to the survey were representative of the study group. It also reveals that they were highly interested in furthering their professional goals. While they were concerned about their careers, they were, by and large, family oriented. These data are important because it gives the uninitiated reader information about this unique population and their motivations.

Program Activities and Teaching Methods (Environmental Variables)

The environmental variables consisted of six categories. They were:

- Teaching Methods
- Technology
- Curriculum
- Research
- Faculty
- Grading

Descriptive data on these categories were compiled from student responses to items 50-81 on the questionnaire. Students were asked: "How would you rate the quality of the following program elements at Air Command and Staff College?" A five-point rating scale was used to rate their perceptions about the quality of teaching methods and program activities at the College. Each category is summarized separately by grouping appropriate questions together to form the six categories mentioned above.

Teaching Methods. Data compiled on teaching methods (items 50-53 on the questionnaire) are summarized in Table 4. The table shows that, on the average, students rated the quality of lectures by guest lecturers higher than other teaching methods used at ACSC. An important observation is that, of all the teaching methods, lectures by instructors were rated the lowest. Yet, one-third of respondents rated lectures by instructors as either "excellent" and "outstanding." By comparison, over two-thirds of respondents perceived guest lecturers as either "excellent" or "outstanding." Students seemed to perceive that both informal lecture seminars and colloquia style seminars were similar in quality. The above observations notwithstanding, the overall mean of 3.3 was relatively weak, showing a lack of enthusiasm for teaching methods used at the College.

Table 4:

Teaching Methods listed by item

Teaching Methods (in percentages)							
Item	Unsat (1)	Marg (2)	Sat (3)	Excel (4)	Out (5)	Mean	SD
Lectures by instructors	2.2	14.9	49.1	31.1	2.6	3.17	.79
Lectures by guest lecturers	1.3	4.8	26.0	55.5	12.3	3.73	.79
Informal lecture seminars	2.7	8.9	47.1	36.0	5.3	3.32	.82
Colloquia style seminars	1.9	5.2	53.1	35.7	4.2	3.35	.73

Teaching Methods Overall Mean = 3.32

Technology. The technology category consisted of 7 items (54-58, 74, and 81). Table 5 summarizes data on items 54-58. Summary data on item #74 from the questionnaire appear in table 6. Table 7 lists summary information on question #81.

All ACSC students were issued a portable computer with a 486 microprocessor. The portables had CD-ROM capability and could be networked together so that students could

send electronic mail to their classmates, faculty, or staff. The AY 1994-1995 class was only the second class to have this technology so readily available to them. While many Air Force officers have used computers in their jobs, most of them have not been exposed to the latest innovations in computer technology. ACSC attempted to provide some instruction to those who were not familiar with the technology. Students were expected to use their computers daily as all daily schedules were released through the computer. Some instructors used electronic testing and many placed readings on the network. Toolbook© is an interactive software that uses graphics, pictures, and quick-time movies to enliven text. Toolbook© was used extensively at ACSC with many students creating Toolbook© presentations as their research projects.

Table 5:

Technology listed by item

Technology (in percentages)							
Item	Unsat (1)	Marg (2)	Sat (3)	Excel (4)	Out (5)	Mean	SD
Use of computers for daily schedules	.4	5.7	11.5	38.3	44.1	4.20	.89
Use of computers for testing	.9	7.1	14.6	39.8	37.6	4.06	.94
Toolbook© readings	11.0	14.9	29.8	25.0	19.3	3.27	1.24
Computerized readings	39.0	34.6	14.9	7.9	3.5	2.02	1.08
Computer Instruction	12.7	30.3	39.9	12.7	4.4	2.66	1.00

Technology overall mean = 3.23

Table 5 shows how students rated technology items. By comparing means, one can see that students rated highly the use of computers for daily schedules and for testing but found computerized readings and computer instruction less than "satisfactory." Toolbook© readings were rated "satisfactory" but respondents were much less impressed

with them than they were with their use for daily schedules and testing. In addition, by glancing at standard deviations (the last column in the table) one can compare the degree of variability in students' responses between the different items. According to these figures, Toolbook© readings appealed to some students but not others. However, forty-five percent of respondents rated Toolbook© as either "excellent" or "outstanding." While this information does not reveal why students agreed less about those items, it does indicate that the use of Toolbook© programs and computerized readings at ACSC may be cause for concern and prompt stake holders to investigate further.

Every graduate of ACSC received a CD-ROM upon graduation. This CD-ROM contained a variety of readings, Toolbook© programs, and student research projects. It was a compact way to provide students with materials used at the College. Since the use of this type of technology is relatively new at ACSC, stake holders were interested in knowing the extent to which graduates found the CD-ROM to be useful. Table 6 and 7 summarize data which answer this question (item 74 and 81 on questionnaire).

Table 6:

Percentage of students who found CD-ROM to be useful?

To what extent have you found the ACSC curriculum CD-ROM to be useful?				
Not at all (1)	Very little (2)	To Some Extent (3)	To Considerable Extent (4)	To Great Extent (5)
37.6 %	19.9 %	24.4 %	14.5 %	3.6 %

Mean = 2.27 SD = 1.21

The data indicated on table 8 show that the average student at ACSC found very little use for the CD-ROM, as evidenced by the mean of 2.27. The mean, however, is misleading because of the large standard deviation of 1.21. This shows that students did not agree

on the extent to which the CD-ROM was useful. However, by combining percentages, one can see that while 57.5 percent said they found the CD-ROM to be of no and very little use, only 42.5 percent perceived it to be of at least some use. These figures indicate that students, more often than not, did not perceive the CD-ROM as being useful to them. Table 7 corroborates these data, indicating that a large percentage of graduates claimed they did not use the CD-ROM (54.4%). Written comments by some respondents revealed that they would use the CD-ROM if they had the capability. Many lamented the fact that their computers at work did not have CD-ROMs and that their own personal computers were also lacking. Regardless, it appears as if the CD-ROM issued to students upon graduation had limited utility.

Table 7

CD-ROM Use

If you use the CD-ROM, where do you use it?				
Home	Work	Both	Don't Use It	No Response
17.1 %	19.7 %	6.6 %	54.4 %	2.2 %

Curriculum. The curriculum category consisted of 7 items (59-62 , 67, 75, and 76) on the questionnaire. Results of the data analysis on items 59-62 are summarized in table 8. Item 67 information appears in table 9. Questions 75 and 76 are covered by tables 10 and 11.

Table 8:

Curriculum listed by item

Curriculum (in percentages)							
Item	Unsat (1)	Marg (2)	Sat (3)	Excel (4)	Out (5)	Mean	SD
Assigned Books	.9	3.1	22.4	46.9	26.8	3.96	.83
Curriculum Flow	4.4	11.5	51.8	28.3	4.0	3.16	.84
Systems Approach	1.3	10.1	31.7	44.9	11.9	3.56	.88
Balance between Academics & Social	6.6	21.1	37.0	28.6	6.6	3.08	1.01

Curriculum Overall Mean = 3.42

The curriculum overall average (mean) falls halfway between "satisfactory" and "excellent" indicating that graduates perceived the ACSC curriculum on the items measured to be of moderate quality. One item (assigned books) stands out as being the most highly rated. Students received over 100 books which they were allowed to keep after graduation. They appear to be very satisfied with the quality of these books as evidenced by the average rating of 3.96 with over a quarter of respondents rating the assigned books as "outstanding." The two lowest rated items from table 8 were curriculum flow and the balance between academics & social. Yet, eighty percent (80 %) of respondents rated the curriculum flow as "satisfactory" or "excellent," and sixty-six percent (66 %) perceived the balance between academics and social as being "satisfactory" or "excellent." Even though the balance between academics & social received the lowest rating on the average, the standard deviation of 1.01 indicates that students were not in agreement about this item.

Question 67 revolved around whether or not graduates perceived ACSC to be a graduate-level course. Data compiled and summarized in Table 9 reveal that nearly sixty-

one percent (60.8 %) thought that ACSC was a graduate-level course to a "considerable extent" and to a "great extent." However, the standard deviation of 1.07 also indicates that student responses on this item varied widely.

Table 9:

Percentage of students who thought ACSC is a graduate-level course

To what extent do you think ACSC is a graduate-level program?				
Not at all (1)	Very little (2)	To Some Extent (3)	To Considerable Extent (4)	To Great Extent (5)
4.4 %	8.8 %	26.0 %	37.0 %	23.8 %

Mean = 3.67 SD = 1.07

When asked about the amount of assigned reading (question #75) 59.2% said there was too much. Not surprisingly, no one responded in the "not enough" category. Data from this question are summarized in table 10.

Table 10:

Assigned Reading

What did you think about the amount of assigned reading?			
Too Much	Not Enough	About Right	No Response
59.2 %	0 %	38.2 %	2.6 %

Written comments corroborate the figures with many respondents writing that the number of pages assigned detracted from their learning experiences.

While graduates perceived that the amount of reading was too much, they felt more positively toward the length of courses. Table 11 lists their responses to the question on the length of courses.

Table 11:

Length of Courses

What did you think about the length of the courses?			
Too Long	Too short	About Right	No Response
18.0 %	3.1 %	75 %	3.9 %

Although the table shows that most students perceived the overall length of courses to be "about right," their written comments provided more detailed information. When given an opportunity to express their views, some students wrote that although they thought most courses were long enough, one course, the Command and Leadership Course, should be expanded and given more time in the curriculum. Still others wrote that not enough attention was paid to space applications. These observations shed additional light on the data presented in table 11.

Research. Research consisted of four items (63, 68, 69, 77) dealing with group research projects, training, support, and research time. Data compiled on group research are summarized in table 12, while information about training, and support appears in tables 13 and 14 respectively. Research time is reported in table 15.

Descriptive data analysis on group research projects show that graduates perceived it to be one of the lowest rated categories. This data are condensed in table 12. The overall mean of 2.7 indicates an average rating that is not quite "satisfactory." A standard deviation of 1.4, however, shows that student ratings varied considerably across the range of scores. The combination of a low mean and considerable variability suggests that the group research component of the College may be cause for concern.

Table 12:

Group Research

Group Research (in percentages)							
Item	Unsat (1)	Marg (2)	Sat (3)	Excel (4)	Out (5)	Mean	SD
Group Research Projects	21.1	23.2	31.6	17.1	6.6	2.70	1.40

Group Research Overall Mean = 2.70

Questions 68 and 69 on the questionnaire dealt with research training and support. Students may arrive at the College without the necessary training to accomplish a quality research project and their reliance on faculty and staff could be heavy at times. Senior leaders at ACSC were interested in how students perceived this element of their education while a student in the program. Tables 13 and 14 consolidate data on these topics.

Table 13:

Percentage of students who thought they received adequate research training.

To what extent were you given adequate training on how to do research?				
Not at all (1)	Very little (2)	To Some Extent (3)	To Considerable Extent (4)	To Great Extent (5)
16.8 %	42.9 %	35.8 %	3.5 %	.9 %

Mean = 2.29 SD = .82

Table 14:

Percentage of students who thought they received adequate research support.

To what extent did you receive adequate support with your research project?				
Not at all (1)	Very little (2)	To Some Extent (3)	To Considerable Extent (4)	To Great Extent (5)
15.9 %	27.4 %	34.1 %	15.0 %	7.5 %

Mean = 2.71 SD = 1.13

Data from these tables reveal that students perceived the quality of training and support for their research somewhat lacking. Almost sixty percent (60 %) of graduates replied that they received no or very little training on how to do research. Respondents' ratings of research support was more positive with forty-three percent (43 %) responding in the "not at all" or "very little" category while forty-nine percent (49 %) replied that they received "some" or "considerable" support on their research projects. Note, however, that the standard deviation for research support was a 1.13, indicating a wider range of scores and showing that students were not in agreement about this item. Written comments in open-ended questions also show dissatisfaction with the research component of the program. Students wrote that they received very little help with their research and that grading on research projects was not standardized. This may indicate a problem area and warrants further investigation.

A final topic in the research category was that of time allotted to do research. Students were asked: "What did you think about the amount of time allotted to research?" Their responses are summarized in table 15.

Table 15:

Research Time

What did you think about the amount of time allotted to research?			
Too Much	Not Enough	About Right	No Response
4.8 %	56.1 %	36.8 %	2.2 %

The percentage of students who thought there was not enough time allotted to research far exceeded those who checked all other areas combined. Clearly, time allotted to research may be another area of concern and should be reviewed.

Faculty. It was not the intent of this study to single out any one individual or department by asking students to rate faculty. Of particular concern was the balance between civilian and military faculty members and the number of faculty members who held Ph.D.s. In keeping with their desire to be comparable to graduate study, ACSC senior leaders wanted to know graduate perceptions on these items. The results of these items are made even more significant by the fact that ACSC recently asked for and was allocated money to fund 12 individuals for Ph.D. study. In addition, several military slots are scheduled to be converted to civilian positions. The faculty currently has very few civilian instructors and even fewer Ph.D.s but the trend is to hire more of both.

Table 16 compares student perceptions of the quality of military vs. civilian faculty (items 64 and 65 on the questionnaire). It appears as if civilian faculty members were rated of higher quality than military faculty members, with over half of the respondents rating civilian faculty as either "excellent" or "outstanding." However, some students were not even exposed to civilian instructors and therefore, the data may be skewed. Yet, written comments on open-ended questions were very critical of military faculty members overall. One of the most frequent comments on the open-ended portion of the questionnaire was that faculty members were not qualified to teach the subject matter.

Table 16:
Faculty listed by item

Faculty (in percentages)							
Item	Unsat (1)	Marg (2)	Sat (3)	Excel (4)	Out (5)	Mean	SD
Military Faculty	3.1	12.8	39.8	39.4	4.9	3.30	.87
Civilian Faculty	2.3	8.1	34.8	44.3	10.4	3.53	.87

Faculty Overall Mean = 3.37

Table 17 deals with students' perceptions about the number of Ph.D.s. The data from this table show that respondents were moderately in favor of adding more Ph.D.s to the faculty with over half of respondents (57.4 %) replying in the "very little" or "to some extent" categories. Again, the standard deviation of 1.05 indicates a wide range of scores on this item. Apparently, students were not in total agreement about the extent to which Ph.D.s should be added to the faculty.

Table 17:

Percentage of students who thought ACSC faculty should consist of more Ph.D.s.

To what extent should the ACSC faculty consist of more Ph.D. members?				
Not at all (1)	Very little (2)	To Some Extent (3)	To Considerable Extent (4)	To Great Extent (5)
2.7 %	19.3 %	38.1 %	23.3 %	16.6 %

Mean = 3.31 SD = 1.05

Table 18 and 19 summarize data about faculty balance and student/faculty interaction. While the greatest percentage of students perceived that the balance between civilian and military members was about right (64.9 %), this is surprising in light of data from table 16 in which respondents rated civilian faculty slightly above military faculty. The issue of student/faculty interaction revolves around the time the two groups spent socializing and getting to know one another. According to data in table 19, students perceived that enough time was allotted for interacting with their faculty members with 67.1 % responding that the time allotted to interaction was "about right."

Table 18: Faculty Balance

What did you think About the balance between civilian and military faculty members?			
More Military	More Civilian	About Right	No Response
6.6 %	25. 0 %	64.9 %	3.5 %

Table 19:

Student/Faculty Interaction

What did you think about the time allotted for student/faculty interaction?			
Too Much	Not Enough	About Right	No Response
.4 %	29.4 %	67.1 %	3.1 %

Grading. The grading category revolved around grading procedures, feedback, the process by which students challenge their grades (reclama), and the role of grades in determining distinguished graduates (items 66, 71. 72, 73, and 80). Table 20 displays data on grading procedures. As is evidenced by the data, nearly fifty-two percent (51.6 %) of respondents rated grading procedures either "unsatisfactory" or "marginal." This was the lowest rated item described thus far. Obviously, grading procedures at ACSC were perceived as less than adequate. Student open-ended comments claimed similar sentiments and corroborate the low rating reflected in table 20. Students perceived that grades were assigned arbitrarily and were not standardized throughout the College. Of particular concern to students was the grading procedures for their research projects. A common thread in students' written comments was how the lack of standardization in grading may have kept many people from becoming distinguished graduates.

Table 20:

Grading Procedures

Grading (in percentages)							
Item	Unsat (1)	Marg (2)	Sat (3)	Excel (4)	Out (5)	Mean	SD
Grading Procedures	21.6	30.0	34.8	13.2	.4	2.41	.98

Grading Procedures Overall Mean = 2.41

The following three tables (21-23) cover questions 71, 72, and 73 on the questionnaire and answer more specific concerns. Question 71 involved feedback on oral and written work, while 72 dealt with the reclama process. Reclama is the process by which students can protest, through official channels, a particular grade in a course. Finally, question 73 asked students about the extent to which grades should be used in determining distinguished graduates.

The data in table 21 show that over three-quarters (78.4 %) of students replied that they received feedback on their work at least to some extent. A small number of students (3.1 %) claimed that they did not receive any feedback.

Table 22 reflects students' responses on the reclama process. This item was included because senior leaders at ACSC were interested in knowing whether or not students were aware of options available to them if they should want to dispute a grade. Since the graduates from AY 1994-1995 were only the second class to fall under a letter grade system in current ACSC history, leaders at the college felt it was necessary to institute a system to aid students in questioning a grade assigned to their work. Almost seventy percent (69.6 %) revealed that they knew about and understood the process at least to some extent. Clearly, there were outliers, with a small number of students responding "not at all" (5.4 %) on one end, and a small amount (8.5 %) on the other end in the "to a great extent" column. This was also reflected in the standard deviation of 1.04 which indicated less clustered scores and a lack of consensus about the reclama process. It is likely that those who used the process knew the most about it, while those who did not need to refute grades, knew very little.

Table 21:

Percentage of students who thought they received adequate feedback

To what extent did you receive feedback on your oral and written work?				
Not at all (1)	Very little (2)	To Some Extent (3)	To Considerable Extent (4)	To Great Extent (5)
3.1 %	18.6 %	36.3 %	35.0 %	7.1 %

Mean = 3.24 SD = .94

Table 22:

Percentage of students who knew about and understood the reclama process

To what extent did you know about and understand the reclama process?				
Not at all (1)	Very little (2)	To Some Extent (3)	To Considerable Extent (4)	To Great Extent (5)
5.4 %	25.0 %	33.9 %	27.2 %	8.5 %

Mean = 3.09 SD = 1.04

Figures in table 23 summarize the data about the use of grades in determining distinguished graduates. Over one-quarter (27.3 %) of graduates felt that grades should not be used at all or very little to determine distinguished graduates. On the other end of the spectrum, nearly fourteen percent (13.9 %) felt they should be used "to a great extent." This dichotomy was reflected in the standard deviation of 1.3 showing large variability in the range of scores on this item. This seems to suggest that those who became distinguished graduates probably believed that grades should be used, while those who did not make it, were not as enthusiastic about the system. However, some students who self-disclosed on the open-ended portion of the questionnaire that they were distinguished graduates were critical of the program and how grades were used as a factor of determining who would or would not be chosen.

Table 23:

Percentage of students who thought grades should be used to determine DG

To what extent should grades be used for determining distinguished graduates?				
Not at all (1)	Very little (2)	To Some Extent (3)	To Considerable Extent (4)	To Great Extent (5)
19.7 %	7.6 %	33.2 %	25.6 %	13.9 %

Mean = 3.06 SD = 1.30

The last item in the grading category revolves around the grading method. For the past two years, ACSC has been issuing grades for their courses rather than recording them as pass/fail. This, of course, created much controversy and questions about the benefit of each method. When students were asked what grading method they thought was more appropriate at ACSC, they overwhelmingly voted for pass/fail grades. The breakdown of this is recorded in table 24.

Table 24:

Grading Method

What grading method do you think is more appropriate at ACSC?	
Letter Grades	Pass/Fail
30.3 %	66.7 %

Clearly, students would rather receive pass/fail grades than letter grades for their efforts at ACSC. Yet, it is difficult to know what they might have said if they had experienced a pass/fail system. Since these graduates did not have an option, they could not be objective about the value of pass/fail. However, many respondents wrote in the open-ended portion of the questionnaire that by having letter grades, students were too competitive and focused less on learning than on getting the top score.

Student Perceptions of Competency on Outcome Measures

The outcome variables consisted of the following four categories:

- Joint Campaign Planning Process
- Air/Space Power Applications
- Command and Leadership
- Critical Thinking

Descriptive data on these categories were compiled from student responses to items 5-49 on the questionnaire. Students were asked: "How would you rate your competency on the following items at the point in time when you completed Air Command and Staff College?" A five-point rating scale was used to rate their perceptions about their competency on a number of items. These items were compiled through a content analysis of course syllabi. Course objectives were extracted from each syllabus and then grouped into "like" categories. The four areas listed above emerged as a result of this analysis. Each category is summarized separately by grouping appropriate questions together to form the four categories mentioned above.

Joint Campaign Planning Process. The joint campaign planning process is one of the major overarching concepts taught at ACSC. It involves teaching students all that is involved in conducting joint (inter-service) campaigns much like the Desert Storm campaign. Table 25 summarizes the results of the descriptive data for this category (items 35-45 on the questionnaire).

Table 25:

Students' Perceptions of Competency on Joint Campaign Planning Process by item

Competency on Joint Campaign Planning Process (in percentages)							
Item	None (1)	Very little (2)	Some (3)	Consid (4)	Great (5)	Mean	SD
Understanding critical factors in planning a theater military operation.	1.3	3.1	36.8	48.2	10.5	3.64	.77
Understanding structure of a joint organization.	.4	6.6	28.2	48.9	15.9	3.73	.82
Understanding Air Force role in joint planning.	.9	5.7	27.2	47.4	18.9	3.78	.85
Understanding and applying joint operations planning.	1.8	6.6	39.0	42.1	10.5	3.53	.84
Understanding roles, functions, capabilities, & limitations of US military forces in joint operations.	1.3	7.0	32.9	51.8	7.0	3.56	.78
Understanding & applying lessons learned from classic military campaigns.	.4	2.6	25.0	51.8	20.2	3.89	.77
Understanding influence of national policy & strategy on joint planning.	0	3.1	25.9	53.5	17.5	3.86	.73
Understanding basic concepts & issues in planning & executing war termination.	1.3	4.4	23.7	51.3	19.3	3.83	.84
Understanding political, economic, & military roles in post-hostilities environment.	1.3	3.1	23.2	49.6	22.8	3.90	.83
Understanding role of technology to conduct and win campaigns.	.9	.4	18.4	49.6	30.7	4.09	.76
Understanding need for resource management & acquisition to support future force development.	1.8	3.9	23.2	50.0	21.1	3.85	.86

Joint Campaign Planning Process Overall Mean = 3.78 SD = .80

The data on the table show that students rated their competency on most items, on the average, very close to "considerable." The lowest rated item on this table is "understanding and applying joint operations planning" with a mean of 3.53, but even on that item, over fifty percent (52.6 %) of the graduates rated their competency as either "considerable" or "great." The highest rated item at 4.09 deals with the role of technology in conducting and winning campaigns. This is not surprising given the emphasis on

technology in modern warfare and the technological expertise Air Force officers are expected to possess. Standard deviations for all items are also very constant indicating a relative consensus among respondents on the items.

Air/Space Power Applications. Table 26 displays descriptive statistics for this second major outcome variable. The data correspond to items 46-49 on the questionnaire.

Table 26:

Students' Perceptions of Competency on Air/Space Power Applications

Competency on Air/Space Power Applications (in percentages)							
Item	None (1)	Very little (2)	Some (3)	Consid (4)	Great (5)	Mean	SD
Understanding role & impact of technology on air campaign planning.	.4	2.2	14.5	56.6	26.3	4.06	.73
Understanding contributions of air and space power on air campaign planning.	0	.9	14.9	54.4	29.8	4.13	.68
Understanding & applying air campaigning to national scenarios.	.9	1.8	26.3	50.9	20.2	3.88	.78
Understanding & analyzing impact of contextual & operational art elements on military campaigns.	.9	2.6	15.4	49.1	32.0	4.09	.81

Air/Space Power Applications Overall Mean = 4.04 SD = .75

Clearly, students rated their competency in this category relatively high with over three-quarters of respondents claiming they have "considerable" or "great" competence in three of the four items. The lowest rated item was "understanding and applying air campaigning to national scenarios" but even on that item, seventy-one percent (71 %) of graduates responded that they possessed "considerable" or "great" competence. More respondents (26.3 %) replied in the "some competence" column for that item than the others but this does not indicate a lack of perceived competence. It is interesting, however, that on two of the highest rated items (#1 and #4), a small number of graduates

responded in the "very little" competence column. These figures stand out because of the high overall rating students gave on those items. One must wonder, however, if the low rating stems from the vague wording of the item rather than a rating based on competency.

Command and Leadership. This category consisted of items 5-16 on the questionnaire. Table 27 summarizes the results of the data analysis.

Table 27:

Students' Perceptions of Competency on Command and Leadership by item

Competency on Command and Leadership (in percentages)							
Item	None (1)	Very little (2)	Some (3)	Consid (4)	Great (5)	Mean	SD
Comparing personality types to make decisions.	1.8	12.8	41.9	38.3	5.3	3.33	.83
Understanding & applying leadership skills in diverse situations.	.4	4.8	28.9	54.8	11.0	3.71	.74
Understanding & applying counseling techniques in a variety of situations.	2.6	14.0	43.9	31.6	7.9	3.28	.90
Applying principles of oral & written communication in different situations.	0	.9	17.5	53.9	27.6	4.08	.69
Understanding Air Force officer promotion system.	2.2	3.9	26.3	42.5	25.0	3.84	.92
Understanding & applying quality force tools and techniques.	3.1	16.2	48.2	28.9	3.5	3.14	.84
Understanding the special nature of the military leader.	.9	4.4	21.9	51.3	21.5	3.88	.82
Understanding standards of conduct & officership.	1.3	2.6	11.8	54.8	29.4	4.08	.80
Understanding combat leader styles throughout history.	.4	3.9	23.7	52.6	19.3	3.86	.78
Understanding inclusion of strong moral character & ethical considerations in decision-making.	.4	2.6	12.3	45.2	39.5	4.21	.79
Understanding commanders' role & responsibilities	.4	3.9	25.0	49.1	21.5	3.87	.81
Understanding key elements of Army, Navy, Air Force, & Marine officer evaluation system.	3.5	21.5	52.3	21.5	2.2	2.97	.81

Command and Leadership Overall Mean = 3.69 SD = .81

As can be seen by looking at the table, most items fell very close to "considerable" on the five-point scale. The lowest rated item involves officer evaluation systems for all the services with over three-quarters (77.3 %) rating their competence as "some," "very little," or "none." The highest rated item concerns including moral character and ethics in decision-making. Nearly eighty-five percent (84.7 %) rated their competence on that item as "considerable" or "great." Item 4 on the table, "applying principles of oral & written communication in different situations" is noteworthy. Although it was not the highest rated item, students rated their competence, on the average, as "considerable" with a low standard deviation of .69, indicating that there was little disagreement about their perceived competency on that item. While respondents, on the average, perceived their competency on Command and Leadership as being close to "considerable," it is interesting that some students did not feel confident in their competence in this area as evidenced by the number of respondents who responded in the "very little" and "none" columns. If one compares these figures to those in the other outcome variables, one can see a dramatic difference. Some students criticized ACSC's handling of the Command and Leadership category in the open-ended section of the questionnaire. Typical comments stated that not enough time in the curriculum was devoted to Command and Leadership while others criticized the topics that were emphasized.

Critical Thinking. The analysis for the Critical Thinking category was based on items 17-34 on the questionnaire. Table 28 shows results of the data analysis.

Table 28:

Students' Perceptions of Competency on Critical Thinking by item

Competency on Critical Thinking (in percentages)							
Item	None (1)	Very little (2)	Some (3)	Consid (4)	Great (5)	Mean	SD
Challenging assumptions	1.3	2.6	21.6	49.8	24.7	3.94	.83
Breaking down barriers to creative thinking.	.9	3.1	32.5	46.5	17.1	3.76	.80
Translating ideas into action.	1.3	.9	21.5	57.9	18.4	3.91	.74
Understanding & implementing change in a military environment.	1.3	4.8	31.1	50.0	12.7	3.68	.81
Understanding differences between conflict and war.	.4	3.9	22.8	52.6	20.2	3.88	.79
Understanding social aspect of war.	.9	1.8	20.2	59.2	18.0	3.92	.73
Understanding circumstances of war.	.9	0	18.5	59.9	20.7	4.00	.69
Understanding & applying war & conflict concepts in different circumstances.	.4	.9	22.0	56.8	19.8	3.95	.70
Understanding & creating war theory.	.4	5.3	28.2	49.8	16.3	3.76	.80
Understanding relationship of war theory to practice of waging war.	.9	2.6	21.9	55.3	19.3	3.90	.77
Understanding interrelationship of historical experience and development of war theory.	.9	1.8	18.1	55.9	23.3	4.00	.75
Ability to critically analyze past & present war theory concepts.	0	2.6	23.7	50.0	23.7	4.00	.76
Understanding how to influence international actors to achieve national objectives.	0	2.2	29.8	53.9	14.0	3.80	.70
Identifying & analyzing a military force's center of gravity.	0	1.8	11.4	44.7	42.1	4.27	.73
Understanding military instrument of national power.	.4	.9	7.0	49.6	42.1	4.32	.68
Synthesizing new ideas on application of air and space power.	.4	3.5	34.2	46.9	14.9	3.72	.77
Analyzing & applying war termination concepts in current & potential scenarios.	1.3	3.5	28.9	54.4	11.8	3.72	.77
Understanding role of innovation in superior war fighting capability.	1.3	1.8	21.5	53.9	21.5	3.93	.79

Critical Thinking Overall Mean = 3.90 SD = .76

From this table one can see that students, on the average, perceived their competencies on the Critical Thinking variable as "considerable." The lowest rated item was

"understanding & implementing change in a military environment" but even so, almost sixty-three percent (62.7%) still rated their competencies as "considerable" and "great." The standard deviation on this item, although higher than most in the category, does not show a great deal of variability indicating that the scores are clustered close together. The highest rated item was "understanding the military instrument of national power" which reveals that almost ninety-two percent (91.7%) of the graduates rated their competencies as either "considerable" or "great." The data in table 28 shows that students rated themselves relatively high on all items and that there is little disagreement among them about the ratings, based on standard deviations.

Relational Analysis

The specific relational questions posed in chapters one and three of this dissertation were: "Was there a relationship between input variables (demographics and student expectations) and outcome variables?" and "Was there a relationship between environmental variables (teaching methods and program activities) and student outcomes?" To answer the first question, the cross tabulation method was utilized to determine the relationship between demographics/ student expectations and outcomes. The data were reported in percentages and represented the number of respondents who perceived a high competence (an average of 4 and 5) on outcome variables by each demographic category (age, race, gender, etc.). Question number two was answered through correlational methods and results were reported as Pearson correlational coefficients (Pearson "r").

The Relationship Between Input Variables and Outcome Variables

Demographic characteristics of graduates consisted of six categories (age, gender, race, career field, Master degree concentration, and commission source). Items 82-87 on the questionnaire show each category and their sub-categories. Student expectations (question #88) consisted of nine statements in which students were asked to check all that apply to them. There are four outcome variables (Joint Campaign, Air/Space Power, Command and Leadership, and Critical Thinking). Items 5-49 on the questionnaire reflected outcome items divided among the four variables as follows:

- Joint Campaign Items 35-45
- Air/Space Power Items 46-49
- Command and Leadership Items 5-16
- Critical Thinking Items 17-34

For the purpose of this analysis, the individual items that made up each outcome variable were added together to create a single value for each outcome variable. For example, items 35-45 were added together to create the Joint Campaign variable. These values were referred to as "collapsed" values. Collapsed values were based on respondents' *total* scores, with the average score being "4" and "5." These values reflected those who perceived their competence as being high based on a total score obtained by adding together individual items. While the relational analysis was based on collapsed values and those values reported in this chapter, data on the relationships between individual items and outcome variables were reported in the appendix (Appendix C). The association between individual items and outcome variables also reflected those who perceived their competence as being high but high values, in this case, were based on the number of

respondents who rated their competencies "considerable" (4) and "great" (5) rather than a total score. Please note that when comparing collapsed values on outcome variables with each of the items that made up the variables, collapsed values were smaller. For example, the collapsed percentages on Joint Campaign presented in the tables contained in this chapter were smaller when compared to the average score for each of the items that made up the scale (see Appendix C). Because collapsed values were based on a *total* score rather than on just the number of individuals scoring "4" and "5", the number of individuals scoring high on collapsed variables was decreased, resulting in lower percentages.

Age and Outcome Variables. Table 29 shows the percentage of respondents in each age category who rated their competency on the average as "considerable" or "great."

Table 29:

Percentage of Respondents Scoring High (an average of 4 and 5) on Outcome Variables by Age.

	Rate (%) Among		
Outcome Variable	**35 & under n = 54**	**36-39 n = 115**	**40 & over n = 51**
Joint Campaign	33 % (18)	48 % (55)	31 % (16)
Air/Space Power	59 % (32)	73 % (84)	57 % (29)
Command & Leadership	28 % (15)	32 % (37)	33 % (17)
Critical Thinking	37 % (20)	56 % (64)	33 % (17)

According to the data in the table, the Air/Space Power outcome variable was the only one where a solid majority of the respondents reported having high competence. The lowest percentage of respondents scoring high occurs in the Command and Leadership

variable. Overall, the largest percentages of respondents scoring high on outcome variables was in Age 2 (36-39 age group), except for Command and Leadership, which, at a modest thirty-two percent (32 %), is not much different than the other age categories.

A more in-depth look at student perceptions of their competencies on individual items (please see Appendix C-1) by age reveals more detailed information. The lowest percentages of respondents scoring high was on item 16, a Command and Leadership item, "understanding key elements of the Army, Navy, Air Force, and Marine officer evaluation systems." The highest percentages on which respondents perceived high competence was item 31, "Understanding the military instrument of national power," a Critical Thinking item. When comparing the items by age, it is apparent that the largest percentages occurred in the 36-39 age group on most individual items. In Joint Campaign, the difference between student perceptions of competencies in Age 2 (36-39 age group) and the other two groups is close to thirty percentage points in some cases. The difference narrows in Air/Space Power and Command and Leadership, but widens again in Critical Thinking. For the most part, the percentages of high competence for age category 36-39 were higher than the other age groups on all items. On two items (9 and 11), however, the percentages of high competence for ages 36-39 were considerably lower than the other age groups. These items deal with understanding the officer promotion system (9), and the special nature of the military leader (11). Perhaps those in the 36-39 age group perceived their competencies less in these particular items because they expected more information about how the promotion system works and about how to be a better leader. It is likely that older officers feel less anxious about promotions and their

leadership potential because they have had more life experiences, while younger officers may have more faith in their abilities to compete.

Gender and Outcome Variables. Table 30 reflects the percentages of respondents scoring high on outcome variables for both males and females.

Table 30:

Percentage of Respondents Scoring High (an average of 4 and 5) on Outcome Variables by Gender.

	Rate (%) Among	
Outcome Variable	**Male n = 179**	**Female n = 41**
Joint Campaign	38 % (68)	51 % (21)
Air/Space Power	66 % (118)	98 % (40)
Command & Leadership	31 % (55)	34 % (14)
Critical Thinking	47 % (84)	41 % (17)

The table shows that female respondents scored their competency as high, as compared to male respondents, on three of the four outcome variables. Apparently, female respondents were more confident in their abilities than males were in all variables except Critical Thinking. The largest percentages of respondents reported high competence in the Air/Space Power outcome variable and the smallest in the Command and Leadership variable.

A review of individual item differences (Appendix C-2) shows similar patterns as in the age category. For example, the overall lowest percentage of respondents scoring themselves high on outcomes was on item 16, and the overall highest was item 31. On the average, the differences between male and female percentages were not large. However,

on three items, the differences stood out and are worthy of mention. On item 43, "understanding the political, economic, and military roles in post-hostilities environment," at 85%, the percentage of female respondents scoring their competency as high was sixteen (16) percentage points higher than male respondents at 69%. Conversely, on items 11 and 25, the percentages of males scoring their competencies as high were as much as twenty-two (22) percentage points higher than females. Item 11 deals with the special nature of the military leader, while item 25 concerns understanding and creating war theory. One possible explanation for the differences revolves around typical male/female stereotypes. While females may feel more confident in their abilities to understand and interpret theories, males may feel more at ease with creating them, especially where military leadership and war theory are concerned. Another possible reason for the difference in perceived competence levels by gender may relate to the career fields available to men and women. Until recently, women were excluded from combat-related jobs, which included flying fighter aircraft. Perhaps women feel less competent in items relating to military leadership and war theory because, in the past, they have not been full participants in the mission of the Air Force.

Race and Outcome Variables. Table 31 summarizes the percentages of respondents scoring their competence as high on outcome variables by race. Although some race categories are small, such as Asian, Hispanic, and Native-American, they are included because even though they represent a small number of graduates, their perceptions are no less important.

Table 31 :

Percentage of Respondents Scoring High (an average of 4 and 5) on Outcome Variables by Race.

	Rate (%) Among				
Outcome Variable	**African-Am n = 17**	**Asian n = 4**	**Hispanic n = 10**	**Native-Am n = 4**	**White n = 181**
Joint Campaign	65 % (11)	25 % (1)	40 % (4)	25 % (1)	39 % (70)
Air/Space Power	82 % (14)	50 % (2)	70 % (7)	75 % (3)	64 % (116)
Command & Leadership	35 % (6)	25 % (1)	50 % (5)	50 % (2)	30 % (54)
Critical Thinking	47 % (8)	50 % (2)	50 % (5)	75 % (3)	45 % (81)

The table reveals that out of the five race categories, the largest percentages of respondents who perceived their competence as high were African-Americans, except in Command and Leadership and Critical Thinking. The Hispanic and Native-American race categories follow African-Americans on overall perceived competency, and then the White race category. The lowest percentages of overall perceived competence was the Asian race category except in Critical Thinking, where Asian respondents scored their competency higher than either African-Americans or White respondents. The largest percentages of respondents scoring high by race categories occurred in the Air/Space Power variable. The smallest percentages of perceived competency varied depending on the race category. For example, the least percentage of African-American, Asian, and White respondents rated their competencies high in the Command and Leadership variable, while the lowest percentages of Hispanic and Native-American respondents rating themselves high was in the Joint Campaign variable.

The above discussion on the comparisons that can be made from looking at table 31 follow through when comparing individual items by race category (Appendix C-3). The largest percentages of African-American respondents scored themselves high on most items. However, an item-by-item comparison shows that, on some items, Asian, Hispanic, and Native-American graduates scored their competencies as high. It is interesting to look at how many items show percentages of 100% for those race categories, but the reader should be cautioned that these figures are based on small sub-populations. The smaller the sub-population, the greater the chance of having all the individuals rating themselves as highly competent. As in previous demographic categories, the lowest percentages of respondents scoring high by race were in item 16, and the highest were in item 31. However, the percentages of African-Americans scoring themselves as highly competent are high on a number of items. Items 45, 46, and 47 join item 31 with ninety-four percent (94%) of African-American respondents rating their competencies as high. Item 45, a joint campaign item, deals with resource management and acquisition, while items 46 and 47, both Air/Space Power items, cover the role and impact of technology on air campaign planning and understanding the contributions of air and space power to theater campaigns. The lowest percentage (next to item 16) of African-Americans scoring their competency as high was on item 7, "understanding and applying counseling techniques in a variety of situations." While the reasons for these high and low percentages are not immediately apparent, it is probably unlikely that there are racial differences that created the high and low perceived competencies for these particular items. It may have more to do with career fields in which African-American officers work. Since this study did not look at the

relationship between race and career field, it is difficult to speculate about this. The lowest percentage of White respondents rating their competency as high occurred in item 10, "understanding and applying quality force tools and techniques," and the most on item 30, "identifying and analyzing a military force's center of gravity." Again, it is difficult to speculate as to why White respondents rated their competencies high or low on certain items. As stated earlier, it may have more to do with the career fields in which White respondents work than it does with their race.

Career Field and Outcome Variables. Table 32 shows percentages of those scoring high on outcome variables by career field. The career fields shown are Operations, Mission Support, Logistics, and Medical/Legal. The Operations career field includes pilots, navigators, missileers, air traffic controllers, and air weapons controllers. Support officers include information management, personnel, and finance officers. Logistics officers consist of those in acquisition and maintenance career areas.

Table 32 :

Percentages of Respondents Scoring High (an average of 4 and 5) on Outcome Variables by Career Field.

	Rate (%) Among			
Outcome Variable	**Ops n = 82**	**Support n = 75**	**Logistics n = 42**	**Med/Legal n = 7**
Joint Campaign	33 % (27)	39 % (29)	45 % (19)	71 % (5)
Air/Space Power	68 % (56)	63 % (47)	55 % (23)	100 % (7)
Command & Leadership	27 % (22)	33 % (25)	33 % (14)	57 % (4)
Critical Thinking	44 % (36)	48 % (36)	74 % (31)	86 % (6)

Overall, a higher percentage of officers in the medical/legal career field scored themselves highly competent on all outcome variables. However, the percentages were based on a very small sub-population (n=7) which increased the potential for all respondents in that category to rate themselves as highly competent. The largest percentage of officers who perceived their competence as high after Medical/Legal were Logistics officers. Logistics officers perceived their competence in the Critical Thinking outcome variable as the highest, and lowest in Command and Leadership. Excluding the Logistics career field, more respondents scored themselves as highly competent in the Air/Space Power variable. The surprising fact about the data in table 32 are the low scores, relative to the other career fields, that appear in the Operations column. On the average, the percentages of officers in the Operations career field who scored their competence as high were the lowest among the four areas represented. One might speculate that this is because of the nature of their career field. Officers who have spent many years in the "cockpit" may rate their competencies low in areas like Command and Leadership because they do not directly get involved in commanding others (at least not at their rank levels). Similarly, unless pilots, navigators, and other operators have been in joint assignments, they may not perceive themselves as being highly competent in Joint Campaign. In addition, while one might assume that pilots, navigators, and other operators would perceive themselves as highly competent in critical thinking skills, this is not necessarily so. Most operators rely heavily on check lists in almost every situation, including emergencies. This might explain why the percentage of those in the Operations career field scoring high on Critical Thinking was the lowest among career fields. Not

surprisingly, the greatest percentage of those in the Operations career field rated themselves highly competent in the Air/Space Power variable. Because they are directly involved in air and space power issues on a daily basis, they may have more confidence in their competencies in this variable.

An in-depth look at individual outcome variable items by career field corroborates the information summarized in table 32 (see Appendix C-4). Percentages in the Medical/Legal column are the highest with many ratings of 100%. The lowest number (after item 16) of Medical/Legal officers scoring themselves highly competent on outcome variables was on item 5, "comparing different personality types and using them to make decisions." While the overall largest percentage of Logistics officers who rated themselves highly competent occurs in the Critical Thinking variable, the largest number of Logistics officers who perceived themselves as being highly competent was on item 14, "understanding the inclusion of a strong moral character and ethical considerations in decision-making," a Command and Leadership item. The percentages on individual items compared across career fields are very close between Operations and Support with the largest difference being no more than ten (10) percentage points. The lowest percentage of Operators scoring high on outcome variables (after item 16), was on item 5 on using personality types. Although percentages from table 32 show that the least number of officers scoring themselves highly competent in outcome variables was in the Operations career field, a comparison of individual items reveals several items on which Operators scored themselves highly competent relative to other career fields. The largest number (next to item 31) of those in the Operations career field who rated themselves highly

competent was on item 27, "understanding the interrelationship of historical experience and the development of war theory," a Critical Thinking item. The strong association between Operations and item 27 may relate to the fact that pilots, navigators and other operators' roles revolve around directly conducting war. Another possible explanation for this association may relate to gender. Operations officers tend to be male, and male officers perceived themselves as highly competent on items concerning war theory (see table C-2 and the discussion on gender and outcome variables).

Master Degree Concentration/Education Level and Outcome Variables. Tables 33 and 34 show the percentages of respondents scoring high on outcome variables by Master Degree concentration and Education Level. Table 33 reveals that the percentages of respondents scoring high on competence were higher for those with Medical/Legal degrees than those with other concentrations.

Table 33 :

Percentage of Respondents Scoring High (an average of 4 and 5) on Outcome Variables by Master Degree Concentration

	Rate (%) Among				
Outcome Variable	**Humanities n = 11**	**Soc Science n = 108**	**Math/Sci n = 52**	**Engineering n = 34**	**Med/Legal n = 6**
Joint Campaign	55 % (6)	41 % (44)	40 % (21)	26 % (9)	67 % (4)
Air/Space Power	73 % (8)	60 % (65)	81 % (42)	62 % (21)	100 % (6)
Command & Leadership	18 % (2)	35 % (38)	29 % (15)	21 % (7)	67% (4)
Critical Thinking	45 % (5)	46 % (50)	46 % (24)	47 % (16)	83 % (5)

Again, the number of individuals in the Medical/Legal category was small increasing the probability that all of those with Medical/Legal concentrations will score high. Excluding the Medical/Legal column, the largest percentages of respondents, on the average, with perceived high competence in outcome variables were in the Math/Science column. The largest percentage of those with Math/Science degrees scoring themselves highly competent was on the Air/Space Power variable at eighty-one percent (81 %), and the lowest percentage on the Command and Leadership variable (29 %). For all five Master Degree concentrations, the lowest percentage of respondents scoring themselves highly competent was in the Command and Leadership variable for those with Humanities Degrees (18 %). Across the five Master Degree concentrations, the percentages of respondents who perceived themselves as highly competent, from largest to smallest, were in Air/Space Power, Critical Thinking, Joint Campaign, and Command and Leadership. It is not surprising that the largest percentages of respondents scoring themselves as highly competent occurred in the Air/Space Power variable. However, it is interesting that the largest percentage of respondents scoring high on competence on Air/Space Power, excluding Medical/Legal, was in the Math/Science concentration. Perhaps this was because those with math and science backgrounds perceived themselves as having a greater understanding about the technical aspects of air and space power principles. Yet, if this were true, one would expect those with engineering degrees to have perceived themselves with a much higher competence in Air/Space Power as well. The lowest percentages across degree concentrations was in the Command and Leadership variable, with the lowest percentage of respondents scoring themselves as highly competent in the

Humanities column. One might conclude that perhaps this was due to gender. However, out of the eleven (11) respondents with Humanities degrees, only four (4) were females. A more likely explanation was that those with Humanities degrees were not in jobs in which their command and leadership skills were utilized.

Table 34 summarizes percentages of respondents scoring high on outcome variables by Education Level. A small percentage (n=4) came to ACSC without an earned Master degree. On the other end of the spectrum, two-thirds more (n=13) brought with them earned Ph.D. degrees.

Table 34 :

Percentages of Respondents Scoring High (an average of 4 and 5) on Outcome Variables by Education Level.

	Rate (%) Among			
Outcome Variable	**No Master n = 4**	**Master n=211**	**Master + n = 16**	**Ph. D. n = 13**
Joint Campaign	25 % (1)	40 % (84)	38 % (6)	31 % (4)
Air/Space Power	75 % (3)	67 % (142)	69 % (11)	69 % (9)
Command & Leadership	25 % (1)	31 % (66)	50 % (8)	8 % (1)
Critical Thinking	75 % (3)	47 % (100)	75 % (12)	62 % (8)

These data suggest that larger percentages of those with no Master degree perceived their competency as high on the four outcome variables as compared to those with Ph.D.s. Again, since the number of individuals in the sub-population of no Master degree is relatively small, some caution must be taken when interpreting these percentages. However, in comparing the four categories, it is evident that the largest percentages of respondents scoring themselves highly competent in outcomes were those with Master

Plus. While one might expect the largest percentages of respondents who scored themselves highly competent on outcomes to be those with earned Ph.D. degrees, table 34 shows contrary evidence to that expectation. On the average, the percentages of respondents with Ph.D.s scoring themselves highly competent on outcome variables appear to be the lowest of all four education levels. A possible explanation for this may be that those with Ph.D.s are in highly specialized areas with peripheral jobs that do not directly relate to the mainstream Air Force. The lowest percentage of respondents scoring themselves highly competent continues to appear in the Command and Leadership variable. Again, this may be because of the types of jobs respondents have held up to the point in time when they attended ACSC. It is interesting, however, that higher percentages of respondents with Master Degrees did not score themselves highly competent on outcome variables as compared to other education levels, especially in the Critical Thinking variable. Perhaps this can be explained by looking at Master Degree concentrations (table 33) which shows that the majority of respondents fell within the Humanities and Social Sciences. Perhaps respondents in these areas perceived their critical thinking skills as lacking because of their choice of study in graduate school. Table 34 seems to suggest, however, that perceived competence on outcome variables, on the average, goes up as respondents level of education increases from Master to Master Plus. It also suggests that, for this study group, obtaining a Ph.D. does not necessarily increase one's perception of competence on outcome variables.

Tables summarizing individual items (C-5 and C-6) show similar patterns as those mentioned in the above discussion. The Medical/Legal Degree Concentration by item

comparison shows many high percentages, with a large cluster of one-hundred percents (100%) in the Critical Thinking variable. By item comparisons across the other four categories seem to hold steady with the largest percentages of high competence for all four categories appearing in the Air/Space Power variable. By item comparisons of Education Level reveal that the largest percentages of respondents scoring themselves highly competent were on item 23, "understanding the circumstances of war," rather than item 31(item 16 was still the lowest). An interesting observation about the comparison by item on Education Level is the low scores found in the Ph.D. column. Yet, relative to the other categories, respondents with Ph.D.s scored their competencies as high on several items, mostly in the Critical Thinking variable. Items 22-26 stand out in the Critical Thinking variable for Ph.D.s as items in which a large percentage of respondents perceived high competence. These items deal with understanding concepts and being able to apply them in new and challenging situations. It makes sense that respondents with Ph.D.s would perceive themselves as highly competent in this skill because of their specialized training, which is evidenced by the data in table C-6.

Commission Source and Outcome Variables. The final demographic category looks at the percentages of respondents scoring high on outcome variables by commission source. The three commission source categories are Reserve Officer Training Corps (ROTC), United States Air Force Academy (USAFA), and Officer Training School (OTS). Table 35 summarizes the results of the data analysis.

Table 35 :

Percentages of Respondents Scoring High (an average of 4 and 5) on Outcome Variables by Commission Source.

	Rate (%) Among		
Outcome Variable	**ROTC n = 91**	**USAFA n = 44**	**OTS n = 78**
Joint Campaign	45% (41)	34 % (15)	35 % (27)
Air/Space Power	64 % (58)	66 % (29)	64 % (50)
Command & Leadership	33 % (30)	32 % (14)	27 % (21)
Critical Thinking	42 % (38)	48 % (21)	45 % (35)

The table shows that the largest percentages of respondents scoring themselves highly competent on outcome variables were commissioned through ROTC. Academy graduates followed closely to ROTC graduates in the percentages, with the lowest percentages of respondents scoring themselves as highly competent, on the average, occurring in the OTS column. The largest percentages, on the average, of respondents scoring themselves highly competent were in the Air/Space Power variable, the smallest were in the Command and Leadership variable. Although percentages vary somewhat across commission sources, the table reveals consistency in most cross tabulations. The most dramatic difference on the table occurs in the ROTC column with the Joint Campaign variable. At 45%, this figure is ten percentage points higher than the other two columns. It is mentioned because, in a table that shows relative consistency, the difference stands out. This seems to suggest that respondents who were commissioned by ROTC were more confident in their competency in Joint Campaign than those who were commissioned by the other two sources. Again, this may be because of the types of jobs held by officers

in that category rather than the source of commission. Although commissioning source does not dictate the types of career field or jobs assigned to officers, it is still possible that more ROTC graduates have held joint assignments than their contemporaries.

Item-by-item examination of the variables across commission sources revealed that items 16 and 31, as in earlier analyses, maintained the lowest and highest percentages (Appendix C-7) across categories. Generally, most of the items appear to be consistent with low and high percentages holding constant across the three commission sources. Next to item 16, the lowest percentage of respondents scoring their competence as high was on item 10, "understanding and applying quality force tools and techniques." Conversely, next to item 31, a larger percentage of respondents scored themselves high on item 12, "understanding standards of conduct and officership." Overall, the commission source variable appears to have the most homogeneity of percentages across columns and less variance than the other demographic variables examined in the data analysis. This suggests that commission source may not be associated with students' perceptions of competence on outcome variables.

Student Expectations and Outcome Variables. Student expectations consisted of nine items in which students were asked to check all that apply. Since students could check more than one item, each expectation is a discrete variable. Tables 36 and 37 summarize the results from the data analysis. The tables show the percentages of respondents scoring high on outcome variables by student expectations (for exact definitions of each expectation, see question 88 on the questionnaire, Appendix A).

Table 36 :

Percentages of Respondents Scoring High (an average of 4 and 5) on Outcome Variables by Student Expectations (1-4).

	Rate (%) Among			
Outcome Variable	**Exp 1 n = 191**	**Exp 2 n = 190**	**Exp 3 n = 196**	**Exp 4 n = 36**
Joint Campaign	48 % (92)	45 % (86)	42 % (82)	36 % (13)
Air/Space Power	66 % (126)	68 % (129)	67 % (132)	67 % (24)
Command & Leadership	30 % (57)	33 % (63)	33 % (64)	25 % (9)
Critical Thinking	45 % (86)	48 % (91)	47 % (92)	39 % (14)

Table 37:

Percentages of Respondents Scoring High (an average of 4 and 5) on Outcome Variables by Student Expectations (5-9).

	Rate (%) Among				
Outcome Variable	**Exp 5 n = 104**	**Exp 6 n = 42**	**Exp 7 n = 6**	**Exp 8 n = 143**	**Exp 9 n = 26**
Joint Campaign	39 % (41)	48 % (20)	33 % (2)	45 % (65)	46 % (12)
Air/Space Power	65 % (68)	64 % (27)	50 % (3)	68 % (98)	77 % (20)
Command & Leadership	30 % (31)	24 % (10)	33 % (2)	38 % (55)	35 % (9)
Critical Thinking	46 % (48)	45 % (19)	67 % (4)	49 % (70)	42 % (11)

As can be seen from these tables, the range of percentages across student expectations are small. The largest percentages of respondents scoring high on outcome variables occur in the Air/Space Power variable, with the highest association on the two tables between expectation 9 and Air/Space Power. Expectation 9 provided respondents with an opportunity to write in additional expectations that did not appear on the list. Apparently, of those who had additional expectations (other than those on the list), a larger percentage

were likely to see themselves as highly competent in Air/Space Power. While it is obvious that those who scored themselves as highly competent in Air/Space Power expected something that did not appear on the list of expectations, what that might be is not altogether clear. The descriptive summary of expectations (see table 3 and subsequent discussion) revealed that the comments on expectation 9 varied but the majority fell in the professional arena. The least percentage of respondents scoring themselves highly competent on outcome variables was in expectation 6, "I would spend a great deal of time socializing" in the Command and Leadership variable. This suggests that those who perceived their competence as high on Command and Leadership expected to work hard and not be involved in a great deal of socializing while a student at ACSC. Overall, tables 36 and 37 show very little association between outcome variables and expectations, indicating that student expectations had little to do with their perceptions about competency in outcome variables.

In conclusion, some interesting relationships between input and outcome variables emerged as a result of the data analysis. Across all demographic characteristics and student expectations, the largest percentages of respondents scoring high on outcome variables were in the Air/Space Power variable, the smallest were in the Command and Leadership variable. This consistency across input variables indicates that, regardless of student characteristics and expectations, more respondents perceived their competency as high in Air/Space Power and the least number perceived their competency as high in Command and Leadership. While it is not surprising that this study group of Air Force

officers would score themselves as being highly competent in Air/Space Power, it is somewhat surprising that Command and Leadership consistently appeared as the least perceived highly competent category. This may come from the fact that, as newly promoted Majors, most officers have not yet held positions that require them to command and/or lead.

Another interesting relationship was between gender and outcome variables. Given the four outcome variables and the nature of the military environment, one might expect a higher percentage of male respondents to score themselves highly competent in outcome variables than female respondents. Table 30 shows evidence to the contrary. In all outcome variables, except Critical Thinking, a larger percentage of female respondents scored their competency as high than did male respondents. This table suggests that female respondents were more confident in their competency level on three of the four outcome variables than male respondents Similarly, table 31 shows that African-American respondents, on the average, were more confident in their competencies than those in the other race categories.

While one might assume that officers in the Operations career field (pilots, navigators, missileers, etc.) and those who have Ph.D.s would score themselves as highly competent in outcome variables, tables 32 and 34 show that this was not the case. On all outcome variables, except Air/Space Power, the percentages of officers in the Operations career field scoring themselves as highly competent were less than those in other career fields. Similarly, table 34 suggests that obtaining a Ph.D. did not necessarily increase students' perceptions of competence on outcome variables.

Finally, the data analysis on two input variables, commission source and student expectations, revealed that the percentages of respondents scoring themselves as highly competent on outcome variables did not vary much across categories. This fact seems to suggest that there was very little association between commission source and outcome variables and student expectations and outcome variables. In other words, respondents' perceived level of competence on outcome variables was not very affected by their source of commission or their expectations.

The Relationship Between Environmental Variables and Outcome Variables

Question #5 from chapters one and three of this dissertation dealt with the relationship between environmental variables and outcome variables. The question was: "Was there a relationship between teaching methods and program activities (environment) and student outcomes?" Environmental variables consisted of six categories (teaching methods, technology, curriculum, research, faculty, and grading). Items 50-74 on the questionnaire comprised the environmental variables used for the data analysis. Items 75-81 were meant to be descriptive items only and were not included in the correlations or the regression equations. Therefore, questionnaire items corresponded to environmental variables in the following manner:

- Teaching Methods — Items 50-53
- Technology — Items 54-58, and 74
- Curriculum — Items 59-62, and 67
- Research — Items 63, 68, and 69
- Faculty — Items 64-65, and 70
- Grading — Items 66, and 71-73

As a reminder, the four outcome variables were Joint Campaign (items 35-45), Air/Space Power (items 46-49), Command and Leadership (items 5-16), and Critical Thinking (items 17-34). As specified in chapters one and three, data on correlations between environment and outcome variables were reported using Pearson Correlation Coefficients (Pearson "r"s). The six environmental variables and four outcome variables were "collapsed" by adding together the items which made up each variable. For example, the Teaching Method variable was collapsed by adding together items 50-53 from the questionnaire. Correlations between both collapsed variables and individual items were reported. Data on individual items were reported in table format and are found in the Appendix (Appendix D). Correlations on collapsed values may be larger than correlations for individual items because there was a wider range of scores on those variables. When there are a wider range of scores, the variance is greater, thereby increasing the size of the correlations. Because of the number of variables involved in computing the correlations, the potential for making a Type I error increases. Therefore, the significance level was set at .01, which limited the probability of a Type I error to one in a hundred. By setting the significance level at .01, the reader can be ninety-nine percent (99 %) certain that there was a relationship between the variables where one was indicated.

Table 38 shows the relationships between the collapsed environmental and outcome variables. As the table indicates, there were moderate positive correlations between variables in most cases which were significant at the .01 level. The largest relationship in this table was between Curriculum and Joint Campaign (r=.46). This relationship shows that those who rated the quality of the curriculum as high were more likely to rate their

competence level in Joint Campaign as high as well. With a correlation coefficient of .44, Teaching Methods and Joint Campaign were also highly correlated, relative to the other variables. The lowest relationship between two variables that was statistically significant at the .01 level was Research and Critical Thinking. Although statistically significant, the low correlation coefficient suggests that this relationship was relatively weak. Finally, according to the data presented in the table, one notes that the perceived quality of research appears to be least associated with the outcome variables. The most associated column with outcomes appears to be Curriculum.

Table 38:

Correlations Between Environmental and Outcome Variables

Variable	Teaching Method	Technology	Curriculum	Research	Faculty	Grading
Joint Campaign	.44*	.32*	.46*	.25*	.36*	.26*
Air/Space Power	.36*	.25*	.41*	.10	.30*	.25*
Command & Leadership	.32*	.25*	.39*	.25*	.35*	.24*
Critical Thinking	.39*	.23*	.41*	.13*	.31*	.22*

* Significant at .01 Level

Appendix D contains the tables in which correlations between all six environmental variables and the four outcome variables are summarized by item. The summaries reveal significant relationships between items. The highest relationship on table D-1, was between items 53 and 39. At r=.36, this correlation shows a moderate positive correlation between items 53, "colloquia style seminars," and 39, "understanding the roles, functions, capabilities and limitations of the U.S. military forces that affect joint and combined

operations." In the Air/Space Power variable all items reached significance, but in the Command and Leadership variable, many did not, especially with item 51, "lectures by guest lecturers." The lowest correlation coefficient in the Command and Leadership variable (not significant) was a -.01 between items 51 and item 8, "applying principles of oral and written communication in a variety of situations." This shows an extremely low inverse relationship in which the two variables tend to go in opposite directions. Overall, table D-1 shows a significant correlation between Teaching Methods and outcome variables except for Command and Leadership where items 50 and 51 (items dealing with lectures) show very little correlation overall. This infers that the perceived quality of lectures at ACSC were least associated with the Command and Leadership variable. It may be that those with perceived high competence on Command and Leadership did not prefer the lecture method because command and leadership skills require a high level of involvement with others, therefore, these individuals may be more accustomed to active rather than passive learning.

Table D-2 in the Appendix summarizes correlations between Technology and outcome variables by item. Overall, the size of the correlations between Technology items and outcome variable items is not very large. The highest Pearson "r" was .28 between items 56, " 'Toolbook' programs to supplement readings," and 10, "understanding and applying quality force tools and techniques." An important observation in table D-2 is the number of low correlations appearing in both the Command and Leadership and Critical Thinking cells. While some significant correlations appear, the number of low correlations indicate that, in general, Technology has a very low correlation with Command and

Leadership and Critical Thinking. Perhaps those who had a tendency to rate the quality of Technology high were in technology-oriented jobs that did not require command and leadership or critical thinking skills. This would account for the low correlations between Technology and these two outcome variables.

Higher correlations are found in table D-3. There were a number of significant correlations in all four outcome variables. The highest significant correlation at $r = .41$ occurred in the Air/Space Power variable between item 61 and items 46 and 48. Curriculum item 61, "systems approach to problem solving," was moderately correlated to both item 46, "understanding the role and impact of technology on air campaign planning," and item 49, "understanding and analyzing the impact of contextual and operational art elements on military campaigns." The fewest significant correlations were between items 59 and 60 and Command and Leadership. Item 59, "assigned books," and item 60, "curriculum flow," appear to be least associated with Command and Leadership. Again, perhaps those who scored their competence as high in Command and Leadership, did not like the assigned books or the curriculum flow because they preferred other types of more active learning. For example, those with a high degree of perceived Command and Leadership skills may have preferred more role playing activities. Overall, the number of significant correlations appearing in table D-3 seem to infer that there was a significant relationship between Curriculum and the four outcome variables. Although there were a number of items on which significance was not reached, for the most part, respondents who rated the quality of Curriculum as high tended to rate their competence level on outcome variables as high as well. This may occur because respondents were Air Force

officers who have been in the Air Force for about twelve years. ACSC was probably not their first experience with professional military education and they were used to the way Air Force PME generally operates--the curriculum flow, the systems approach, and the like.

Table D-4 summarizes results of the data analysis between Research and outcome variables by item. Although there were several significant correlations on the table, overall the correlations were extremely low, especially within the Air/Space Power and Critical Thinking variables. The highest relationship appeared in the Joint Campaign variable between item 69, "the extent to which students received adequate support with their research projects," and item 36, "understanding the structure of a joint organization." Item 17, "challenging assumptions," shows a low inverse relationship with all three Research variables. The data in table D-4 infer that Research has, with a few exceptions, little to no relationship with outcome variables. This corroborates the data in table 38 which showed that the perceived quality of research was, when compared to other environmental variables, least associated with the outcome variables.

Correlations between faculty and outcome variables are displayed in table D-5. There were many significant correlations especially between items 64, "military faculty members," and 65," civilian faculty members," and outcome variables. The highest Pearson "r" was .33, appearing three times in the military faculty members (item 64) column. An interesting observation in table D-4 was the low correlations between item 70, "the extent to which the faculty should consist of more Ph.D.s" and outcome variables. With the exception of items 9, 25, and 29, which achieved significance, there appears to be

no relationship between student perceptions of the number of Ph.D.s at ACSC and their perceived competence on outcome variables. These data seem to indicate that respondents perceived that increasing the number of Ph.D.s on the faculty would not necessarily improve the quality of the faculty.

The final table in Appendix D, table D-6, lists correlations between Grading and outcome variables. According to the data in table D-6, there were a few significant correlations, especially in the Joint Campaign and Air/Space Power variable. There are fewer significant correlations in the Command and Leadership and Critical Thinking variables. However, the highest Pearson "r" at .31 occurs in the Critical Thinking variable between item 72, "the extent to which students knew about and understood the reclama process," and item 20, "understanding and implementing change in a military environment." Apparently, respondents who rated their competence on "change in a military environment" high were also more inclined to rate the quality of the "reclama process"(ACSC's system of disputing grades) as high as well. Perhaps individuals who were more receptive to change were more accepting of the way in which grades could be disputed at ACSC. Others, as evidenced by table D-6, did not have the same perception. Although there were a number of other significant correlations appearing on the table, overall the relationship between Grading and outcome variables was low. The most highly correlated column with outcome variables was item 71, "the extent to which students received feedback on oral and written work," as is evidenced by the number of correlations reaching significance in that column, especially in the Joint Campaign variable. It is possible that many respondents who rated their competence high in Joint Campaign

have held joint assignments (those in conjunction with other services) in the past. Perhaps this distinction would make those individuals more inclined to rate the quality of feedback for their work as high. In other words, the nature of joint assignments may be the distinction that created the perception that feedback on oral and written work at ACSC was of high quality. Conversely, item 66, "grading procedures" shows the least relationship with all four outcome variables. These data suggest that students did not rate the grading procedures at ACSC as being of high quality regardless of their perceptions of their competence level on outcomes.

In conclusion, results of the data analysis to show the relationships between environmental and outcome variables were reported in table 38. These values reflected "collapsed" values on both environmental and outcome variables. Item-by-item relationships were reported in tables D-1 through D-6 at Appendix D. Table 38 revealed that, on the average, environmental variables were associated with outcomes in the following manner (from most to least): Curriculum, Teaching Methods, Faculty, Technology, Grading, and Research. The largest relationship was between Curriculum and the Joint Campaign outcome variable (r=.46), and the smallest statistically significant relationship was between Research and Critical Thinking (r= .13). Interestingly enough, the relationship between Research and Air/Space Power did not reach significance at the .01 level. This indicates that there was no relationship between Research and the Air/Space Power outcome variable.

Tables D-1 through D-6 at Appendix D corroborate the data in table 38 but gives more details about item-by-item relationships. Overall, these data show that, the environmental variables were least associated with the Command and Leadership and Critical Thinking outcome variables. Although the relationship between some items did reach significance, generally speaking, these two outcome variables show little to no relationship with environmental variables. One possible explanation why this occurred is that Air Force officers, as a group, do not perceive their competence in Command and Leadership or Critical Thinking as being high because of the types of jobs they have held up to this point in their careers.

Predictive Analysis

The specific predictive question posed in chapters one and three of this dissertation was: "Holding the input variables (demographics and student expectations) constant, was there a relationship between environmental variables (teaching methods and program activities) and student outcomes?" As stated earlier, multiple regression was the statistical procedure used to determine the effect of environmental variables on outcome variables while "controlling" for the effects of input variables. The researcher expected that demographics and student expectations (inputs) would correlate with outcome measures. As a result, any observed correlation between environmental variables (teaching methods and program activities) and students' perceptions of competence on outcomes may have occurred because of student input characteristics. To obtain a less biased estimate of the effects of teaching methods and program activities at ACSC on students' perceptions of

competence on outcome measures, it was necessary to hold the input variables constant. Therefore, the first block of variables in the regression consisted of demographics and student expectations. By entering the input variables in the regression first, the researcher was able to tell if the teaching methods and program activities at ACSC contributed anything to the prediction of student perceptions of competence on outcome variables beyond what could be predicted from student input characteristics (Astin, 1993, pg. 285). There are four outcome variables--Joint Campaign, Air/Space Power, Command and Leadership, and Critical Thinking. Results of the regression analyses on all four outcome variables were summarized and reported.

The researcher used the *forward selection* method in SPSS to enter variables. Independent variables were entered as two "blocks," input variables as block one and environmental variables as block two. The researcher established the criterion for inclusion in the regression equation at a confidence level of .05 ($F>3.85$). SPSS entered the variables from the first block one at a time. The first variable considered for entry was the one with the largest positive or negative correlation with the dependent variable. If the first variable met the criterion for inclusion, the procedure continued. Once the first variable was entered, the program then moved on to look at the partial correlations between the dependent variable and each of the independent variables not yet entered into the equation. The partial correlation was the correlation between an independent variable and the dependent variable that was adjusted for the variables already in the equation. The variable with the largest partial correlation was the next candidate for entry into the equation. This procedure was repeated until there were no other variables that met the

entry criterion (Norusis, 1993, pg. 347). When all of the predictive power of the input variables were exhausted, the program then moved to the variables in the second (environmental) block. The procedure continued with the second block of variables in the same manner as the first block. When all of the predictive power of both blocks of variables were exhausted, the program terminated (Astin, 1993, pg. 285).

Predictions on Joint Campaign Planning Process

Table 39 shows the results of the regression procedure on the outcome variable, Joint Campaign Planning Process. The first column shows the step number in the regression. The second column lists the variable entered at each step. The Multiple R column lists the multiple correlation coefficient at each step in the equation. The Multiple R is the simple correlation between the outcome variable and the estimate of that outcome derived from the regression equation at that step in the analysis (Astin, 1993, pg. 285). The next column shows the simple Pearson "r" between the entering variable and the outcome variable. R-squared is the square of the Multiple R, but it also represents "the proportion of the variation in the dependent variable 'explained' by the model" (Norusis, pg. 320). By looking at the change in R-squared, the researcher can determine to what extent variation was explained by variables above what was explained by the other variables already in the equation.

Table 39:

Predicting Student Perceptions of Competence on Joint Campaign Planning Process.

Step	Variable	Multiple R	Simple r	R-squared	R-squared Change
Input					
1	Age 2	.18	.17	.03	.03
2	Exp 8	.27	.18	.08	.05
Environment					
3	Curriculum	.48	.46	.23	.15
4	Teach Methods	.51	.44	.26	.03

This table shows that two input variables, Age 2, the 36-39 age group, and Expectation 8, "I would be academically challenged while a student at ACSC," entered the equation at steps one and two. This means that those who were in the age group, 36-39, and who expected to be academically challenged at ACSC, were more likely to perceive greater competence on the Joint Campaign outcome variable. After the student input characteristics were controlled, two environmental variables entered the regression equation in the second stage (steps 3 and 4). These data suggest that the curriculum and teaching methods at ACSC affected students' perceptions of competence on Joint Campaign after student inputs were controlled. Eight percent (8 %) of the variance was explained by the inputs, and Curriculum explained fifteen (15 %) of the variance in the equation above what was explained by the inputs. When Teaching Methods was added to the equation at step four, it only added three percent (3 %) more to the equation. This occurred because most of the variation was explained by Curriculum before Teaching Methods was added. This suggests that, after controlling for input variables, students who rated Curriculum of high quality were fifteen percent (15 %) more likely to score themselves as highly competent on Joint Campaign. Teaching Methods added a small

amount to the equation meaning that, after Curriculum, those who rated Teaching Methods of high quality, were three percent (3 %) more likely to score themselves as highly competent in Joint Campaign.

Four environmental variables (Faculty, Technology, Grading, and Research) did not even enter the equation. Table 40 shows what happened when these four variables were forced into the equation.

Table 40:

Predicting Student Perceptions of Competence on Joint Campaign Planning Process: Forcing in Environmental Variables Not In Equation.

Step	Variable	Multiple R	Simple r	R-squared	R-squared Change
5	Faculty	.53	.36	.28	.02
6	Technology	.53	.32	.28	.00
7	Grading	.53	.26	.28	.00
8	Research	.53	.25	.28	.00

This table indicates that Faculty added a small amount (2 %) to the equation but that Technology and Grading did not add anything to the prediction of students' perceptions of competence on the Joint Campaign Planning Process when variables were forced into the equation after inputs and Curriculum and Teaching Methods were already entered.

Although tables 39 and 40 show the results of the data analysis when all environmental variables are entered as a block, they do not show what would happen if each environmental variable entered the equation individually after inputs were controlled. Table 41 shows the predictive power of each environmental variable entered individually after input variables were entered into the equation. The R-squared change values in the

last column indicate the amount of variance each environmental variable added individually to the equation after inputs.

Table 41:

Predicting Student Perceptions of Competence on Joint Campaign Planning Process: Environmental Variables Entered Separately After Inputs.

Variable	Multiple R	R-squared	R-squared Change
Inputs after Step 2	.27	.08	.05
Curriculum	.48	.23	.15
Teach Methods	.45	.20	.12
Faculty	.41	.17	.09
Technology	.40	.16	.08
Grading	.38	.14	.06
Research	.36	.13	.05

These data show that the same two variables, Curriculum and Teaching Methods, accounted for the most variation after inputs even when they are entered in the equation individually. Notice that Curriculum added the same amount of variance (15 %) above inputs in both equations (tables 39 and 41). However, when Teaching Methods entered the equation individually after inputs, it added twelve percent (12 %) above what was accounted for by the input variables. This was much higher than the three percent (3 %) that Teaching Methods added to the equation when it had to share predictive power with Curriculum (table 39). Similarly, Faculty did not enter the equation on table 39 based on the established criterion, but it accounted for nine percent (9 %) of the variation above input variables when it did not have to share predictive power. This indicates that, in relation to the other environmental variables, it was still moderately important in predicting students' perceptions of competence. The other three environmental variables

(Technology, Grading, and Research) also accounted for a moderate amount of the variation. This indicates that even though these variables did not enter the equation when they had to share with the other variables, but when taken individually, they still show some predictive power after inputs were controlled. The reason for this is that independent variables tend to be correlated with each other, which is called "multicolinearity." As more variables were added to the equation, they shared increasing amounts of variance with each other, attributing most of the shared variance to the variable that entered the equation first.

Predictions on Air/Space Power Applications

Table 42 summarizes the results of the regression analysis for Air/Space Power Applications. It shows that three input variables entered the equation: The Medical /Legal career field, Age 2 (36-39 age group), and Expectation 8, "I would be academically challenged while a student at ACSC."

Table 42:

Predicting Student Perceptions of Competence on Air/Space Power Applications.

Step	Variable	Multiple R	Simple r	R-squared	R-squared Change
Input					
1	Med/Legal	.18	.18	.03	.03
2	Age 2	.25	.17	.06	.03
3	Exp 8	.29	.13	.08	.02
Environment					
4	Curriculum	.46	.41	.21	.13
5	Teach Methods	.48	.36	.23	.02

Table 42 reveals similar data as that listed in table 39, with Age 2 and Expectation 8 entering the equation. However, the Medical/Legal career field entered the equation at

step one, indicating that it had the most predictive power on students' perceptions of competence on the Air/Space Power Applications (3 %). Age 2 added three percent (3 %) above the Medical/Legal career field and Expectation 8 added two percent (2 %) even after Medical/Legal and Age 2 entered the equation. A total of eight percent (8 %) of the variance was attributed to input variables. This means that respondents who were in the Medical/Legal career field, 36-39 years old, and who expected to be academically challenged were more likely to score themselves highly competent on Air/Space Power Applications. The environmental variables that entered the equation after controlling for inputs were, once again, Curriculum and Teaching Methods. However, Curriculum explained less variation in the Air/Space Power outcome variable than it did in the Joint Campaign variable (.15 versus .13). This can be attributed to the inclusion of the Medical/Legal career field in table 42. Multicolinearity between the independent variables reduced the amount of variation explained by the environmental variables after inputs were added to the equation. Curriculum still accounted for thirteen percent (13 %) of the variation above that explained by input variables. Teaching Methods, when added to the equation, only accounted for two percent (2 %) of the variation. Even though Teaching Methods entered the equation, the amount of variation it explained was small, indicating that it had very little predictive power when it accompanied Curriculum. Again, this can be explained by the multicolinearity between environmental variables.

Table 43 shows what happened when environmental variables that did not enter the equation were forced into the regression after step 5. These data reveal that the reason these environmental variables did not enter the equation was they did not add anything to

the equation over what was accounted for by Curriculum and Teaching Methods. By the time the four remaining environmental variables entered the equation, there was very little shared variance remaining for them, due to their intercorrelations with the other variables.

Table 43:

Predicting Student Perceptions of Competence on Air/Space Power Applications: Forcing in Environmental
Variables Not In Equation.

Step	Variable	Multiple R	Simple r	R-squared	R-squared Change
6	Faculty	.49	.30	.24	.01
7	Technology	.49	.25	.24	.00
8	Grading	.49	.25	.24	.00
9	Research	.50	.10	.25	.01

Notice that Research, which was forced into the equation at step 9, actually accounted for one percent (1 %) of the variation when all other variables were already in the equation. This was a very small amount but it stood out because of the low simple correlation Research had with the outcome variable (r=.10 which was not significant) and because the variables entering the equation at steps 7 and 8 did not account for any change in variation. This can be explained by looking at the partial regression coefficients of the variables that entered the equation. The coefficient for a particular variable is adjusted for other independent variables in the equation and any statement about an independent variable is contingent upon the other variables in the equation (Norusis, pg. 341). The partial regression coefficients of the variables entered in the equation from tables 42 and 43 are as follows:

Med/Legal	2.045216
Age 2	.788672
Exp 8	.049422
Curriculum	.202972

Teach Methods	.152686
Faculty	.072617
Technology	.043424
Grading	.067152
Research	-.143189

These figures indicate that after statistical adjustment for the other independent variables in the equation, Research negatively affected students' perceptions of competence on Air/Space Power Applications to a greater degree than Faculty, Technology or Grading affected it positively. In other words, respondents who rated the quality of Research as low were those who were most likely to score themselves highly competent in Air/Space Power Applications.

When the environmental variables were entered into the equation individually after the input variables were controlled and their R-squared values compared to that of inputs after step 3, the amount of variance explained by individual variables are shown. These data are summarized in table 44.

Table 44:

Predicting Student Perceptions of Competence on Air/Space Power Applications: Environmental Variables Entered Separately After Inputs.

Variable	Multiple R	R-squared	R-squared Change
Inputs after Step 3	.29	.08	.08
Curriculum	.46	.21	.13
Teach Methods	.42	.18	.10
Faculty	.37	.14	.06
Technology	.38	.14	.06
Grading	.38	.14	.06
Research	.30	.09	.01

These data corroborate data from tables 42 and 43, showing Curriculum and Teaching Methods as accounting for the most variance. Three variables, Faculty, Technology, and Grading, appeared to account for the same amount of variance when entered individually after inputs. Research, as suspected, accounted for the least amount of variance showing that it accounted for only one percent (1 %) above what was accounted for by the inputs.

Predictions on Command and Leadership

Table 45 summarizes the regression data analysis on the students' perceptions of competence on the Command and Leadership variable. These data reveal that only one input variable (Expectation 8) entered the equation. After the input variables were controlled, Curriculum and Faculty entered the equation at steps 2 and 3.

Table 45:

Predicting Student Perceptions of Competence on Command and Leadership.

Step	Variable	Multiple R	Simple r	R-squared	R-squared Change
Input					
1	Exp 8	.19	.21	.04	.03
Environment					
2	Curriculum	.38	.39	.14	.10
3	Faculty	.42	.35	.18	.04

According to the data in this table, once input variables were controlled, Curriculum accounted for ten percent (10 %) of the explained variance above what was accounted for by the inputs. With Curriculum in the equation, Faculty came in at step 3, accounting for only four percent (4 %) of the variance above that of Curriculum. This suggests that Curriculum, as in the other regression analyses, had the greatest predictive power on students' perceptions of competence on Command and Leadership after controlling for

input variables. Again, because of multicolinearity, most of the variance was attributed to Curriculum, leaving little left over for the other variables to share.

In order to see how much variance was explained by the remaining environmental variables which did not enter the equation, these four variables (Teaching Methods, Technology, Research, and Grading) were forced into the equation at steps 4-7 in the equation. Table 46 summarizes the data from this procedure.

Table 46:

Predicting Student Perceptions of Competence on Command and Leadership: Forcing in Environmental Variables Not In Equation.

Step	Variable	Multiple R	Simple r	R-squared	R-squared Change
4	Teach Methods	.43	.32	.18	.00
5	Technology	.43	.25	.18	.00
6	Research	.43	.25	.18	.00
7	Grading	.44	.24	.19	.01

Teaching Methods, Technology, and Research did not account for any added variance above that already accounted for by the variables already in the equation. The Grading variable did not enter the equation either, but still accounted for one percent (1 %) above that accounted for after the other variables were already entered into the equation. This was a similar situation that occurred with the Air/Space Power variable and Research. Grading has a larger partial regression coefficient than the other environmental variables, except Curriculum and Faculty. This means that after statistical adjustment for the other independent variables in the equation, Grading affected students' perceptions of competence on Command and Leadership to a greater degree than Teaching Methods, Technology, and Research affected it. Therefore, Grading can still account for a small

portion of the variance even after the other variables were already in the equation. Notice that the Pearson "r"s for the variables in table 46 were extremely close, suggesting that these variables might have had similar predictive powers.

Table 47 compares the amount of variance explained by each environmental variable when they were entered individually after inputs. The R-squared values in the second column are very close which shows that, when these variables were entered individually after inputs were controlled, the predictive power of each was similar. These figures corroborate the data from tables 45 and 46, revealing that out of the six environmental variables, Curriculum and Faculty had the most predictive power once inputs were controlled. However, some of the other variables, when allowed to enter the equation first, accounted for notable amounts of variance. Grading, for example, accounted for seven percent (7 %) of the variance when allowed to enter the equation first, which was only one percent (1 %) lower than Faculty.

Table 47:

Predicting Student Perceptions of Competence on Command and Leadership: Environmental Variables Entered Separately After Inputs.

Variable	Multiple R	R-squared	R-squared Change
Inputs after Step 1	.19	.04	.04
Curriculum	.38	.14	.10
Teach Methods	.32	.10	.06
Faculty	.35	.12	.08
Technology	.29	.08	.04
Grading	.33	.11	.07
Research	.30	.09	.05

Predictions on Critical Thinking

The results of the regression analysis of the Critical Thinking variable are summarized in table 48. This table displays four input variables that entered the equation from the first block. When the second block of variables were entered, two environmental variables emerged from the analysis: Curriculum and Teaching Methods. Two of the input variables that entered the equation in the first block, Age and Expectation 8, were the same two variables that appeared in earlier analyses. The other two variables, the Mission Support career field (information management, personnel, finance, etc.) and Expectation 3, "I would meet other people and learn about other career fields," require some elaboration.

Table 48:

Predicting Student Perceptions of Competence on Critical Thinking.

Step	Variable	Multiple R	Simple r	R-squared	R-squared Change
Input					
1	Exp 3	.19	.24	.04	.04
2	Support	.24	-.09	.06	.02
3	Age 2	.27	.12	.07	.01
4	Exp 8	.30	.17	.09	.02
Environment					
5	Curriculum	.46	.41	.21	.12
6	Teach Methods	.48	.39	.23	.02

Because the forward selection method of SPSS enters variables in the equation largely based on partial regression coefficients, the order that the input variables entered the equation in block one corresponded to those coefficients. The partial regression coefficients for the input variables in table 48 were as follows:

Expectation 3	3.111840
Support	-3.052972
Age 2	2.219535
Expectation 8	.314900

Notice that even after statistical adjustment for the other variables in the equation, the Support career field negatively affected students' perceptions of competence on Critical Thinking. Even though the partial regression coefficient of Support was negative, it was still larger than either Age 2 or Expectation 8, which accounted for why Support entered the equation at step 2. This means that respondents who expected ACSC to provide them with a chance to network, who were *not* in the Support career field, who were 36-39 years old, and who expected to be academically challenged at ACSC tended to score their competence on Critical Thinking as high.

After the input variables were accounted for, Curriculum and Teaching Methods entered the equation at steps 5 and 6. Input variables together explained nine percent (9 %) of the variance in the equation. Curriculum explained twelve percent (12 %) of the variance above that explained by all the input variables. After Curriculum entered the equation, Teaching Methods only added two percent (2 %) above variance explained by inputs and Curriculum. These figures indicate that Curriculum had the most predictive power from the environmental variable block after inputs entered the equation, while Teaching Methods added very little. Multicolinearity allowed Curriculum to account for the majority of the variance, leaving little left for Teaching Methods.

Table 49 shows what would happen if the environmental variables not entered in the equation were forced into the regression after inputs. As this table indicates, Faculty

added only one percent (1 %) above Teaching Methods, while Technology and Grading added nothing to the equation. Research, however, added one percent (1 %) above Grading when forced in at step 10. Again, this resulted because Research had the largest partial regression coefficient (-.524517) after Faculty. Notice that Research had a negative effect on students' perceptions of competence on Critical Thinking as it did in the Air/Space Power variable, evidenced by the negative coefficient. In fact, the size of the regression coefficient indicates a much stronger negative effect on Critical Thinking than was found in Air/Space Power, where the regression coefficient was only -.143189.

Table 49:

Predicting Student Perceptions of Competence on Critical Thinking: Forcing in Environmental Variables Not In Equation.

Step	Variable	Multiple R	Simple r	R-squared	R-squared Change
7	Faculty	.49	.31	.24	.01
8	Technology	.49	.23	.24	.00
9	Grading	.49	.22	.24	.00
10	Research	.50	.13	.25	.01

In order to see how much variance was explained by each individual environmental variable after inputs were entered, each variable was entered individually into a regression equation with the input variables controlled. Table 50 shows the results of this regression analysis. The input variables after step 4 accounted for nine percent (9 %) of the variance. The R-squared change values for each environmental variable reflect the difference between each environmental variable and the inputs after step 4. This provides a concise comparison of the amount of added variance provided by each environmental variable after inputs.

Table 50:

Predicting Student Perceptions of Competence on Critical Thinking: Environmental Variables Entered Separately After Inputs.

Variable	Multiple R	R-squared	R-squared Change
Inputs after Step 4	.30	.09	.09
Curriculum	.46	.21	.12
Teach Methods	.43	.18	.09
Faculty	.39	.15	.06
Technology	.36	.13	.04
Grading	.37	.14	.05
Research	.32	.10	.01

Table 50 confirms the results of the regression analysis from table 48, with the highest R-squared values in the Curriculum and Teaching Methods variables. Faculty, Technology, and Grading added similar amounts to variance explained after inputs when they were entered individually. Finally, Research shows a small R-squared change value of one percent (1 %) indicating that, although Research negatively affected the outcome variable, it still accounted for a small amount of variance when forced to enter the equation at step 5, after inputs were controlled.

In conclusion, a comparison of the regression analyses of the four outcome variables reveals patterns of prediction. For all four outcome variables, the input variable that always entered the equation in the first block was Expectation 8, "I would be academically challenged while a student at ACSC." This seems to suggest that respondents who had greater expectations of an academically challenging program were more likely to perceive themselves as having higher competence on all four outcome variables. Another variable that entered the equation in the first block, except in Command and Leadership, was Age

2, the 36-39 age group. According to these data, respondents who were 36-39 years old were more likely than the other two age groups to score themselves highly competent on outcomes except for Command and Leadership. Two career fields entered the regression equation in the first block on two variables: Medical/Legal in Air/Space Power Applications and Support (a negative effect) in Critical Thinking. These data reveal that for Air/Space Power Applications, those students who were Medical/Legal officers were more likely to perceive themselves as highly competent, while students who were *not* Mission Support (information management, personnel, finance) were more likely to score themselves highly competent on the Critical Thinking variable.

After controlling for input variables, the variables that entered the equation on the second block also show similar patterns for each variable. For the most part, Curriculum and Teaching Methods entered the equation with Curriculum accounting for most of the variance before Teaching Methods entered. The only exception to this pattern was with the Command and Leadership variable where Curriculum and Faculty entered the equation. However, Curriculum still accounted for the majority of the variance, leaving very little left to Faculty. The Curriculum variable consisted of five (5) items from the questionnaire (59-62, 67). Items 59-62 dealt with assigned books, curriculum flow, the sytems approach to problem solving, and the balance between academics and social functions. Item 67 asked students the extent to which they believed ACSC to be a graduate-level program. Since the Curriculum variable apparently was most predictive of outcome variables, it was necessary to run regressions between individual Curriculum items and the four outcome variables. The results of these analyses revealed that item 61,

"The systems approach to problem solving," accounted for the most variance in all four outcome variables. In other words, out of the Curriculum items, those respondents who rated the quality of the systems approach to problem solving as high were most likely to score themselves as highly competent in outcome variables. After item 61, item 59, "assigned books," entered the equation except in Command and Leadership where item 61 accounted for all of the variance (14 %). The assigned books item added a little variance above the systems approach item, with the largest percentage (6 %) of added variance in the Critical Thinking variable. The other Curriculum items did not enter the equation, suggesting they did not add anything to the overall variance. From these data, one can infer that, out of all of the items on the questionnaire, item 61 on the systems approach to problem solving was most predictive of students' perceptions of competence on outcome items.

The research question that covered the predictive analysis was: "Holding the input variables (demographics and student expectations) constant, was there a relationship between environmental variables (teaching methods and program activities) and outcomes?" The predictive analysis revealed the extent to which environmental variables affected outcomes after input variables were controlled. By controlling for the potential bias of input variables, one can be more certain that the effects of environmental variables on outcomes were true effects. However, conclusions of the predictive analyses must be tempered by the fact that there may be some important student input characteristics that were not controlled in the analysis. Even though pretest data are known to have considerable predictive power on outcomes, this analysis did not include any pretest

variables in the inputs. As stated earlier, this was a limitation of this study. What can be concluded from the predictive analysis is that, after controlling for the effects of inputs, which accounted from 3 % (Command and Leadership) to 9 % (Critical Thinking) of the variance, the Curriculum variable added from 10 % (Command and Leadership) to 15 % (Joint Campaign) above inputs. This suggests that after controlling for inputs, respondents who rated Curriculum (particularly item 61) as high were more likely to perceive their competence on outcome variables as high. The predictive power of the Curriculum variable depended on which outcome was the dependent variable. Apparently, Curriculum accounted for the most variance after inputs in the Joint Campaign variable, and the least in Command and Leadership. This is probably due to the effects of multicolinearity where variables must share variance with the other variables in the equation. Therefore, the amount of variance accounted for by Curriculum depends on the other variables that were already in the equation. Finally, the results of the analyses revealed that other environmental variables, which did not enter the equation when they must share variance with Curriculum, would account for some of the variance after inputs if they were allowed to enter the equation at the first step. These data suggest that, although most environmental variables did not enter the equation, they should not be discounted and their predictive power should be examined individually.

Qualitative Analysis

Questions 89 and 90 on the questionnaire were open-ended qualitative questions. They were included so that graduates would have an opportunity to address issues that

were either not on the questionnaire or items that respondents felt needed elaboration. This brief narrative summarizes the qualitative information provided by respondents in questions 89 and 90. The researcher compiled the qualitative data into a single document and then conducted a content analysis to extract patterns.

Question 89 asked students, "In one or two sentences, describe how you would improve Air Command and Staff College." Out of the 228 returned questionnaires, 198 respondents (87 %) wrote comments on question 89. Five categories of comments emerged as a result of the content analysis (curriculum, grading and distinguished graduates program, faculty, research, and teaching methods).

Patterns of comments on the curriculum centered around three main topics: teaching more command and leadership skills, emphasizing joint campaign planning more, and reducing the reading workload to give students a chance for more analysis. Respondents who wrote in the open-ended portion of the questionnaire, believed that the curriculum was too focused on air campaign planning and not enough on command and leadership issues. One respondent summed it up like this, "As a commander it would have been appropriate if Air Command and Staff College would have spent some curriculum time teaching something besides air campaign planning which I suspect less than 10% of grads will ever do!" In addition to more command and leadership, respondents also believed that the school needed to emphasis joint campaign planning more because many of them would be working in joint assignments after graduation from ACSC. The third curricular pattern revolved around the reading workload. According to many respondents, the

amount of reading was unrealistic. Graduates believed that they would benefit more from less but more focused reading, giving them more time to discuss and analyze the material.

Comments on the method of grading at ACSC were tied to the distinguished graduate (DG) program in most cases. Of the 50 respondents who made comments about the grading process, 30 of them (60 %) recommended that the DG program be discontinued. Overall comments about the DG program revolved around standardization of grades. Respondents believed that grading was subjective and too dependent on the course instructor. Because DG was determined largely by grades, many graduates perceived the subjective grading method to be unfair. Respondents also believed that group grades on research projects were an unfair practice that kept many individuals (with high individual grades) from becoming distinguished graduates. While these comments about unfair grading practices and the DG program appear to be from those who did not achieve DG status, this was not always the case. Some respondents self-disclosed that they were distinguished graduates from the College and they still felt that the grading system was "arbitrary."

Thirty-one (31) respondents made comments about the faculty. Of those thirty-one individuals, twenty-six (26) wrote that the faculty was unqualified to be teaching at the College. Comments like, "hire instructors with more experience," "bring the very best officers to serve as faculty," and "hire instructors that have expertise in the field that they are teaching," were typical of the criticisms about faculty. A few wrote that the school should hire more Ph.D.s, but most were concerned that ACSC was not seeking out and hiring the most qualified faculty members, regardless of their level of education.

The research component of the College was another topic of criticism. Respondents (25) who commented about research wrote that ACSC research methods were inadequate to be deemed research. The frustration seemed to stem from the perceived incongruence between the time allotted for research and the expectations. Respondents believed that they did not have enough time to pursue their research or interface with faculty about their projects. In addition, many commented that they did not come to ACSC with the skills necessary to do research but training was not available to them. Yet, the College placed a great deal of emphasis on research, by making collaborative projects mandatory and by including research grades in criteria for DG. The disappointment felt by many respondents was summed up by one graduate who said, "They want a high quality product but really keep you humping with large reading assignments. This leaves too little time for research."

The final topic addressed in the comments to question 89 was teaching methods. Only a small number of respondents (8) wrote about teaching methods but they made some valid observations. A few respondents wrote that there should be less lectures with more seminar work at the College. Some of those who made comments about teaching methods were concerned that senior-level Air Force leadership did not come to ACSC to speak. Still others wrote that guest lecturers should present both sides of their topics in order to provide a balance.

While question 89 was designed to solicit comments about how ACSC could be improved, the open-ended question, #90, was intended to provide respondents with an opportunity to elaborate on scaled items from the rest of the questionnaire. Question 90

states, "Please use this space to comment on any of the items on this questionnaire. Be sure to specify to which item you are referring." The content analysis placed the comments on this question into the three I-E-O categories. Questions 82-88 on the questionnaire corresponded to input variables of demographics and student expectations. In the open-ended portion of the questionnaire, a few respondents commented that they did not want to give any demographic information because, "this goes beyond statistics and can narrow the data to one individual." Most respondents did answer the demographic section but a couple refused to give race or gender. Those who chose to comment about their decision not to supply this information wrote that race and gender should not matter in a survey. In addition to commenting on demographic data, some respondents used question 90 to elaborate about the student expectation portion of the questionnaire (question 88). Those writing about this area (4 individuals) gave positive and negative responses. Some wrote that ACSC was not what they expected, but they were pleasantly surprised that it was academically challenging. Conversely, others wrote that, although they did not expect to have a lot of free time at ACSC, they did not expect to have less time than they had in their previous jobs. They attributed this to the large number of assigned reading materials.

The comments from question 90 that corresponded to the environmental variables (questions 50-81 on the questionnaire) are the most interesting. Although respondents elaborated on a number of environmental items, four items stand out. The largest number of individuals (12) chose to use question 90 to elaborate on item 73, "To what extent should grades be used for determining distinguished graduates?" The comments on this

item mirror those already described from question 89. Graduates who wrote about this item felt that grades were much too subjective to be of any value in determining distinguished graduates. Some respondents recommended that the program be eliminated. Another item upon which respondents frequently commented was item 74, "To what extent have you found the ACSC curriculum CD-ROM to be useful?" Elaborations of this item centered around whether or not the respondent had CD-ROM access. Most said that they would use the CD-ROM if they had access either at home or work. Two other items were frequently targeted in question 90: item 75, "What did you think about the amount of assigned reading?" and item 76, "What did you think about the length of the courses?" Again, written comments about these topics mirrored those in question 89. Respondents felt that there was too much reading (item 75), and that some courses were too long, while others were too short (item 76).

Respondents commenting about outcome variables (questions 5-49) were mostly concerned about the survey's methodology. Twenty-seven (27) individuals wrote that they believed that the survey was biased because it did not ask students for their perceptions of their competence *prior* to attending ACSC. Comments such as, "competence was not necessarily gained at ACSC," and " many questions I can rate as 5, but not because of ACSC," were typical of the remarks made about items 5-49 on the questionnaire. While these observations are valid, the survey's methodology and limitations could not be fully explained within the scope of the questionnaire. Although there were many people who seemed to be concerned about the survey's validity, these

individuals took the time to answer all the questions and to elaborate freely in the open-ended portion of the questionnaire.

In conclusion, open-ended comments on the questionnaire supplemented the quantitative analysis by addressing many of the same issues. The relational analysis revealed that Command and Leadership, an outcome variable was, more often than not, the least associated with input (demographic and student expectations) variables. Also, when comparing correlations between environmental and outcome variables, Command and Leadership was one of the least associated with the environmental variables. Similarly, a large number of respondents wrote that not enough Command and Leadership was taught at ACSC. This was one of the most criticized elements that emerged from the content analysis on the qualitative data. Other patterns from the qualitative analysis also mirror those from the relational analysis. For example, Research (an environmental variable) was a major topic in students' responses on the qualitative portion of the questionnaire. Correlations between Research and the outcome variables revealed that Research had the least association with outcomes. There are many more examples of how the qualitative data elaborates on the descriptive and relational analyses. Therefore, the qualitative data add greatly to the existing quantitative information which has already been discussed. It provides another element of understanding about ACSC and how the entire program can be improved. Portions of this qualitative information will be used along with the quantitative data in the final conclusions and recommendations in chapter five.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

This chapter covers conclusions and recommendations suggested by the results and findings outlined in chapter four. In order to present conclusions and recommendations, it is necessary to provide a brief summary of the findings. After the summary, a discussion will follow that will tie the conclusions suggested by the findings back to the problem of the study. Once conclusions are outlined, the discussion will turn to the recommendations and implications for Air Command and Staff College. Implications for future research and policy will be outlined. Finally, limitations of the study will be addressed.

Summary of the Major Findings

This study was interested in determining the overall effectiveness of Air Command and Staff College based on the perceptions of recent Air Force graduates of the College (n=395). Effectiveness was defined as the extent to which students rated their competencies on outcome variables and how students' perceptions of the quality of teaching methods and program activities affected their perceived competency on outcomes. Based on the data from a 90-item questionnaire titled, "Student Perceptions of Program Effectiveness Questionnaire," the researcher analyzed student perceptions of three types of variables--inputs, environment, and outcomes. Input variables consisted of demographic factors and student expectations. Environmental variables were the teaching methods and program activities to which students were exposed while at ACSC.

Outcomes were defined as the course objectives derived by distilling information from course syllabi. Various statistical methods were used to analyze the data, starting with descriptive information in the form of means, standard deviations, and percentages. Next, the relationships between input variables and outcomes were reported using the cross-tabulation method. Cross-tabulations were used to analyze the percentages of respondents who scored themselves highly competent (an average of 4 and 5) on outcome variables by all of the demographic factors (age, gender, race, career field, Master Degree concentration, and commission source) and the nine student expectations. The relationships between environmental variables and outcomes were analyzed with Pearson "r"s. Significant relationships at the .01 level of significance were reported. Finally, multiple regression analysis was used to determine the predictive power of environmental variables, after controlling for the effects of potentially biasing input variables. The results of the data analysis on each outcome variable were reported. As can be seen from this brief synopsis of statistical methods used, this study was designed to provide breadth rather than depth by analyzing the data with different and increasingly more sophisticated methods.

Descriptive Findings. The first question posed by this dissertation focused on describing the demographic factors and student expectations of respondents. Descriptive demographic data revealed that graduates from the Academic Year (AY) 1994-1995 class at ACSC tended to be white males in their middle thirties (36-39). Respondents were more likely to be in a non-operational career field, most often in a Mission Support job (information management, personnel, finance, etc.) with an earned Master Degree, more

often than not, in a Social Sciences field. Officers from this class tended to have been commissioned through the Reserve Officer Training Corp (ROTC), with Air Force Academy graduates making up the smallest percentage (19.9%) of ACSC graduates from this class. An analysis of student expectations revealed that officers generally expected ACSC to be academically challenging and to provide them with a chance to "network" with their fellow officers. Most officers also expected ACSC to be important for their career progression.

The second research question asked how students rated the teaching methods and program activities (environmental variables) at ACSC. The following table summarizes the findings by showing overall means of each environmental variable. Means shown represent collapsed values derived by averaging the questionnaire items indicated. The scale consisted of five levels: (1) "unsatisfactory," (2) "marginal," (3) "satisfactory," (4) "excellent," (5) "outstanding." For a more detailed examination of the data, please refer to the descriptive analysis section of chapter four.

Table 51:

Overall Means Compared on Environmental Variables

Variable	Overall Means
Teaching Methods (items 50-53)	3.32
Technology (items 54-58; 74)	3.05
Curriculum (items 59-62; 67)	3.47
Research (items 63, 68, 69)	2.55
Faculty (items 64, 65, 70)	3.33
Grading (items 66, 71-73)	2.91

This table shows that students perceived the overall quality of Curriculum items to be the highest, relative to the other items, followed by Teaching Methods and Faculty. Research and Grading items were perceived as being the lowest rated items overall. To elaborate on these data, respondents generally rated guest lecturers as being of higher quality than instructors. They did not like the computerized readings, the amount of reading assigned, group research, or grading procedures. Students wanted to see more Command and Leadership content incorporated into the curriculum and more time, training and support for their research projects. Civilian faculty members were rated as being of higher quality than military faculty members, but most students said that the balance between civilian and military faculty was "about right." In their written comments, students severely criticized the way in which grades were used to determine distinguished graduates, which may have led them to say they believed that pass/fail grades were more appropriate at ACSC than letter grades.

The third question posed by this study, and the last descriptive question, asked how students rated their competency on outcome variables at the point in time when they completed ACSC. Again, the means represent averaged means on the items indicated. The scale consisted of five levels: (1) "None," (2) "Very little," (3) "Some," (4) "Considerable," (5) "Great." According to the descriptive data on outcome variables presented in table 52, students rated their competency close to "considerable," on Air/Space Power and Critical Thinking. The lowest perceived competence was in the Command and Leadership variable, which fell almost halfway between "some competence" and "considerable competence." Students perceived themselves as having a

slightly higher competence in Joint Campaign than in Command and Leadership. Again, for specific information on individual items, please refer to tables 25-28 in the descriptive section of chapter four.

Table 52:

Overall Means Compared on Outcome Variables

Variable	Overall Means
Joint Campaign (items 35-45)	3.78
Air/Space Power (items 46-49)	4.04
Command & Lead (items 5-16)	3.69
Critical Thinking (items 17-34)	3.90

Relational Findings. The first relational question (question four) was concerned with the relationship between input variables (demographics and student expectations) and outcomes. The data were analyzed using cross tabulations and reported in percentages. The analysis revealed that across all demographic categories and student expectations, the largest percentage of respondents scoring themselves as highly competent on outcome variables was in the Air/Space Power variable. Conversely, the smallest percentage was in the Command and Leadership variable. In all outcome variables, except in Critical Thinking, women tended to perceive themselves as more competent on all of the outcome variables than did males. African-American officers tended to score themselves higher on Joint Campaign and Air/Space Power than did other race categories, but Hispanic and Native-American officers scored themselves more competent in Command and Leadership and Critical Thinking than did other race categories. Operations officers (pilots,

navigators, missileers, etc.), in all categories except Air/Space Power, scored themselves less competent than those in other career fields. Those in the Medical/Legal career field, however, tended to perceive themselves as more competent on all four outcome variables than did those in other career fields. Similarly, the data analysis on the percentage of respondents scoring high on outcome variables by Master Degree Concentration revealed that officers with Medical/Legal degrees tended to perceive themselves as more competent on all four outcomes than other degree categories. Also, obtaining a Ph.D. did not appear to increase students' perceptions of competence on outcomes. Comparing percentages of respondents scoring high on outcome variables by Commission Source and Student Expectations revealed that students' perception of their competence on outcomes did not vary considerably across commission sources or expectations. These data seem to indicate that respondents' perceived level of competencies on outcome variables were not very affected by their source of commission or their expectations.

Question five on this dissertation was concerned with the relationship between environmental variables (teaching methods and program activities) and student outcomes. The data were analyzed using Pearson "r"s. The results of the data analysis on the relationships between environmental and outcome variables revealed that environmental variables were associated with outcomes (significant at the .01 level), from most to least, in the following manner: Curriculum, Teaching Methods, Faculty, Technology, Grading, and Research. The largest correlation was between Curriculum and the Joint Campaign variable (r=.46), and the smallest between Research and Critical Thinking (r=.13). There

was no relationship between Research and the Air/Space Power variable (r=.10 which was not significant at the .01 level).

Predictive Findings. Question six posed in chapters one and three frames the predictive question which asks what were the effects of environmental variables on outcomes after controlling for the effects of input variables (demographics and student expectations). Through multiple regression analysis and the Statistical Package for the Social Sciences (SPSS), the researcher entered variables in two blocks, first analyzing the overall predictability of input variables. Once input variables were accounted for, the second block of variables consisting of environmental variables was entered. This method allowed the researcher to determine the true effects of environmental variables on outcomes by first controlling for the potentially biasing effects of input variables. The R-squared change values in table 53 indicate to what extent variation in outcomes was explained by the variables and in what order they entered the equation. For example, for the Joint Campaign variable, Age 2 entered the equation first, accounting for three percent (3 %) of the variation, followed by Expectation 8, which added five percent (5 %) of the explained variance above what could be explained by Age 2. Once these input variables were in the equation, Curriculum and Teaching Methods entered. For the Joint Campaign variable, Curriculum accounted for fifteen percent (15%) of the variance over what could be attributed to input variables. Teaching Methods, in this instance, only added three percent (3%) over Curriculum. In other words, Curriculum accounted for most of the explained variance above inputs, leaving Teaching Methods with only a small portion of the variance.

Table 53:

Summary of Amounts of Variation Explained by Inputs and Environmental Variables.

Outcome Variable	R-squared Change Inputs	R-squared Change Environment
Joint Campaign (items 35-45)	Age 2 = .03 Exp 8 = .05	Curriculum = .15 Teaching Methods =.03
Air/Space Power (items 46-49)	Med/Legal = .03 Age 2 = .03 Exp 8 =.02	Curriculum = .13 Teaching Methods=.02
Command & Lead (items 5-16)	Exp 8 = .03	Curriculum = .10 Faculty = .04
Critical Thinking (items 17-34)	Exp 3 = .04 Support = .02 Age 2 = .01 Exp 8 = .02	Curriculum = .12 Teaching Methods=.02

Table 53 shows that of all of the input variables, Expectation 8, "I would be academically challenged while a student at ACSC," had some predictive power for all four outcome variables, ranging from two percent (2%) in Air/Space Power and Critical Thinking to five percent (5%) in Joint Campaign. Notice that Expectation 8, although occurring in all four variables, entered the equation only after other input variables, except in Command and Leadership where it was the only input variable to have any predictive power. Age 2, the 36-39 age group, also occurred in all outcomes except Command and Leadership. Age 2 added from one percent (1 %) of the variance (Critical Thinking) to three percent (3%) in Joint Campaign and Air/Space Power. In other words, students who expected to be academically challenged and who were in the 36-39 age group were more likely to score themselves as highly competent in most outcomes, except Command and Leadership. Two career fields emerged from the data analysis as having predictive power but only for two outcome variables. Officers who were in the Medical/Legal career

field were more likely to score themselves highly competent on Air/Space Power Applications, while those graduates who were *not* in the Support career field were more likely to rate themselves high on competence in Critical Thinking (an inverse relationship).

After controlling for input variables, the regression equations showed that Curriculum accounted for the most variance in all four outcome variables, ranging from ten percent (10 %) in Command and Leadership to fifteen percent (15 %) in Joint Campaign. Following Curriculum, Teaching Methods added a small amount in every equation from two percent (2 %) in Air/Space Power and Critical Thinking to three percent (3 %) in Joint Campaign. In the Command and Leadership variable, Faculty replaced Teaching Methods where it accounted for four percent (4 %) of the variance over that which could be explained by Curriculum. These data indicate that after controlling for input variables, respondents who rated the quality of Curriculum as high tended to score themselves as highly competent in the four outcome variables. In other words, of the six environmental variables examined in this study, Curriculum emerged as explaining the most variance in all four outcome variables after the potentially biasing effect of input variables were controlled.

This summary highlighted the major findings of the data analyses. It was not intended to repeat all of the results from chapter four, but was meant to direct the reader's attention back to the research questions and the overarching themes that emerged from the data. The sections that follow will illuminate some possible explanations for these findings and suggest recommendations and implications for policy changes at ACSC.

Conclusions

The mission of Air Command and Staff College is "to educate mid-career officers to develop, advance, and apply air and space power in peace and war." While this mission statement outlines the major focus of the College, this study was also concerned with outcomes that were not explicitly stated. The four outcome variables not only included Air/Space Power Applications, but also looked at the Joint Campaign Planning Process and developmental goals such as Critical Thinking and Command and Leadership. The researcher determined through careful analyses of course syllabi and collaboration with key leaders at ACSC that these four outcomes were central to ACSC's program. By looking at the data presented in this study, one can readily see that, although students scored their competency on Air/Space Power as the highest among the outcomes, they perceived themselves as being highly competent in all four outcomes. This is not surprising given the fact that ACSC students tended to be mature, educated, and motivated individuals who have been highly successful in their respective career fields. Therefore, one explanation for the high level of perceived competence may be because those chosen to attend the College were high achievers in the first place. Another possible explanation is that ACSC was having an effect on those who graduate from the program. This study was designed to minimize the effect of the things students brought with them to the College by controlling for input variables (demographics and student expectations) so that any conclusions made about the program's effect on outcomes could be claimed as true effects. The conclusions presented in this section will highlight the major findings of

the study and offer elaborations about how ACSC affected students as a result of their participation in this program.

The Effect of Inputs on Outcomes. The demographic characteristics of the respondents to this study were already revealed, but what was the profile of students who perceived themselves as highly competent across most of the four outcome variables? Based on correlational data between demographics and outcome variables, students who perceived high competence on outcomes tended to be between the ages of 36-39, be an African-American female in the Medical/Legal career field (having earned a Medical/Legal degree). This individual tended to have an education level above the Master level (Master Plus) and be a ROTC graduate. This profile was presented to show the dichotomy between the respondents and those students who perceived themselves as being highly competent on outcome variables. These data seem to suggest that if students like this one could be found in the population, they would do well at ACSC. Of course, a student such as this one does not exist in the study group or in the Air Force. Yet, one can infer from this comparison that the College may be meeting the needs of its minority students, especially black females. This conclusion must be tempered by the fact that this group represents a small portion of respondents and that individuals who choose the Air Force as a career may not be typical of those found in the population as a whole. The data also seem to suggest that those in the Medical/Legal career field would do well at ACSC. Again, these individuals represent only a small portion (n=7) of respondents. In addition, those in the Medical and Legal professions have specialized training which might give them an edge over others when attending a program such as ACSC. Another plausible

explanation may be that ACSC is serving well the Medical and Legal officers who attend the program. However, if the goal of ACSC is to address the needs of all of their students, it is important for decision-makers to know what student characteristics were possessed by those who perceived high competence on outcome variables.

A more in-depth synthesis of correlational data between inputs and outcomes revealed several notable conclusions. While those in the 36-39 age group perceived themselves highly competent on the majority of outcomes, they perceived the least competence in Command and Leadership. Students in the 40 and over age group, however, perceived themselves highly competent in Command and Leadership, but the least competent in Critical Thinking and Joint Campaign. A possible explanation for this is that older officers have more confidence in their abilities as leaders than other age groups either because of their life experiences or work-related knowledge. Those students who were 35 and under perceived the least competence in Air/Space Power and in Command and Leadership. Just as older officers perceived themselves highly competent in Command and Leadership, it appears as if younger officers did not feel as competent in this area as other age categories. This may be because younger officers do not have as much life experiences as their older contemporaries. Similarly, younger officers may not feel as competent in Air/Space Power as other age groups because they may not have as much total life experiences outside their professional development as older officers. One might conclude from these data that the various age groups perceived their competencies differently depending on which outcome is being investigated. While the school is addressing the needs of the mainstream (36-39 age group), they may not be meeting the needs of outlier

groups in Command and Leadership (35 and under) and Critical Thinking (40 and over). These data seem to indicate that younger officers need Command and Leadership training, while older officers lack critical thinking skills. Knowing this information provides ACSC with an opportunity to address those needs.

Interesting findings also emerged from the data analysis on gender and race. Females and African-Americans emerged as the top groups scoring themselves highly competent in the majority of outcomes. This might be explained by concluding that female and African-American officers arrived at the school with higher perceptions of their abilities. It is possible that the Air Force only attracts members of these two minority groups who already perceive themselves as highly competent. It is also possible that women and African-American officers are better learners who are motivated to do well at the College. One might also conclude that ACSC is doing a good job of meeting the needs of minorities, especially women and African-American officers. However, other data do indicate more stereotypical findings. For example, even though female respondents, on the average, scored their competencies as high on almost all outcome variables, they did not perceive themselves as having high competence in Critical Thinking. This seems to suggest that ACSC needs to look at how to instill in female officers a higher perception of competence in critical thinking skills.

Another finding based on correlational data between demographics and outcome variables involved the career field and the Master Degree concentration in which perceptions of high competence were highest. Students who perceived their competence as high in all four outcomes were in the Medical/Legal career field and degree

concentration. This seems to suggest that officers in the Medical/Legal career field performed better at ACSC than those in other career fields at ACSC. This observation must be moderated by two things: the fact that the Medical/Legal sub-population was small (n=7) and that given the nature of Medical and Legal training, it is possible that these officers were better learners. One may also conclude that ACSC is meeting the needs of the Medical and Legal officers which allows them to perform well while a student in the program. What was more notable from the correlational data between career fields and outcomes was the perceived competence level of Operations officers. Excluding the Air/Space Power variable, officers in the Operations career field (pilots, navigators, missileers, etc.) perceived their competence in outcome variables as lowest among the career fields presented. Even though Operators did not make up the majority of students at the College, they are a central element of the Air Force. It makes sense that they should score themselves highly competent in Air/Space Power because of the nature of their jobs which deals with this area on a daily basis. Perhaps the fact that Operators scored themselves least competent in all outcomes except Air/Space Applications suggests to ACSC that the focus of their program, at least for this group, should move in the direction of Command and Leadership, Joint Campaign, and Critical Thinking.

The data on the correlation between demographics and Commission Source revealed that those who were commissioned through ROTC were most likely to score themselves high on all outcomes except Critical Thinking. Air Force Academy graduates (USAFA) tended to score themselves highest on the Critical Thinking outcome variable. These data seem to suggest that those who were commissioned through ROTC may need to improve

their critical thinking skills and that ACSC might be able to provide the necessary training. Since those commissioned through ROTC make up the majority of respondents (and the study group as well), it behooves the College to investigate this further.

When one reviews the Expectations that were most associated with students' perceptions on outcome variables, it differs across outcomes. For example, those who scored themselves high on the Joint Campaign variable were more likely to choose Expectation 1, "ACSC would improve my chances for future promotions," and Expectation 6, "I would spend a great deal of time socializing." Conversely, students who scored themselves high on the Air/Space Power variable tended to choose Expectation 9, "Other (please specify)." Those scoring themselves highly competent on Command and Leadership tended to choose Expectation 8, "I would be academically challenged while a student at ACSC." and those with perceptions of high competence on Critical Thinking chose Expectation 7, "I would learn very little while a student at ACSC." As one can tell, students' choice of expectations varied depending on outcome. Yet, this is valuable information because expectations provide additional insight into how inputs affect outcomes. For example, if one were to determine that Command and Leadership needed to be emphasized, one might conclude from the data that by finding a way to instill in students an expectation of being academically challenged, students' perceptions of their competence on Command and Leadership would subsequently improve.

The first step in the regression analyses on all four outcomes was to enter the input variables as a block. The results of this procedure yielded information about which input variables were most predictive of outcomes. As stated in the summary and presented in

table 53, of all of the input variables, Expectation 8, "I would be academically challenged while a student at ACSC," had some predictive power for all four outcome variables. It accounted for the most variance in Joint Campaign (5 %) and the least in both Command and Leadership and Critical Thinking (2 %). However, Expectation 8 entered the equation first in only one variable, Command and Leadership. As one can tell by looking at the data presented in table 53, the regression analyses on input variables yielded different results for each outcome variable. For the Joint Campaign variable, Age 2 (36-39 age group) entered the equation first, accounting for three percent (3 %) of the variance, followed by Expectation 8, which accounted for five percent (5 %) of the explained variance over what could be attributed to Age 2. This means that those who fell within the 36-39 age group and expected to be academically challenged while a student at ACSC were more likely to score themselves highly competent in Joint Campaign. For the Air/Space Power Applications outcome variable, three input variables were predictive of perceived high competence: the Medical/Legal career field, Age 2, and Expectation 8. In other words, those who were in the Medical/Legal career field, in the 36-39 age group, and who expected to be academically challenged while a student at ACSC were more likely to score themselves highly competent on Air/Space Power. Conversely, only one input variable appeared to be predictive of high perceived competence on Command and Leadership--Expectation 8 (accounting for 3 % of the variance). The final regression analysis on outcome variables revealed that for the Critical Thinking variable, four input variables were predictive of perceived high competence. Expectation 3, "I would meet other people and learn about other career fields," entered the equation first, accounting for

four percent (4 %) of the variance. The Support career field (information management, personnel, finance, etc.) also was predictive of high perceived competence on the Critical Thinking outcome. However, the Support career field had an inverse relationship with outcomes, meaning that those *not* in this career field were more likely to score themselves highly competent on Critical Thinking. In other words, the Support career field had a negative effect on students' perceptions of high competence on Critical Thinking. It entered the equation at step 2 and accounted for two percent (2 %) of the variance over what was attributed to Expectation 3. Age 2 and Expectation 8 also had some predictive power for the Critical Thinking variable but after Expectation 3 and Support entered the equation, not much was left for these two variables (1 % and 2 % respectively). Overall, input variables accounted for the most variance in the Critical Thinking variable (9 %), with the least variance attributable to input variables occurring in the Command and Leadership variable (3 %). These data are valuable in determining which input variables are most associated with high perceived competence in outcome variables. Although it is doubtful that key leaders at ACSC can change student inputs, by knowing this information they can address problem areas and better meet the needs of their students.

The Effect of Environment on Outcomes. The discussion thus far has centered on demographics and student expectations, which were input variables. Obviously these were important because it gave the researcher insight into student characteristics which may be important in making recommendations about the program. However, the College has little choice as to the type of student who comes to ACSC. Students are chosen as a result of a central board and the criteria are based on their rank as well as their abilities to hold key

field grade (Major and above) positions in the future. While decision-makers at the College do not have control over student characteristics or expectations, they do have control over their teaching methods and program activities. The results of the correlational data analysis between environmental variables and outcomes revealed that the Curriculum variable was most associated with outcomes, with Teaching Methods following Curriculum closely. The largest relationship occurred in the Joint Campaign outcome variable with Curriculum (r =.46), while the smallest significant relationship was between Research and Critical Thinking (r=.13). Surprisingly, there was no relationship between Research and the Air/Space Power outcome variable. One can conclude from these data that Curriculum items were most associated with high competence on outcome variables, especially in Joint Campaign. On the other end of the spectrum, the Research component of the College was least associated with outcomes, especially Critical Thinking. The fact that Research was not associated with the Air/Space Power outcome variable was notable. Apparently, the Research component of the College, which was not even associated with Air/Space Power, the outcome on which a larger percentage of students tended to score themselves as highly competent, was consistently rated as being of low quality, relative to the other variables. These data seem to imply that ACSC Curriculum items are the most facilitative toward students' perceptions of high competence on outcomes, while Research items are not. Even though Curriculum and Research emerged as extremes, the other variables, especially Teaching Methods and Faculty were also significantly associated with outcomes and should not be discounted as unimportant.

The Effect of Environment on Outcomes After Controlling for Inputs. Results of the predictive analysis substantiated the correlational findings. The multiple regression analysis allowed the researcher to control for the effects of input variables, while examining the effects of environmental variables on outcomes. Although many researchers use correlational data to predict or show causation, multiple regression is a more powerful statistical tool for that purpose. In this case, after controlling for input variables, Curriculum had the most predictive power in the regression equations for all four outcome variables (ranging from 10 % in Command and Leadership to 15 % in Joint Campaign). Teaching Methods also had some predictive power for outcomes above what was explained by Curriculum (ranging from 2 % in Air/Space Power and Critical Thinking to 3 % in Joint Campaign) except in Command and Leadership, where Faculty followed Curriculum as having some predictive power (4 % after Curriculum). Overall, the amount of variance explained by environmental variables after accounting for inputs ranged from fourteen percent (14 %) in Command and Leadership and Critical Thinking to eighteen percent (18 %) in Joint Campaign. This suggests that after controlling for inputs, respondents who rated the quality of Curriculum as high were most likely to rate their competence in outcomes as high. After Curriculum, Teaching Methods emerged as adding some variance to the equation. Because most of the variance was attributed to Curriculum and Teaching Methods, there was no predictive power left for the other environmental variables such as Faculty, Technology, Grading, and Research. This is not to say that these variables should be ignored. In fact, if one were to look at the correlation coefficients on these variables as outlined in table 38, one would see that they were all

significant at the .01 level except for Research and Air/Space Power Applications. Similarly, when all environmental variables were entered into the regression equations individually after inputs, they all accounted for some portion of the variance. Yet, the fact remains that Curriculum emerged as the most predictive environmental variable which suggests that this element of the program is most facilitative toward students' perceptions of high competence on outcomes. Conversely, Research items consistently appear as the least associated with outcomes, both in the correlational analysis and the regression. This suggests that this element of the program is not as successful as the others and should be targeted for possible improvement and modification.

Because Curriculum items were most associated with and most predictive of outcome variables, a more detailed examination of individual Curriculum items was warranted. The five Curriculum items used for the analyses were:

- Item 59, "Assigned books."
- Item 60, "Curriculum flow."
- Item 61, "Systems approach to problem solving."
- Item 62, "Balance between academics and social functions."
- Item 67, "To what extent do you think ACSC is a graduate-level program?"

Regression analyses of individual Curriculum items revealed that item 61, "the systems approach to problem solving," and item 59, "assigned books," had the most predictive powers on outcomes. This suggests that students who rated the quality of the systems approach to problem solving and assigned books as high were most likely to rate their competence in outcome variables as high. One might conclude from these data that all that needs to be done to ensure success at ACSC is to concentrate on Curriculum items,

particularly the systems approach and assigned books. Undoubtedly, a strategy such as this would yield similar results to what was found in this study.

Descriptive data and qualitative results added details to this overall analysis. When descriptive statistics on Curriculum were compared, "assigned books" stood out as being the most highly rated item, with over a quarter of respondents rating the books as "outstanding." Respondents also rated the "systems approach to problem solving as high" but below "assigned books." Although students rated the books highly, they thought that the amount of assigned reading was excessive. Written comments from the open-ended section of the questionnaire also discussed this problem. Respondents believed that while the books were "outstanding," the amount of reading they were expected to accomplish did not allow them enough time for synthesis or analysis. Descriptive data and qualitative comments on Research also validated the predictive data. Group research was one of the lowest rated items on the questionnaire (grading procedures was the lowest). Respondents were disappointed that they had not received adequate training or support for their research projects. Their frustrations seemed to center on the incongruence between the lack of support for research from faculty and staff while the College placed a great deal of emphasis on that portion of the program. Grading procedures were also not rated very high. This seemed to also revolve around research projects. In written comments, students wrote that the lack of standardization in grading kept many people from being chosen as distinguished graduates. Many also wrote that by having assigned grades, the competitive nature of most people detracted from the learning experience. Descriptive data and qualitative open-ended comments from the questionnaire seemed to

suggest the same conclusions derived from the quantitative analyses. However, another item stood out in respondents' written comments that should be added here. Graduates of ACSC were very critical of military faculty members (although no names were mentioned). According to their comments, they believed that military faculty were not qualified to teach them. An element of bitterness showed through in many comments in which respondents wrote that the school was allowing officers to come to ACSC to teach even though they had not been "good enough" to get selected to attend the school themselves. Whether or not this was a valid observation, the fact remains that there seems to be a consensus among graduates that the military faculty members were deficient. Quantitative data seemed to corroborate these sentiments as the data show that students rated civilian faculty members as being of higher quality than military faculty members.

The conclusions highlighted above only touched the surface of the findings of this study. However, the conclusions chosen for inclusion in this chapter represent, in a broad sense, the most important, overarching findings. The purpose of this study was to develop a comprehensive institution-wide assessment program for Air Command and Staff College. Comprehensibility, by its very nature, sacrifices depth for breadth. By looking at broad brush strokes, one sacrifices many nuances that occur as a result of any assessment. ACSC is, by higher education standards, a short course and assessment efforts must be quick, comprehensive, and readable but they also must provide information that leads to program improvement. Decision-makers at ACSC have shown that they are willing to make dramatic changes in their curriculum. This study represents a place for them to start

when they examine what they are currently doing. It answered questions about what worked and what did not work quite as well, at least as perceived by graduates of the program. Although the study does have several limitations (these will be discussed in detail later), it represented one way in which targeted, detailed information about program elements could be gathered. It also showed how the data could be examined and reported. Clearly, there is still much that needs to be answered but the researcher believes that this study provided a place in which one could start investigating a short, yet complicated program such as Air Command and Staff College.

Recommendations and Implications

The final question (#7) posed in chapters one and three of this dissertation was: "What were the implications of the results of this study for Air Command and Staff College?" This section addresses both recommendations and implications. Recommendations are based on the results of the data analyses and the conclusions already discussed. Implications refer to policy and research implied by the results.

The first recommendation for decision-makers at ACSC is to look at the mission statement. While the current mission statement explicitly states the focus of the College, it is obvious that the implied goals of the program do not deal only with Air/Space Power Applications. Command and Leadership and Critical Thinking, not to mention Joint Campaign all emerged as important aspects of ACSC. The mission statement should be concise but it should also encompass all of the major goals of the program. The data implied that Command and Leadership was an area in which students felt the least

competent. This does not necessarily mean that students are not learning Command and Leadership at ACSC as the data showed that students' perceptions of competence on all outcomes were relatively high. However, ACSC leaders may want to take a look at how they are teaching the Command and Leadership outcome and give some thought to ways in which they might improve facilitating this skill. Although the quantitative data revealed that students perceived the most competence in Air/Space Power, written comments suggested that some students were frustrated because the school wanted to mold them into air campaign planners and many did not see the utility in learning this skill. Of course, focusing on weak or strong areas are not mutually exclusive. The College could have a strong air campaign element and a strong Command and Leadership component as well which would address both areas. Perhaps Command and Leadership skills could be incorporated "across the curriculum" rather than only taught in a module set aside for that purpose. Students could be learning how to be air campaigners and commanders at the same time. This would require some creative pedagogy across all courses as well as collaborative teaching techniques between faculty members, but it would be a worthwhile experiment and one in which everyone would benefit.

This study did not administer any type of pretest to students prior to their exposure to the learning environment at ACSC because of time constraints. However, a second recommendation for the College would be to give students a pretest on the major components of the program. The College could devise its own instruments for measuring students' abilities as they come into the program. They could also use standardized instruments devised and validated by experts, especially when measuring skills such as

critical thinking. Pretest data on incoming students would prove to be helpful for discovering strengths and weaknesses of each class. Longitudinal data could be compiled and patterns studied for future improvement efforts at the College. Pretest data could also become part of a larger assessment program in which different teaching techniques and program activities are implemented and tested. Assessment data should be tied to student talent development and the College's programs continually reviewed and improved as a result.

According to the correlational and predictive analyses, Curriculum items were the most associated with outcomes. This could suggest two things: students' perceptions of high competence existed prior to their arrival at ACSC or the College did a good job of communicating the Curriculum items to students. Whatever the case, the school must decide if they wish to reinforce program elements on which students already perceive high competence or if they are interested in focusing on elements on which students' perceived themselves less competent. Of all the Curriculum items, item 61, "the systems approach to problem solving," and item 59, "assigned books" were the most associated with outcomes. In other words, those who rated these program elements highly were also those who perceived greater competency on outcomes. If ACSC could get students to see the "systems approach" and "assigned books" as more important, then higher outcomes might follow. Even though students rated the quality of the assigned books highly, they repeatedly criticized the reading load in their written comments. Students perceived that not enough time was allotted for them to discuss the readings because the load was too unrealistic. Apparently, ACSC's goal is not only to provide students with reading

opportunities, but also to emphasize research and critical thinking skills. Reading for reading's sake will not create an environment that facilitates research or critical thinking. While students should be exposed to various viewpoints, historical examples, and current events, they should also have a chance to synthesize and analyze. To this end, students should be given reading assignments that provide them with background information on an issue, but they should be encouraged to form their own opinions about it and be allowed to discuss what they read with others. The recommendation in this area would be to assign less reading, emphasize research, and facilitate discussions and interaction between students.

The Research element of the College was consistently one of the most criticized and lowest rated elements of the overall program. The relational and predictive analyses revealed that Research was the least associated with outcomes and one of the least predictive elements of the school. This indicates that decision-makers at ACSC need to take a hard look at the Research program and decide what their goals should be in this area. Is ACSC a "research" institution? Is it important to teach mid-career officers to be researchers? This study revealed that students were most frustrated with group research grades and the lack of direction on how to do research. The College cannot assume that all of their students have had adequate training on research skills or that they even know how to work on team projects. It is important for those who are involved in grading student research projects to have an opportunity to interact with students. Training should be available for those who need it and faculty mentors should be assigned to research teams to help facilitate the process. Grading procedures must be outlined in

detail and students made aware of what is expected of them. These are just a few recommendations that could help alleviate some of the frustration about the research process. If ACSC is serious about teaching research skills and promoting excellent research projects, then students should be given ample time to pursue this element of the program and they should be given constant mentoring by those who are qualified. In addition, an element of "mastery" learning should be built into the research program. Students should work with a faculty mentor and be allowed to continually rewrite and revise their research products. Students should be allowed to choose their own research projects, perhaps even submitting proposals for what they want to do. Ideas from around the Air Force could be solicited and "real-world" problems could be addressed. This method works well in business and industry and in some highly successful business schools (Mann and Staudenmier, 1991). By providing students with an opportunity to work on issues and problems that commanders and senior Air Force leaders identify as central, ACSC would be providing a service to the Air Force while providing students with considerable learning experiences. Finally, group research is a good idea as Air Force officers must often work collaboratively on projects. This study revealed that students' perceptions of the Research element at ACSC was relatively negative and they voiced, through their written comments, that they were frustrated with the research process at ACSC because they were not given adequate training on research or provided ample time to work on their projects. Therefore, it is important that student groups not be left to their own devices while conducting their research. They should be guided on both group processes and research principles by an experienced faculty member. Again, if ACSC is

serious about providing a learning environment that emphasizes research, decision makers must be committed to it and provide ample support for both faculty and students.

While the Curriculum and Research variables represented both ends of the spectrum after all elements of the program were examined, the other environmental variables (Teaching Methods, Technology, Faculty, and Grading) were also significantly associated with outcomes and should not be overlooked. Teaching Methods, next to Curriculum, was most associated with the outcomes and, in most cases, emerged as providing some predictive power after inputs and Curriculum entered the regression equations. A notable observation about students' perceptions of Teaching Methods was that students rated the quality of lectures by guest lecturers as the highest among all the methods used with the lowest rated method being lectures by instructors. This seems to imply that students prefer to be taught by guest lecturers rather than ACSC faculty members. Students did rate the quality of military faculty lower than civilian faculty and criticized them in their written comments. Senior leaders at ACSC have already taken steps to help improve the quality of their military faculty members by obtaining sponsored Ph.D. slots for selected faculty members. While this study did not indicate that students might rate the faculty higher if they had Ph.D.s, it is still a step in the right direction.

Technology is a dynamic and necessary tool which facilitates communication and creates numerous possibilities for education and research. ACSC has done a tremendous job in a short period of time by providing students with the hardware and by giving them an overview of the uses of technology in a classroom setting. However, the school must not assume that everyone comes to the school with the same knowledge about the

internet, the worldwide web, or even basic word processing. Training is essential and constant reinforcement about how to use technology is a must. Not only should students be learning about the internet, the worldwide web, e-mail, and Toolbook©, but they should be exposed to many aspects and possibilities. Some students may want to know how to use a database program like "Excel" or a statistical package such as "Statistical Package for the Social Sciences." Others may be interested in learning how to use presentation programs like "Powerpoint." Other interactive software in addition to Toolbook© also exist that might appeal to some students. While recognizing the benefits of technology in the classroom, one must also recognize the downside. The data revealed that students rated the quality of computerized readings as lowest among all Technology items (see table 5). Placing reading assignments on the net should be avoided unless students have access to a printer. Interactive programs such as Toolbook© can enliven text, but they should not replace the written word. The pros and cons of the various uses of technology should be investigated and different techniques tried and tested. Finally, the pace of technology moves so quickly that unless one devotes time to it constantly, new and exciting software and uses for them can be easily overlooked. If ACSC is committed to how technology can be used in their program, and it appears as if they are, they should hire a technologist to keep abreast of the latest changes and to train the faculty and staff on its uses. This individual could be someone who is already at the school or they could invest additional funds into hiring someone who knows and understands the complexities that surround the use of technology.

As already stated, the purpose of asking students to rate the quality of the faculty was to look at their perceptions about the balance between military and civilian faculty members and to find out to what extent they thought the faculty should consist of more Ph.D.s. The results of the data analyses revealed that students rated the quality of civilian faculty members higher than military faculty but they believed that the balance between the two was "about right." When asked to what extent they thought the ACSC faculty should consist of more Ph.D.s, over half of respondents replied in the "very little" and "to some extent" categories. Written comments in the open-ended section of the questionnaire added to this quantitative analysis. Students criticized the military faculty members for not being qualified to teach. In other words, respondents did not believe that military faculty members were "subject matter" experts. It is difficult to find people throughout the military that are both qualified to teach and who volunteer to come to ACSC to be on faculty. This issue has been a continual problem for Air Force PME and is not one that is likely to be alleviated soon (Davis and Donnini, 1991). As was already stated, ACSC senior leaders have invested a lot of time and resources into obtaining sponsorship to send some faculty members to obtain Ph.D.s. While having more Ph.D.s on faculty will improve the chance that many will be subject matter experts and know how to conduct and direct research, one must remember that rank and experience probably count for more than advanced degrees in a setting like ACSC. Faculty members with new Ph.D.s may be able to teach history or political science issues, and they may be more qualified to teach students how to proceed on their research projects, but will they have the kind of field experiences that add credibility to what they are saying? This issue could be alleviated

somewhat by bringing in people with the necessary experience. The guest lecturer program is one avenue but students appear to want to be able to interact with those who have firsthand experience. Again, ACSC must decide what the focus of the College should be. If they want the school to be an academic program, complete with a number of Ph.D.s in history, political science, and social science, then it is appropriate to infuse the faculty with more people with advanced degrees. Conversely, if ACSC wants to concentrate on military issues, particularly air campaign planning, then perhaps it is more appropriate to hire more officers with current field experience. These officers do not necessarily have to be all pilots. In fact, given the fact that there are more non-rated officers attending the program, it would be inappropriate to hire only pilots. To attract the most qualified faculty members, ACSC should be committed to their faculty by providing them with time to be innovative and creative. They should be recognized for their hard work and encouraged to pursue their own research projects and to present them at national conferences. Faculty development programs should be an important part of the College and perhaps centrally directed and administered by someone whose prime responsibility is to help faculty members in all aspects of their job.

The lowest rated item on the questionnaire was grading procedures, with nearly fifty-two percent (51.6 %) of respondents rating it as "unsatisfactory" or "marginal." Written comments corroborated this data. Obviously, grading procedures at ACSC were perceived as less than adequate. Of particular concern for students was the way in which grades were used for determining distinguished graduates. Most respondents who wrote about this topic recommended that the DG program be discontinued. While this is

unlikely to happen, it is important for ACSC to look at how grades are being assigned and how the perception that grades are assigned arbitrarily can be changed. In addition, decision-makers at the College need to decide if they perceive the school to be a graduate program or if they are mostly interested in providing management development education in the tradition of business and industry. If the school is a graduate program, then grades are appropriate and students should be working toward a Master Degree. If it is a management development program, then grades are inappropriate and the focus of the school should be on team building and real-world research projects. These are important distinctions but the current environment at the school suggests that they are trying to do both. After the College defines what it is all about, it must communicate this to the students while letting them know what is expected of them.

The conclusions and recommendations highlighted in this chapter represent the broad themes implied by the data analyses. Some of the recommendations can be easily implemented while others may take a change in policy and a large commitment by those in key positions. Reviewing the mission statement and defining what direction the College will take in the future will be the first challenge. The results of the data brought out in this study revealed that ACSC is doing many things well and that the needs of a majority of their students are being met. On the average, students perceived themselves as being highly competent on all four outcomes, but there were areas in which students did not score themselves as highly competent as others. Generally speaking, students also rated the program activities and teaching methods used at ACSC to be of high quality. Yet,

some elements of the program were not perceived as being as effective as others and warrant further inspection. This chapter outlined some of these elements and made recommendations about what could be done to remedy problem areas.

This study did not deal with ACSC's impact on the Air Force or the role of professional military education in the modern military. However, the data revealed that some elements of the program, particularly the research element, lent themselves to addressing real-world problems and issues. While students are exposed to current issues and problems, they do not seem to be part of the solutions. It would be advisable for key leaders at ACSC to find out what problems the various commands face in their day-to-day operations. Research at ACSC should target real-world problems in which groups formulate solutions and present them to commanders throughout the Air Force (or Army, Navy, Marines). Students should be encouraged to work on problems that they find engaging and that apply to their particular expertise. By having students work on research projects that address current issues and problems, students will see relevance in what they are doing and the College can be assured that their students are also learning how to be critical thinkers and competent researchers. In addition, ACSC will become the place in the Air Force where theory, research, and solutions come together in a student-centered learning environment.

Limitations and Future Research

Limitations of this study were already discussed in detail in chapter three. The four major limitations outlined involved the scope of the study, design limitations, self-

reporting, and the homogeneity of the study group. Out of those four, the scope of the study and design limitations are the most serious. When design decisions were made for this dissertation, the researcher had several constraints, time and proximity to the College being the most detrimental. While the best approach may have been to give students a pretest, follow their progress throughout the ten months, and end with a series of posttests, it was not possible to implement such a plan. However, this should be done in future research activities. A longitudinal study of one class should be designed and implemented. Additionally, several longitudinal studies should be accomplished and a data base of information compiled and change over time studied and patterns reported. Quantitative data should be supplemented by qualitative information compiled through observations and interviews. These data could then be compared to quantitative statistics to reinforce findings and recommendations. Major decisions should not be made without several reinforcing studies suggesting similar directions. In fact, the school lends itself to becoming a laboratory for research with unlimited possibilities. The possibilities at ACSC are endless with a new class coming in every year. Faculty and staff at the College should be encouraged to design and implement experiments that will help them decide what methods work and what does not work. For example, two sections could be taught the same material using different techniques, perhaps the case study method in one instance and colloquia-style seminars in another. An ANOVA design for an experiment such as this would yield quantitative information about which method was the most effective. This could be done for any number of program activities used at ACSC.

This study was interested in developing a comprehensive assessment program that could be implemented quickly and findings reported in the shortest possible time. As a result, the researcher sacrificed depth for breadth. This study presented broad patterns, but future studies should target one area of the program and design a study that looks at only that area. For example, the technology component of the College has become very important across the curriculum and lends itself to being the subject of several future studies. Any number of ACSC program elements could be investigated for their plausible uses and limitations.

In describing the limitations and implications for future research, one runs the risk of demeaning one's own research. Yet, research is always an ongoing process with each study revealing areas that should be investigated further. While most studies ask more questions than they answer, one of the purposes of doing research is to discover areas of concern and to hold them up to the light for examination. This study was able to do just that, the limitations notwithstanding. There is still much that needs to be done with the assessment program at ACSC. It should evolve continually, asking for deeper and more detailed data. The survey instruments should be constantly reviewed and revised. Yet, research for research's sake is not necessarily a productive activity. Researchers at ACSC, as with any higher education institution, should tie their assessment efforts to both accountability and improvement. To do less would discredit the research process as well as those who are served by it.

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APPENDIX A: "Student Perceptions of Program Effectiveness Questionnaire," Cover Letters and Reminder Postcard.

Survey Code _____

Student Perceptions of Program Effectiveness of Air Command and Staff College

Introduction: This questionnaire is intended to gather information about the effectiveness of Air Command and Staff College program activities and teaching methods in accomplishing its primary program goals. BE HONEST in your evaluation of the program. Your individual responses will be kept CONFIDENTIAL and the data gathered from your comments will be reported in aggregated form only.

General Directions: Sections A, B, and C are preceded by a rating scale. Read each item carefully and place the number that best describes your perception in the space provided. The last portion of section C and section D, demographic data, requires you to place a check mark next to the appropriate response.

A. Overall Effectiveness

Specific Directions: Questions 1-4 are designed to determine your overall evaluation of your educational experiences at Air Command and Staff College. Please rate questions 1-3 using the rating scale below by placing the appropriate number in the space provided.

1=Strongly Disagree
2=Disagree 3=Neutral
4=Agree 5=Strongly Agree

_____1. Overall, the program was effective.
_____2. I consider this program a valuable experience in my professional career.
_____3. I would recommend attendance at ACSC to other officers.

Use the following rating scale to answer question 4:

1=Unsatisfactory
2=Marginal 3=Satisfactory
4=Excellent 5=Outstanding

_____4. The mission of Air Command and Staff College is "to educate mid-career officers to develop, advance, and apply air and space power in peace and war." How well do you think the program accomplished that mission?

B. Course Objectives

Specific Directions: The following questions are designed to gather data on your perceptions about your competency in a number of areas. Please rate questions 5-49 using the scale below.

1=No competence
2=Very little competence
3= Some competence
4=Considerable competence
5=Great competence

How would you rate your competency on the following items at the point in time when you completed Air Command and Staff College?

_____5. Comparing different personality types and using them to make decisions.

_____6. Understanding and applying leadership skills in diverse situations.

_____7. Understanding and applying counseling techniques in a variety of situations.

_____8. Applying principles of oral and written communication in a variety of situations.

_____9. Understanding the Air Force officer promotion system.

_____10. Understanding and applying quality force tools and techniques.

_____11. Understanding the special nature of the military leader.

_____12. Understanding standards of conduct and officership.

_____13. Understanding combat leader styles throughout history.

_____14. Understanding the inclusion of a strong moral character and ethical considerations in decision-making.

_____15. Understanding commanders' roles and responsibilities.

_____16. Understanding key elements of the Army, Navy, Air Force, and Marine officer evaluation systems.

_____17. Challenging assumptions.

_____18. Breaking down barriers to creative thinking.

_____19. Translating ideas into action.

_____20. Understanding and implementing change in a military environment.

_____21. Understanding the differences between conflict and war.

_____22. Understanding the social aspect of war.

_____23. Understanding the circumstances of war.

_____24. Understanding and applying war and conflict concepts in different historical circumstances.

_____25. Understanding and creating war theory.

_____26. Understanding the relationship of war theory to the practice of waging war.

_____27. Understanding the interrelationship of historical experience and the development of war theory.

_____28. Ability to critically analyze past and present war theory concepts.

_____29. Understanding how to influence international actors to achieve national objectives.

_____30. Identifying and analyzing a military force's center of gravity.

_____31. Understanding the military instrument of national power.

_____32. Synthesizing new ideas on the application of air and space power.

_____33. Analyzing and applying war termination concepts and issues in current and potential scenarios.

_____34. Understanding the role of innovation in superior war fighting capability.

_____35. Understanding the critical factors that the Commander-in-Chief needs in order to plan and prosecute a theater military operation.

_____36. Understanding the structure of a joint organization.

_____37. Understanding the role of the Air Force in supporting joint planning.

_____38. Understanding and applying joint operations planning doctrine and procedures.

_____39. Understanding the roles, functions, capabilities and limitations of the US military forces that affect joint and combined operations.

_____40. Understanding and applying lessons learned from classic military campaigns throughout history.

_____41. Understanding the influence of national policy and strategy on the joint /combined planning process.

_____42. Understanding basic concepts and issues in planning and executing war termination.

_____43. Understanding the political, economic, and military roles in post-hostilities environment.

_____44. Understanding the use of technology to conduct and win campaigns.

_____45. Understanding the need for resource management and acquisition to support future force development.

_____46. Understanding the role and impact of technology on air campaign planning.

_____47. Understanding the contributions of air and space power to theater campaigns.

_____48. Understanding and applying the air campaign process to national scenarios.

_____49. Understanding and analyzing the impact of contextual and operational art elements on military campaigns.

C. Program Activities and Teaching Methods

Specific Directions: The following questions are designed to rate your perceptions of the quality of program activities and teaching methods at Air Command and Staff College. Please rate questions 50-66 using the scale below.

1=Unsatisfactory
2=Marginal
3=Satisfactory
4=Excellent
5=Outstanding

How would you rate the quality of the following program elements at Air Command and Staff College?

_____50. Lectures by course instructors.
_____51. Lectures by guest lecturers.
_____52. Informal lecture seminars.
_____53. Colloquia style seminars.
_____54. Use of computers for daily schedules.
_____55. Use of computers for testing.
_____56. "Toolbook" programs to supplement readings.
_____57. Computerized readings.
_____58. Level of computer instruction or hands-on training.
_____59. Assigned books.
_____60. Curriculum flow.
_____61. Systems approach to problem solving.
_____62. Balance between academics & social functions.
_____63. Group research projects.
_____64. Military Faculty members.
_____65. Civilian Faculty members.
_____66. Grading procedures.

Use the following rating scale to answer 67-74.

1=Not at all
2=Very little
3=To some extent
4=To a considerable extent
5=To a great extent

_____67. To what extent do you think ACSC is a graduate-level program?

_____68. To what extent were you given adequate training on how to do research?

_____69. To what extent did you receive adequate support (resources, faculty assistance) with your research project?

_____70. To what extent should the ACSC faculty consist of more members who have Ph.D.s?

_____71. To what extent did you receive adequate feedback on your oral and written work?

_____72. To what extent did you know about and understand the reclama process?

_____73. To what extent should grades be used for determining distinguished graduates?

_____74. To what extent have you found the ACSC curriculum CD-ROM to be useful?

Please answer the following questions by placing a check mark in the space that most describes your opinion about that item.

75. What did you think about the amount of assigned reading?
____Too Much____Not enough
____About right

76. What did you think about the length of the courses? ____Too Long____Too Short ____About right

77. What did you think about the amount of time allotted to research?
____Too Much____Not enough
____About right

78. What did you think about the balance between civilian and military faculty members?
____More military ____More civilian ____About right

79. What did you think about the time allotted for student/faculty interaction?
____Too Much____Not enough
____About right

80. What grading method do you think is more appropriate at ACSC?
_____Letter grades
_____Pass/Fail

81. If you use the CD-ROM, where do you use it? _____Home
_____Work _____Don't use it

D. Demographic Data

Specific Directions: This information is needed for statistical control only. Please place a check mark next to the response that best describes the category to which you belong.

82. Age: _____35 and under
_____36-39
_____40 and over
_____Other (please specify)_____

83. Gender: _____Male
_____Female

84. Race:
_____African-American
_____Asian
_____Hispanic
_____Native-American
_____White, non-Hispanic
_____Other (please specify)
_____

85. Career Field:
_____Operations
(please specify)_____

_____Mission Support
(please specify)_____

_____Logistics
(please specify)_____

_____Medical/Legal
(please specify)_____

_____Other
(please specify)_____

86. Masters Degree Concentration:
_____Humanities
(please specify)_____

_____Social Sciences
(please specify)_____

_____Math and Science
(please specify)_____

_____Engineering
(please specify)_____

_____Medical/Legal
(please specify)_____

_____Other
(please specify)_____

_____No Master's Degree
_____Masters Plus
_____Ph.D.

87. Commission Source:
_____ROTC
_____USAFA
_____OTS
_____Other
(please specify)_____

E. Student Expectations

Specific Directions: This information concerns your expectations about ACSC before you attended the program. Complete the following sentence (check all that apply).

88. **When I found out that I was selected to attend ACSC, I expected that:**

_____ACSC would improve my chances for future promotions.
_____ACSC's curriculum would make me a better Air Force officer.

_____I would meet other people and learn about other career fields.
_____I would improve my golf game.
_____I would get to spend more time with my family.
_____I would spend a great deal of time socializing.
_____I would learn very little while a student at ACSC.
_____I would be academically challenged while a student at ACSC.
_____Other (please specify)
_____

F. Open-Ended Questions

Specific Directions: The following items are open-ended questions. Use the back of this form if necessary but try to direct your comments to specific areas of the program.

89. In one or two sentences, describe how you would improve Air Command and Staff College. Please be specific!

90. Please use this space to comment on any of the items on this questionnaire. Be sure to specify to which item you are referring.

If you would like to receive the results from this study, please put your name and address in the space provided below.

_____

_____

_____

THANK YOU!

AU SCN 95-11 (expires 18 July 1996)

Appendix A-2

Brenda F. Roth
601 Shepards Hill Road
Charlottesville, VA 22903

3 November 1995

<Title> <First Name> <Last Name>
<Address1>
<Address2>
<City> <State> <Postal Code>

Dear <Title> <Last Name>

As a recent graduate of Air Command and Staff College, you are in a position to evaluate the overall effectiveness of the program and to rate the quality of ACSC's teaching methods and program activities. This is important as ACSC continues to refine its program and the Air Force places more emphasis on professional military education.

I am an active duty Air Force officer pursuing my Ph.D. in Higher Education at the University of Virginia. My research involves a comprehensive evaluation of ACSC's teaching methods and program activities. Your perceptions of the effectiveness of the program are invaluable and will be used to enhance the quality of ACSC's programs. Although your participation in this study is voluntary, in order that the results of this study truly represent the perceptions of ACSC graduates, it is important that each questionnaire be completed and returned in the enclosed self-addressed stamped envelope. It should take you only 15 to 20 minutes to complete the questionnaire.

You may be assured of complete confidentiality. The questionnaire has an identification number for mailing purposes only. This is so that I may check your name off the mailing list when your questionnaire is returned. Your name will never be placed on the questionnaire itself and the results of the study will be reported in aggregate form only. In accordance with AFI 37-132 and the Privacy Act of 1974, the information you provide will be used for official purposes only.

I would be happy to answer any questions you may have about the study. Please write or call me at 1-800-531-9748.

Thank you very much for your assistance.

Appendix A-3

Brenda F. Roth
601 Shepards Hill Rd.
Charlottesville, VA 22903

30 November 1995

«Title» «FirstName» «LastName»
«Address1»
«Address_2»
«City», «State» «PostalCode»

Dear «Title» «LastName»

About a month ago, I wrote to you seeking your perceptions about the overall effectiveness of Air Command and Staff College and asking you to rate the quality of ACSC's teaching methods and program activities. As of today, I have not received your completed questionnaire. I realize that you may not have had time to fill out the questionnaire but I would really like to have your inputs. If you have already returned the questionnaire, I sincerely appreciate your interest and participation.

The study is being conducted as part of my Ph.D. work in Higher Education at the University of Virginia but it is also an important study to ACSC and to the future of professional military education in the Air Force. I am writing to you again because the study's usefulness depends on my receiving a questionnaire from each graduate of the program. In order for information from the study to be truly representative of the perceptions of ACSC graduates, it is essential that each person in the population return their questionnaire.

In the event that your questionnaire has been misplaced, I am enclosing a replacement. I would be happy to answer any questions you have about the study. Please write or call me at 1-800-531-9748.

Thank you very much for your participation.

Appendix A-4

Last week, a questionnaire seeking your perceptions about the overall effectiveness of Air Command and Staff College was mailed to you. As an active duty Air Force officer, your opinions are invaluable in pinpointing areas of the College that should be changed or modified.

If you have already completed and returned the questionnaire to me, please accept my sincere thanks for your participation. If not, please take a few minutes to fill out the questionnaire today. I am especially grateful to you for your help because I believe that your response will be very useful to senior leaders at the College as they continue to refine their program.

If you did not receive a questionnaire, or if it was misplaced, please call me at 1-800-531-9748 and I will get another one in the mail to you today.

APPENDIX B: Course Descriptions

Course Descriptions

Campaign Introduction (OV 500)

This course provides students with an overview of the concepts and principles they will encounter throughout the academic year. It is capstoned by a simulation which measures student aptitude in all of the succeeding courses (20 contact hours).

Command and Leadership (CL 500)

This course enhances student skills in five areas: Command Essential Skills, Communication Skills, Quality Concepts, Joint Operations, and Computer Skills. It provides a solid foundation for subsequent instruction and prepares the students for future command or staff positions. Command Essential Skills introduces the resources available to the commander and provides various leadership techniques. Some of those skills include understanding of critical Air Force positions on diversity, accountability, and homosexuality. In the Communication Skills area, speaking, writing, and research skills are honed. Quality Concepts introduces the basic terms and concepts key to a Quality Air Force. In tomorrow's world, force employment will likely involve some form of joint or combined operation. The Joint Operations area begins presenting seminars needed for certification as Joint Professional Military Education-Phase I graduates. Finally, current ACSC computer equipment capabilities are introduced as well as the future uses of the computer to the air campaigner (55 contact hours).

War Objectives (WC 500)

This course sets the stage for the remainder of the curriculum by introducing and defining the concepts essential to the study of the operational art of war and by clarifying the distinction between war, conflict, and conflict termination. The course assumes war, conflict and conflict termination are interdependent elements, whose nature and meaning can only be understood fully as part of the social and cultural context in which they occur. On the basis of this view, a number of conflict and conflict termination models are developed through an examination of the actors in, and the motives and levels of violent confrontation (26 contact hours).

Military Theory (MT 500)

This course looks at warfare systematically. Modern warfare is an intellectual and a technological phenomenon, and military theorists have long attempted to impose order and rationality on what is essentially an irrational enterprise. The reformation of military theory and the creation of new paradigms are the first steps in integrating new technology into war fighting. Discussing the strengths, weaknesses, uses, and relevance of such

attempts, from Sun Tzu to the most recent aerospace thinkers, provides the students with the analytical tools necessary to develop military theory into the twenty-first century (48 contact hours).

Strategic Structures (SS 500)

This course teaches coalition theory and introduces power projection instruments. It begins the process of making security assessments and analyses of hostile and friendly centers of gravity as well as the role of intelligence in the National Security Process. This course gives students the opportunity to look at the basic civil/military leadership power relationships in state and non-state entities. The students are introduced to illustrative case studies as examples of centers of gravity (87 contact hours).

Operational Structures (OS 500)

This course is designed to give the student a fundamental understanding of the military instrument of national power required for campaign planning in later blocks of instruction. The course begins by building a strong theoretical understanding of objectives, strategy, and doctrine. The student is prepared for combat planning in the joint environment by lessons on individual service force structure, doctrine, and force application. Basic principles of logistics, and command and control (C2) are introduced followed by a review of current US logistics, intelligence and C2 capabilities and challenges. The course concludes with an examination of the use of systems analysis to find centers of gravity of military forces (90 contact hours).

Joint Operations and Campaign Concepts (JO 500)

This course introduces Basic Service Joint Doctrine. After studying the Joint Deliberate and Crisis Action Planning System, this block leads the student to begin selecting campaign options. It also provides the opportunity to begin developing courses of action for traditional warfare as well as military options short of war (67 contact hours).

Air Campaign (AC 500)

This course explores the military technical revolution (MTR) and its effects on warfare. It develops an appreciation of the synergistic contributions of air power to the combat commander's campaign plan. It lays the basis for mastering Operational Art in Air and Space and for the exploitation of air power in support of US national objectives. Its goal is an understanding of the Master Attack Plan from which the Air Tasking Order is derived (136 contact hours).

War Termination (WT 500)

This course explores the war termination concept beyond describing the moment marking the war's end. The students will understand the campaign termination missions conducted by US military forces in the transition to peace. A phase of military operations, campaign termination must be planned in full coordination with war fighting operations. To this end, the students analyze case studies highlighting the importance of matching the ends desired to the means used in the campaign (21 contact hours).

Campaign 2000+ (FC 500)

This course defines possible future force structures needed to meet an undefined and technologically accelerating future in the hope of defining rather than reacting to change. Historical lessons are used to forecast future trends. Policy, resource allocation, acquisition employment and power projection issues are applied through a final exam which connect the present to the forecasted future in a series of steps needed to shape and prepare the military.

(Source: *Air Command and Staff College AY96 Curriculum Plan*, March 1995.)

APPENDIX C: Percentages of Respondents Scoring High (an average of 4 and 5) on Outcome Variables by Demographic Variables and Student Expectations

Table C-1 :Percentages of Respondents Scoring High (4 and 5) on Outcome Variables by Age

	Rate (%) Among		
Item	**35 & under n = 54**	**36-39 n=115**	**40 & over n=51**
Joint Campaign			
35	43 % (23)	66 % (76)	55 % (28)
36	46 % (25)	75 % (86)	59 % (30)
37	46 % (25)	76 % (87)	65 % (33)
38	39 % (21)	62 % (71)	43 % (22)
39	43 % (23)	69 % (79)	51 % (26)
40	65 % (35)	77 % (88)	67 % (34)
41	61 % (33)	76 % (87)	69 % (35)
42	69 % (37)	74 % (85)	63 % (32)
43	67 % (36)	75 % (86)	71 % (36)
44	70 % (38)	86 % (99)	75 % (38)
45	63 % (34)	75 % (86)	67 % (34)
Air/Space Power			
46	80 % (43)	88 % (101)	73 % (37)
47	81 % (44)	88 % (101)	76 % (39)
48	57 % (31)	78 % (90)	65 % (33)
49	76 % (41)	88 % (101)	71 % (36)
Command & Lead			
5	43 % (23)	43 % (50)	45 % (23)
6	68 % (37)	66 % (76)	61 % (31)
7	35 % (19)	34 % (39)	53 % (27)
8	85 % (46)	82 % (94)	75 % (38)
9	74 % (40)	62 % (71)	73 % (37)
10	33 % (18)	37 % (42)	25 % (13)
11	80 % (43)	68 % (78)	73 % (37)
12	87 % (47)	81 % (93)	86 % (44)
13	56 % (30)	78 % (90)	73 % (37)
14	85 % (46)	85 % (98)	82 % (42)
15	65 % (35)	75 % (86)	67 % (34)
16	19 % (10)	27 % (31)	24 % (12)
Critical Thinking			
17	76 % (41)	78 % (90)	63 % (32)
18	59 % (32)	70 % (81)	51 % (26)
19	69 % (37)	83 % (95)	71 % (36)
20	61 % (33)	67 % (77)	53 % (27)
21	72 % (39)	75 % (86)	71 % (36)
22	63 % (34)	84 % (97)	78 % (40)
23	76 % (41)	84 % (97)	76 % (39)
24	70 % (38)	80 % (92)	71 % (36)
25	59 % (32)	70 % (81)	59 % (30)
26	69 % (37)	81 % (93)	67 % (34)
27	78 % (42)	83 % (95)	69 % (35)
28	63 % (34)	81 % (93)	67 % (34)
29	65 % (35)	70 % (81)	61 % (31)
30	80 % (43)	88 % (101)	90 % (46)
31	89 % (48)	95 % (109)	88 % (45)
32	59 % (32)	70 % (80)	43 % (22)
33	61 % (33)	70 % (80)	63 % (32)
34	65 % (35)	83 % (95)	67 % (34)

Table C-2 :

Percentages of Respondents Scoring High (4 and 5) on Outcome Variables by Gender

	Rate (%) Among	
Item	**Male n=179**	**Female n=41**
Joint Campaign		
35	58 % (104)	56 % (23)
36	63 % (112)	71 % (29)
37	66 % (118)	66 % (27)
38	49 % (88)	63 % (26)
39	58 % (104)	59 % (24)
40	72 % (129)	68 % (28)
41	68 % (122)	80 % (33)
42	69 % (123)	76 % (31)
43	69 % (123)	85 % (35)
44	78 % (139)	88 % (36)
45	68 % (122)	78 % (32)
Air/Space Power		
46	82 % (147)	83 % (34)
47	84 % (151)	80 % (33)
48	72 % (129)	61 % (25)
49	80 % (143)	85 % (35)
Command & Lead		
5	44 % (78)	44 % (18)
6	65 % (116)	68 % (28)
7	37 % (67)	44 % (18)
8	82 % (146)	78 % (32)
9	67 % (120)	68 % (28)
10	33 % (59)	34 % (14)
11	76 % (136)	54 % (22)
12	85 % (152)	78 % (32)
13	74 % (132)	63 % (26)
14	85 % (152)	83 % (34)
15	69 % (124)	76 % (31)
16	23 % (41)	29 % (12)
Critical Thinking		
17	75 % (135)	68 % (28)
18	65 % (116)	56 % (23)
19	77 % (138)	73 % (30)
20	64 % (114)	56 % (23)
21	72 % (129)	78 % (32)
22	77 % (138)	80 % (33)
23	80 % (144)	80 % (33)
24	75 % (134)	78 % (32)
25	83 % (149)	63 % (26)
26	75 % (135)	71 % (29)
27	78 % (139)	80 % (33)
28	73 % (130)	76 % (31)
29	68 % (122)	61 % (25)
30	86 % (154)	88 % (36)
31	93 % (166)	88 % (36)
32	63 % (113)	51 % (21)
33	64 % (115)	73 % (30)
34	75 % (134)	73 % (30)

Table C-3 :

Percentages of Respondents Scoring High (4 and 5) on Outcome Variables by Race

	Rate (%) Among				
Item	**African-Am n=17**	**Asian n=4**	**Hispanic n=10**	**Native-Am n=4**	**White n=181**
Joint Campaign					
35	71 % (12)	50 % (2)	50 % (5)	75 % (3)	57 % (103)
36	71 % (12)	50 % (2)	60 % (6)	75 % (3)	64 % (116)
37	76 % (13)	50 % (2)	70 % (7)	50 % (2)	65 % (118)
38	65 % (11)	25 % (91)	50 % (5)	50 % (2)	52 % (94)
39	76 % (13)	50 % (2)	60 % (6)	50 % (2)	57 % (103)
40	76 % (13)	75 % (3)	70 % (7)	75 % (3)	70 % (127)
41	88 % (15)	75 % (3)	70 % (7)	100 % (4)	68 % (123)
42	82 % (14)	100 % (4)	80 % (8)	100 % (4)	67 % (122)
43	88 % (15)	100 % (4)	100 % (10)	100 % (4)	67 % (122)
44	82 % (14)	75 % (3)	100 % (10)	100 % (4)	78 % (141)
45	94 % (16)	50 % (2)	90 % (9)	50 % (2)	67 % (122)
Air/Space Power					
46	94 % (16)	75 % (3)	90 % (9)	100 % (4)	81 % (146)
47	94 % (16)	100 % (4)	90 % (9)	75 % (3)	82 % (148)
48	82 % (14)	75 % (3)	90 % (9)	100 % (4)	67 % (121)
49	82 % (14)	75 % (3)	70 % (7)	100 % (4)	82 % (146)
Command & Lead					
5	47 % (8)	50 % (2)	60 % (6)	50 % (2)	44 % (76)
6	70 % (12)	75 % (3)	90 % (9)	100 % (4)	63 % (114)
7	35 % (6)	25 % (1)	60 % (6)	75 % (3)	38 % (68)
8	82 % (14)	100 % (4)	70 % (7)	75 % (3)	81 % (147)
9	65 % (11)	50 % (2)	80 % (8)	75 % (3)	67 % (122)
10	41 % (7)	0% (0)	50 % (5)	75 % (3)	31 % (57)
11	76 % (13)	75 % (3)	70 % (7)	75 % (3)	71 % (128)
12	71 % (12)	100 % (4)	90 % (9)	75 % (3)	85 % (153)
13	82 % (14)	100 % (4)	60 % (6)	100 % (4)	70 % (126)
14	76 % (13)	75 % (3)	90 % (9)	100 % (4)	85 % (153)
15	65 % (11)	75 % (3)	70 % (7)	75 % (3)	70 % (127)
16	18 % (3)	0% (0)	40 % (4)	50 % (2)	24 % (43)
Critical Thinking					
17	76 % (13)	75 % (3)	80 % (8)	100 % (4)	72 % (131)
18	53 % (9)	50 % (2)	80 % (8)	100 % (4)	62 % (112)
19	71 % (12)	75 % (3)	70 % (7)	100 % (4)	77 % (139)
20	47 % (8)	75 % (3)	70 % (7)	100 % (4)	63 % (114)
21	76 % (13)	75 % (3)	90 % (9)	50 % (2)	73 % (132)
22	88 % (15)	100 % (4)	90 % (9)	100 % (4)	75 % (136)
23	88 % (15)	100 % (4)	100 % (10)	100 % (4)	78 % (141)
24	76 % (13)	100 % (4)	90 % (9)	75 % (3)	74 % (134)
25	76 % (13)	100 % (4)	70 % (7)	75 % (3)	62 % (113)
26	88 % (15)	100 % (4)	90 % (9)	100 % (4)	71 % (128)
27	88 % (15)	100 % (4)	70 % (7)	100 % (4)	76 % (138)
28	82 % (14)	50 % (2)	60 % (6)	100 % (4)	72 % (131)
29	76 % (13)	75 % (3)	90 % (9)	100 % (4)	64 % (115)
30	82 % (14)	100 % (4)	100 % (10)	100 % (4)	86 % (155)
31	94 % (16)	100 % (4)	100 % (10)	100% (4)	91 % (164)
32	65 % (11)	75 % (3)	50 % (5)	50 % (2)	61 % (110)
33	76 % (13)	100 % (4)	60 % (6)	75 % (3)	65 % (117)
34	88 % (15)	50 % (2)	60 % (6)	75 % (3)	75 % (135)

Table C-4 : Percentages of Respondents Scoring High (4 and 5) on Outcome Variables by Career Field

	Rate (%) Among			
Item	**Operations n=82**	**Support n=75**	**Logistics n=42**	**Med/Legal n=7**
Joint Campaign				
35	52 % (43)	59 % (44)	55 % (23)	86 % (6)
36	60 % (49)	65 % (49)	64 % (27)	71% (5)
37	61 % (50)	69 % (52)	64 % (27)	71 % (5)
38	46 % (38)	56 % (42)	50 % (21)	71 % (5)
39	57 % (47)	55 % (41)	62 % (26)	86 % (6)
40	71 % (58)	65 % (49)	74 % (31)	100 % (7)
41	71 % (58)	64 % (48)	76 % (32)	86% (6)
42	76 % (62)	60 % (45)	67 % (28)	100% (7)
43	74 % (61)	67 % (50)	69% (29)	100 % (7)
44	78 % (640	76 % (57)	83 % (35)	86 % (6)
45	61 % (50)	69 % (52)	81 % (34)	71 % (5)
Air/Space Power				
46	83 % (68)	79 % (59)	81 % (34)	100 % (7)
47	85 % (70)	77 % (58)	88 % (37)	86 % (6)
48	76 % (62)	68 % (51)	55 % (23)	100 % (7)
49	84 % (69)	77 % (58)	74 % (31)	100% (7)
Command & Lead				
5	41 % (34)	47 % (35)	43 % (180	29 % (2)
6	61 % (50)	68 % (51)	74 % (31)	57 % (4)
7	30 % (25)	40 % (30)	48 % (20)	57 % (4)
8	80 % (66)	83 % (62)	81 % (34)	86 % (6)
9	65 % (53)	75 % (56)	60 % (25)	71 % (5)
10	30 % (25)	36 % (27)	29 % (12)	43% (3)
11	72 % (59)	69 % (52)	71% (30)	86 % (6)
12	83 % (68)	83 % (62)	83 % (35)	86 % (6)
13	67 % (55)	77 % (58)	64 % (27)	86 % (6)
14	85%(70)	80 % (60)	90 % (38)	100 % (7)
15	70 % (57)	72% (54)	69% (29)	86 % (6)
16	27 % (22)	21 % (16)	24% (10)	14 % (1)
Critical Thinking				
17	70 % (57)	73 % (55)	79 % (33)	71% (5)
18	61 % (50)	56 % (42)	74% (31)	71 % (5)
19	72 % (59)	79 % (59)	79 % (33)	100 % (7)
20	59 % (48)	56 % (42)	74 % (31)	71 % (5)
21	72 % (59)	68 % (51)	79 % (33)	86 % (6)
22	76 % (62)	77 % (58)	81% (34)	86 % (6)
23	82 % (67)	77 % (58)	79 % (33)	86 % (6)
24	70 % (57)	73% (55)	81% (34)	100 % (7)
25	67 % (55)	60 % (45)	57 % (24)	100 % (7)
26	76 % (62)	71% (53)	71% (30)	100 % (7)
27	87 % (71)	73% (55)	71% (30)	86 % 6)
28	76 % (62)	69 % (52)	67 % (28)	100% (7)
29	71% (58)	55% (41)	69 % (29)	100 % (7)
30	83% (68)	89% (67)	81% (34)	100 % (7)
31	93% (76)	91% (68)	88% (37)	100 % (7)
32	65% (53)	52% (38)	67 % (28)	71% (5)
33	68 % (56)	61 % (46)	62 % (26)	100 % (7)
34	78% (64)	67 % (50)	76 % (32)	86 % (6)

Table C-5 :

Percentages of Respondents Scoring High (4 and 5) on Outcome Variables by Masters' Degree Concentration

	Rate (%) Among				
Item	**Humanities n = 11**	**Soc Science n = 108**	**Math/Science n = 52**	**Engineering n = 34**	**Med/Legal n=6**
Joint Campaign					
35	55 % (6)	59% (64)	56 % (29)	50 % (17)	83% (5)
36	45% (5)	68 % (73)	71% (37)	44% (15)	67 % (4)
37	64% (7)	69% (74)	71% (37)	50 % (17)	67% (4)
38	45% (5)	56% (60)	52% (27)	44% (15)	67% (4)
39	64% (7)	62% (67)	56% (29)	47% (16)	67% (4)
40	64% (7)	75% (81)	67% (35)	71% (24)	100% (6)
41	55% (6)	74% (80)	75% (39)	65% (22)	83% (5)
42	73% (8)	68% (73)	81% (42)	62% (21)	100% (6)
43	91% (10)	74% (80)	77% (40)	59% (20)	100% (6)
44	73% (8)	81% (88)	81% (42)	74% (25)	83% (5)
45	82% (9)	70% (76)	67% (35)	62% (21)	33% (3)
Air/Space Power					
46	82% (9)	81% (88)	88% (46)	82% (28)	100% (6)
47	82% (9)	82% (89)	88% (46)	82% (28)	83% (5)
48	82% (9)	67% (72)	87% (45)	59% (20)	100% (6)
49	73% (8)	79% (85)	90% (47)	82% (28)	100% (6)
Command & Lead					
5	64% (7)	46% (50)	38% (20)	35% (12)	50% (3)
6	73% (8)	69% (74)	65% (34)	59% (20)	67% (4)
7	36% (4)	43% (46)	35% (18)	26% (9)	67% (4)
8	100% (11)	80% (86)	81% (42)	85% (29)	83% (5)
9	73% (8)	69% (74)	75% (39)	53% (18)	83% (5)
10	36% (4)	31% (34)	35% 918)	24% (8)	50% (3)
11	73% (8)	70% (76)	73% (38)	74% (25)	83% (5)
12	91% (10)	83% (90)	83% (43)	85% (29)	100% (6)
13	64% (7)	72% (78)	71% (37)	71% (24)	83% (5)
14	91% (10)	85% (92)	83% (43)	82% (28)	100% (6)
15	91% (10)	71% (77)	67% (35)	65% (22)	83% (5)
16	18% (2)	27% (29)	23% (12)	9% (3)	17% (1)
Critical Thinking					
17	64% (7)	72% (78)	79% (41)	84% (27)	83% (5)
18	64% (7)	60% (65)	69% (36)	72% (23)	83% (5)
19	64% (7)	81% (88)	75% (39)	81% (26)	100% (6)
20	73% (8)	64% (69)	58% (30)	66% (21)	83% (5)
21	55% (6)	75% (81)	75% (39)	72% (23)	83% (5)
22	73% (8)	79% (85)	79% (41)	78% (25)	100% (6)
23	73% (8)	79% (85)	88% (46)	78% (25)	83% (5)
24	64% (7)	73% (79)	79% (41)	81% (26)	100% (6)
25	64% (7)	71% (66)	71% (37)	75% (24)	100% (6)
26	64% (7)	71% (77)	88% (46)	81% (26)	100% (6)
27	73% (8)	77% (83)	88% (46)	84% (27)	100% (6)
28	64% (7)	74% (80)	79% (41)	78% (25)	100% (6)
29	64% (7)	69% (74)	65% (34)	66% (21)	100% (6)
30	82% (9)	87% (94)	92% (48)	88% (28)	100% (6)
31	91% (10)	92% (99)	96% (50)	94% (30)	100% (6)
32	64% (7)	58% (63)	63% (33)	78% (25)	67% (4)
33	64% (7)	71% (77)	69% (36)	63% (20)	100% (6)
34	64% (7)	70% (76)	83% (43)	81% (26)	100% (6)

Table C-6 : Percentages of Respondents Scoring High (4 and 5) on Outcome Variables by Education Level

	Rate (%) Among			
Item	**No Masters n=4**	**Masters n=211**	**Masters + n=16**	**Ph. D. n=13**
Joint Campaign				
35	75 % (3)	57 % (121)	75 % (12)	62 % (8)
36	25 % (1)	64 % (134)	44 % (7)	54 % (7)
37	25 % (1)	66 % (139)	25 % (4)	46 % (6)
38	25 % (1)	53 % (111)	25 % (4)	31 % (4)
39	50 % (2)	58 % (123)	38% (6)	38 % (5)
40	75 % (3)	73 % (153)	69 % (11)	92 % (12)
41	50 % (2)	72 % (152)	69 % (11)	62 % (8)
42	75% (3)	71 % (150)	75 % (12)	62% (8)
43	50 % (2)	74 % (156)	75 % (12)	62% (8)
44	75 % (3)	80 % (168)	75 % (12)	77 % (10)
45	50% (2)	68 % (144)	56 % (9)	38 % (5)
Air/Space Power				
46	75% (3)	84 % (177)	81 % (13)	77 % (10)
47	100 % (4)	84 % (177)	75% (12)	77 % (10)
48	75% (3)	72 % (152)	75% (12)	62 % (8)
49	75% (3)	82 % (174)	81% (13)	92% (12)
Command & Lead				
5	50 % (2)	44 % (92)	56 % (9)	38% (5)
6	50 % (2)	66 % (140)	75% (12)	31 % (4)
7	25 % (1)	38 % (81)	50 % (8)	23% (3)
8	50 % (2)	82 % (173)	94 % (15)	62% (8)
9	50 % (2)	68 % (144)	63% (10)	46 % (6)
10	50 % (2)	32 % (67)	44% (7)	31% (4)
11	75% (3)	72 % (152)	88 % (14)	62% (8)
12	75% (3)	84 % (178)	94% (15)	77% (10)
13	75% (3)	72 % (151)	75% (12)	77% (10)
14	75% (3)	85 % (179)	94% (15)	69 % (9)
15	75% (3)	71 % (149)	81% (13)	54% (7)
16	0% (0)	22 % (47)	13% (2)	0% (0)
Critical Thinking				
17	75% (3)	75 % (158)	88 % (14)	77 % (10)
18	75% (3)	64 % (136)	75% (12)	77 % (10)
19	75% (3)	79 % (166)	81% (13)	85% (11)
20	75% (3)	63 % (133)	81% (13)	54% (7)
21	75% (3)	73 % (154)	63% (10)	77% (10)
22	75% (3)	78 % (165)	69% (11)	92% (12)
23	100% (4)	80 % (169)	81% (13)	92% (12)
24	75% (3)	75 % (159)	75% (12)	92% (12)
25	75% (3)	66 % (140)	56% (9)	92% (12)
26	50% (2)	77 % (162)	75% (12)	92% (12)
27	75% (3)	81 % (170)	88% (14)	77% (10)
28	75% (3)	75 % (159)	75% (12)	92% (12)
29	75% (3)	67 % (142)	81% (13)	69 % (9)
30	75% (3)	88 % (185)	81% (13)	77% (10)
31	75% (3)	92 % (195)	81% (13)	85% (11)
32	75% (3)	63 % (132)	81% (13)	69% (9)
33	75% (3)	69 % (146)	63% (10)	62% (8)
34	75% (3)	75 % (158)	81% (13)	92% (12)

Table C-7 : Percentages of Respondents Scoring High (4 and 5) on Outcome Variables by Commission Source

	Rate (%) Among		
Item	**ROTC n=91**	**USAFA n=44**	**OTS n=78**
Joint Campaign			
35	57 % (52)	48% (21)	60 % (47)
36	66 % (60)	61% (27)	63% (49)
37	65% (59)	61% (27)	69% (54)
38	49% (45)	55% (24)	54% (42)
39	62% (56)	59% (26)	55% (43)
40	69% (63)	70% (31)	72% (56)
41	75% (68)	59% (26)	69% (54)
42	70% (64)	66% (29)	68% (53)
43	73% (66)	75% (33)	67% (52)
44	79% (72)	84% (37)	74% (58)
45	69% (63)	68% (30)	71% (55)
Air/Space Power			
46	82% (75)	84% (37)	77% (60)
47	85% (77)	84% (37)	79% (62)
48	70% (64)	68% (30)	67% (52)
49	81% (74)	82% (36)	78% (61)
Command & Lead			
5	42% (38)	43% (19)	47% (37)
6	64% (58)	73% (32)	63% (49)
7	37% (34)	30% (13)	42% (33)
8	85% (77)	91% (40)	72% (56)
9	70% (64)	61% (27)	68% (53)
10	38% (35)	32% (14)	27% (21)
11	74% (67)	73% (32)	71% (55)
12	87% (79)	82% (36)	81% (63)
13	69% (63)	68% (30)	76% (59)
14	86% (78)	86% (38)	82% (64)
15	67% (61)	73% (32)	72% (56)
16	23% (21)	25% (11)	26% (20)
Critical Thinking			
17	75% (68)	77% (34)	69% (54)
18	65% (59)	64% (28)	59% (46)
19	74% (67)	80% (35)	76% (59)
20	59% (54)	68% (30)	62% (48)
21	77% (70)	61% (27)	73% (57)
22	76% (69)	73% (32)	82% (64)
23	82% (75)	80% (35)	77% (60)
24	69% (63)	80% (35)	78% (61)
25	59% (54)	66% (29)	67% (52)
26	73% (66)	75% (33)	73% (57)
27	69% (63)	89% (39)	81% (63)
28	69% (63)	60% (31)	74% (58)
29	63% (57)	66% (29)	67% (52)
30	82% (75)	86% (38)	90% (70)
31	93% (85)	89% (39)	91% (71)
32	59% (54)	61% (27)	59% (46)
33	67% (61)	55% (24)	68% (53)
34	70% (64)	75% (33)	76% (59)

Table C-8: Percentages of Respondents Scoring High (4 and 5) on Outcome Variables by Student Expectations

	Rate (%) Among			
Item	**Expectation 1 n=191**	**Expectation 2 n=190**	**Expectation 3 n=196**	**Expectation 4 n=36**
Joint Campaign				
35	56% (107)	60% (114)	59% (116)	53% (19)
36	64% (123)	67% (127)	67% (131)	56% (20)
37	68% (130)	69% (131)	68% (134)	72% (26)
38	52% (99)	55% (105)	53% (104)	56% (20)
39	59% (113)	61% (115)	61% (119)	58% (21)
40	72% (138)	74% (140)	73% (143)	72% (26)
41	71% (135)	73% (139)	73% (143)	67% (24)
42	69% (132)	72% (136)	71% (140)	61% (22)
43	73% (139)	74% (140)	74% (146)	72% (26)
44	81% (155)	80% (152)	83% (162)	83% (30)
45	69% (132)	70% (133)	73% (143)	75% (27)
Air/Space Power				
46	83% (158)	84% (159)	84% (164)	92% (33)
47	84% (161)	86% (163)	85% (166)	94% (34)
48	70% (134)	72% (136)	70% (137)	75% (27)
49	81% (155)	83% (157)	83% (162)	72% (26)
Command & Lead				
5	43 % (83)	43% (81)	45% (88)	47% (17)
6	64% (123)	64% (122)	66% (129)	69% (25)
7	38% (73)	37% (70)	40% (79)	36% (13)
8	81% (154)	80% (152)	83% (163)	86% (31)
9	69% (131)	68% (130)	68% (134)	72% (26)
10	30% (58)	33% (62)	34% (66)	31% (11)
11	71% (136)	72% (137)	71% (140)	81% (29)
12	84% (160)	84% (159)	85% (166)	89% (32)
13	71% (136)	73% (139)	72% (142)	61% (22)
14	84% (161)	84% (160)	85% (166)	89% (32)
15	70% (133)	71% (134)	72% (141)	72% (26)
16	25% (47)	25% (48)	25% (49)	19% (7)
Critical Thinking				
17	74% (142)	73% (138)	75% (147)	83% (30)
18	65% (124)	64% (122)	64% (126)	69% (25)
19	76% (146)	76% (144)	78% (152)	83% (30)
20	61% (116)	63% (120)	62% (121)	69% (25)
21	74% (141)	74% (140)	76% (148)	61% (22)
22	77% (147)	78% (148)	80% (156)	81% (29)
23	80% (152)	79% (151)	81% (159)	81% (29)
24	76% (145)	76% (144)	78% (152)	75% (27)
25	64% (123)	69% (129)	68% (134)	56% (20)
26	75% (144)	74% (141)	78% (152)	67% (24)
27	78% (149)	79% (150)	81% (158)	81% (29)
28	75% (143)	75% (142)	76% (149)	69% (25)
29	65% 125)	68% (130)	68% (134)	67% (24)
30	86% (165)	87% (166)	87% (171)	89% (32)
31	92% (176)	92% (175)	94% (184)	94% (34)
32	59% (113)	61% (116)	62% (122)	58% (21)
33	65% (125)	67% (127)	68% (134)	56% (20)
34	74% (142)	75% (142)	77% (151)	67% (24)

Table C-9 : Percentages of Respondents Scoring High (4 and 5) on Outcome Variables by Student Expectations (continued)

	Rate (%) Among				
Item	**Expectation 5 n=104**	**Expectation 6 n=42**	**Expectation 7 n=6**	**Expectation 8 n=143**	**Expectation 9 n=26**
Joint Campaign					
35	54% (56)	62% (26)	67% (4)	62% (89)	58% (15)
36	60% (62)	60% (25)	67% (4)	68% (97)	62% (16)
37	67% (70)	67% (28)	33% (2)	71% (101)	65% (17)
38	51% (53)	50% (21)	33% (2)	54% (77)	38% (10)
39	62% (64)	57% (24)	50% (3)	63% (90)	54% (14)
40	73% (76)	69% (29)	50% (3)	75% (107)	69% (18)
41	70% (73)	76% (32)	50% (3)	73% (105)	65% (17)
42	69% (72)	76% (32)	83% (5)	75% (107)	73% (19)
43	67% (70)	81% (34)	100% (6)	78% (112)	81% (21)
44	82% (85)	83% (35)	83% (5)	87% (124)	92% (24)
45	74% (77)	71% (30)	67% (4)	71% (102)	81% (21)
Air/Space Power					
46	85% (88)	88% (37)	67% (4)	85% (121)	88% (23)
47	88% (92)	88% (37)	50% (3)	87% (125)	88% (23)
48	71% (74)	64% (27)	83% (5)	73% (105)	73% (19)
49	83% (86)	83% (35)	100% (6)	81% (116)	85% (22)
Command & Lead					
5	40% (42)	52% (22)	50% (3)	48% (69)	46% (12)
6	67% (70)	64% (27)	67% (4)	69% (99)	69% (18)
7	35% (15)	36% (15)	50% (3)	47% (67)	46% (12)
8	82% (85)	79% (33)	67% (4)	80% (115)	88% (23)
9	66% (69)	69% (29)	67% (4)	69% (99)	69% (18)
10	29% (30)	21% (9)	67% (4)	36% (51)	27% (7)
11	74% (77)	71% (30)	83% (5)	78% (111)	96% (25)
12	81% (84)	76% (32)	100% (6)	86% (123)	96% (25)
13	68% (71)	71% (30)	83% (5)	77% (110)	73% (19)
14	88% (91)	90% (38)	100% (6)	85% (122)	100% (26)
15	72% (75)	67% (28)	50% (3)	76% (109)	65% (17)
16	23% (24)	17% (7)	0% (0)	29% (41)	15% (4)
Critical Thinking					
17	74% (77)	74% (31)	83% (5)	72% (103)	77% (20)
18	64% (67)	60% (25)	83% (5)	62% (88)	58% (15)
19	75% (78)	83% (35)	83% (5)	77% (110)	73% (19)
20	64% (67)	57% (24)	67% (4)	63% (90)	54% (14)
21	70% (73)	67% (28)	67% (4)	80% (113)	69% (18)
22	81% (84)	79% (33)	100% (6)	80% (113)	81% (21)
23	80% (83)	76% (32)	100% (6)	84% (120)	81% (21)
24	70% (73)	69% (29)	83% (5)	80% (115)	85% (22)
25	63% (66)	64% (27)	67% (4)	73% (102)	69% (18)
26	75% (78)	76% (32)	83% (5)	80% (115)	85% (22)
27	83% (86)	83% (35)	100% (6)	81% (116)	81% (21)
28	73% (76)	71% (30)	83% (5)	77% (110)	73% (19)
29	71% (74)	76% (32)	83% (5)	73% (104)	62% (16)
30	87% (90)	86% (36)	83% (5)	87% (125)	85% (22)
31	94% (98)	95% (40)	100% (6)	94% (134)	96% (25)
32	60% (62)	62% (26)	83% (5)	63% (90)	69% (18)
33	63% (65)	67% (28)	100% (6)	70% (100)	65% (17)
34	75% (78)	71% (30)	67% (4)	77% (110)	92% (24)

APPENDIX D: Correlations Between Environmental Variables and Outcome Variables by Item

Table D-1 : Correlations Between Teaching Methods and Outcome Variable by Item

	Teaching Methods (n = 228)			
Item	**50**	**51**	**52**	**53**
Joint Campaign				
35	.26*	.28*	.25*	.22*
36	.27*	.21*	.30*	.27*
37	.31*	.26*	.30*	.30*
38	.25*	.21*	.28*	.30*
39	.27*	.21*	.31*	.36*
40	.18*	.17	.29*	.21*
41	.26*	.23*	.31*	.34*
42	.30*	.23*	.20*	.30*
43	.22*	.18*	.23*	.29*
44	.18*	.22*	.25*	.23*
45	.17*	.09	.19*	.23*
Air/Space Power				
46	.20*	.25*	.27*	.28*
47	.19*	.16*	.26*	.22*
48	.17*	.21*	.22*	.21*
49	.23*	.24*	.26*	.29*
Command & Lead				
5	.07	.13	.17	.22*
6	.13	.05	.18*	.22*
7	.09	.12	.18*	.30*
8	.01	-.01	.19*	.16
9	.10	.14	.19*	.19*
10	.21*	.12	.24*	.27*
11	.17*	.15	.27*	.25*
12	.09	.06	.13	.20*
13	.14	.15	.30*	.21*
14	.15	.14	.23*	.21*
15	.19*	.13	.23*	.26*
16	.21*	.17	.28*	.27*
Critical Thinking				
17	.03	.05	.17	.13
18	.14	.13	.24*	.16
19	.06	.10	.20*	.16
20	.16	.16	.22*	.11
21	.12	.23*	.20*	.07
22	.16	.21*	.16	.16
23	.12	.06	.17*	.11
24	.26*	.15	.18*	.13
25	.22*	.20*	.19*	.19*
26	.23*	.17*	.29*	.23*
27	.22*	.21*	.31*	.21*
28	.26*	.23*	.20*	.22*
29	.19*	.16	.20*	.13
30	.24*	.18*	.22*	.22*
31	.28*	.21*	.34*	.30*
32	.21*	.19*	.24	.22*
33	.25*	.22*	.18*	.25*
34	.11	.21*	.17*	.27*

*Significant at .01 Level

Table D-2 : Correlations Between Technology and Outcome Variables by Item

	Technology (n = 228)					
Item	**54**	**55**	**56**	**57**	**58**	**74**
Joint Campaign						
35	.28*	.18*	.17	.23*	.21*	.18*
36	.22*	.16	.19*	.21*	.16	.26*
37	.22*	.16	.19*	.25*	.14	.27*
38	.25*	.17*	.23*	.17	.14	.20*
39	.19*	.17	.17*	.17*	.13	.19*
40	.19*	.16	.15	.21*	.12	.13
41	.23*	.21*	.16	.15	.14	.24*
42	.19*	.17*	.25*	.20*	.19*	.22*
43	.17	.15	.16	.26*	.21*	.15
44	.20*	.17*	.14	.18*	.13	.12
45	.09	.15	.11	.15	.09	.09
Air/Space Power						
46	.16	.17	.21*	.23*	.15	.20*
47	.18*	.16	.20*	.17*	.10	.13
48	.16*	.04	.12	.19*	.14	.14
49	.20*	.10	.15	.18*	.20*	.12
Command & Lead						
5	.08	.05	.12	.12	.09	-.01
6	.10	.06	.14	.13	.03	.05
7	.20*	.12	.21*	.11	.07	.04
8	.04	.03	.08	.07	.16	-.06
9	.21*	.09	.13	.03	.00	.11
10	.24*	.15*	.28*	.23*	.14	.15
11	.17*	.09	.19*	.16	.10	.16
12	.10	.01	.08	.10	.09	.07
13	.22*	.20*	.19*	.21*	.18*	.24*
14	.08	.06	.08	.11	.12	.14
15	.17*	.03	.17*	.14	.16	.18*
16	.17*	.08	.24*	.19*	.08	.16
Critical Thinking						
17	-.00	-.06	.00	.00	.09	.02
18	.15	.11	.10	.10	.13	.18*
19	.08	.03	.04	.02	.05	.06
20	.18*	.18*	.09	.04	.07	.14
21	.19*	.18*	.08	.04	.02	.16
22	.13	.09	.03	.08	.04	.03
23	.16	.19*	.09	.08	.06	.09
24	.17*	.12	.09	.11	.11	.12
25	.14	.09	.13	.18*	.14	.21*
26	.15	.08	.11	.16	.14	.15
27	.12	.14	.12	.21*	.17*	.18*
28	.07	.10	.06	.20*	.14	.15
29	.14	.07	.06	.12	.06	.21*
30	.22*	.14	.24*	.15	.09	.18*
31	.23*	.11	.21*	.19*	.17	.23*
32	.08	.12	.10	.13	.19*	.21*
33	.16	.18*	.25*	.23*	.18*	.17
34	.06	.03	.06	.15	.16	.09

*Significant at .01 Level

Table D-3 : Correlations Between Curriculum and Outcome Variables by Item

	Curriculum (n = 228)				
Item	**59**	**60**	**61**	**62**	**67**
Joint Campaign					
35	.31*	.21*	.37*	.26*	.17
36	.25*	.25*	.34*	.28*	.19*
37	.30*	.27*	.37*	.36*	.22*
38	.27*	.23*	.31*	.25*	.20*
39	.30*	.26*	.35*	.28*	.29*
40	.25*	.19*	.33*	.19*	.18*
41	.29*	.13	.35*	.25*	.19*
42	.26*	.19*	.33*	.12	.25*
43	.18*	.17	.27*	.15	.19*
44	.22*	.06	.37*	.09	.15
45	.23*	.15	.30*	.09	.18*
Air/Space Power					
46	.30*	.23*	.41*	.17	.19*
47	.21*	.05	.35*	.16	.20*
48	.26*	.21*	.41*	.19*	.15
49	.31*	.20*	.40*	.21*	.16
Command & Lead					
5	.15	.07	.13	.09	.12
6	.14	.13	.26*	.08	.21*
7	.16	.16	.25*	.07	.25*
8	.10	.12	.20*	.10	.09
9	.13	.12	.27*	.13	.11
10	.10	.20*	.25*	.21*	.13
11	.26*	.17*	.28*	.23*	.16
12	.16	.15	.26*	.17*	.10
13	.22*	.12	.32*	.32*	.21*
14	.16	.17	.28*	.14	.17
15	.17	.17	.27*	.17*	.15
16	.18*	.10	.27*	.23*	.16
Critical Thinking					
17	.24*	.15	.23*	.11	.01
18	.24*	.12	.27*	.15	.14
19	.20*	.08	.23*	.05	.06
20	.23*	.23*	.30*	.09	.20*
21	.21*	.09	.19*	.17	.17*
22	.26*	.11	.20*	.13	.08
23	.19*	.10	.19*	.14	.17
24	.30*	.18*	.29*	.22*	.16
25	.34*	.21*	.31*	.25*	.10
26	.34*	.18*	.31*	.18*	.11
27	.27*	.20*	.33*	.23*	.11
28	.34*	.15	.33*	.22*	.09
29	.22*	.05	.18*	.18*	.10
30	.22*	.23*	.36*	.18*	.20*
31	.30*	.24*	.32*	.27*	.21*
32	.23*	.18*	.38*	.14	.20*
33	.22*	.19*	.28*	.13	.16
34	.25*	.12	.31*	.16	.08

*Significant at .01 Level

Table D-4 : Correlations Between Research and Outcome Variables by Item

	Research (n=228)		
Item	**63**	**68**	**69**
Joint Campaign			
35	.16	.21*	.12
36	.17	.22*	.26*
37	.17*	.23*	.25*
38	.20*	.18*	.20*
39	.17*	.15	.18*
40	.13	.10	.09
41	.16	.21*	.18*
42	.13	.17	.13
43	.09	.13	.11
44	.16	.12	.04
45	.24*	.19*	.11
Air/Space Power			
46	.09	.21*	.02
47	.11	.15	.01
48	.01	.10	.02
49	.09	.12	.10
Command & Lead			
5	.02	.09	.07
6	.15	.11	.05
7	.17*	.18*	.17*
8	.10	.05	-.01
9	.09	.06	.09
10	.20*	.21*	.23*
11	.17	.13	.19*
12	.13	.07	.05
13	.12	.20*	.20*
14	.14	.12	.09
15	.21*	.18*	.16
16	.20*	.18*	.22*
Critical Thinking			
17	-.01	-.12	-.05
18	.05	.08	.05
19	.11	.05	.02
20	.17*	.10	.08
21	.12	.11	.02
22	.02	.04	.06
23	.11	.12	.14
24	.10	.15	.11
25	.03	.09	.13
26	.11	.07	.11
27	-.01	.09	.09
28	.06	.10	.11
29	.14	.09	.09
30	.07	.10	.11
31	.13	.11	.15
32	.14	.19*	.13
33	.03	.10	.11
34	.04	.09	.10

*Significant at .01 Level

Table D-5 : Correlations Between Faculty and Outcome Variables by Item

	Faculty (n=228)		
Item	**64**	**65**	**70**
Joint Campaign			
35	.25*	.32*	.16
36	.30*	.32*	.09
37	.31*	.30*	.08
38	.27*	.26*	.09
39	.33*	.24*	.04
40	.23*	.24*	.02
41	.26*	.21*	.06
42	.33*	.25*	.10
43	.20*	.17	.10
44	.26*	.18*	.07
45	.27*	.24*	.08
Air/Space Power			
46	.32*	.24*	.14
47	.23*	.15	.09
48	.24*	.16	.17
49	.27*	.26*	.11
Command & Lead			
5	.12	.11	.09
6	.27*	.10	.04
7	.21*	.14	.03
8	.22*	.15	.11
9	.21*	.22*	.20*
10	.33*	.26*	.12
11	.27*	.20*	.12
12	.25*	.16	.09
13	.24*	.25*	.10
14	.26*	.17	.06
15	.27*	.23*	.16
16	.26*	.27*	.14
Critical Thinking			
17	.14	.09	.12
18	.24*	.22*	.09
19	.20*	.07	.11
20	.25*	.14	.03
21	.16	.13	.11
22	.27*	.10	.09
23	.09	.14	.05
24	.26*	.21*	.10
25	.19*	.18*	.20*
26	.23*	.23*	.16
27	.15	.20*	.09
28	.18*	.22*	.15
29	.15	.13	.21*
30	.24*	.17*	.14
31	.28*	.18*	.12
32	.28*	.16	.09
33	.24*	.19*	.07
34	.22*	.18*	.10

*Significant at .01 Level

Table D-6 : Correlations Between Grading and Outcome Variables by Item

	Grading (n=228)			
Item	**66**	**71**	**72**	**73**
Joint Campaign				
35	.17	.22*	.15	.12
36	.17	.22*	.10	.10
37	.21*	.24*	.07	.13
38	.15	.15	.13	.08
39	.14	.14	.14	.18*
40	.15	.24*	.10	.20*
41	.15	.20*	.06	.19*
42	.16	.29*	.18*	.21*
43	.11	.18*	.15	.16
44	.04	.13	.16	.19*
45	.05	.10	.02	.08
Air/Space Power				
46	.13	.21*	.13	.21*
47	.05	.14	.11	.17
48	.07	.14	.19*	.19*
49	.08	.25*	.08	.18*
Command & Lead				
5	.02	.04	-.03	-.02
6	.08	.08	.13	.02
7	.12	.18*	.09	.12
8	.05	.11	.11	.08
9	.13	.14	.11	.09
10	.25*	.16	.09	.08
11	.10	.17	.16	.12
12	.07	.10	.19*	.14
13	.14	.25*	.22*	.03
14	.10	.13	.11	.10
15	.05	.11	.08	-.01
16	.15	.23*	.17	.01
Critical Thinking				
17	-.06	-.04	.08	.12
18	.06	.12	.20*	.08
19	.03	.06	.16	.07
20	.15	.11	.31*	.06
21	.09	.09	.12	.05
22	.01	.10	.14	.09
23	.06	.16	.13	.06
24	.10	.15	.10	.13
25	.09	.17	.06	.17
26	.12	.17	.03	.19*
27	.12	.17	.09	.16
28	.11	.21*	.11	.26*
29	-.05	.09	-.01	.07
30	.10	.18*	.09	.12
31	.10	.18*	.13	.11
32	.03	.17	.14	.13
33	.15	.21*	.18*	.18*
34	-.01	.19*	-.00	.17

*Significant at .01 Level