A SURVEY OF CERTIFIED FLIGHT INSTRUCTORS: SELF REPORTED ASSESSMENTS OF DEPTH AND BREADTH OF KNOWLEDGE AND CONFIDENCE TO TEACH PRIVATE PILOT STUDENTS

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CHAPTER I

INTRODUCTION

Background

Learning to fly an aircraft is a complex undertaking. Over the past ninety years the method for earning pilot wings has matured greatly from the trial-and-error method to the highly organized formal training programs available today. Whereas a student in the past only had to master a relatively simple, if unreliable, aircraft, today students and instructors alike must understand and master a complex aircraft in a much more complex environment:

> In the early days of aviation, faulty engines and substandard airframe construction led to the majority of accidents. For example, the OX5 series of engines, which powered almost every military and civil aircraft design in the 1920's, had a time-between-overhaul of about 50 hours. It seemed that power-off landings were more common than the opposite and led to a large percentage of all aircraft mishaps.
>
> As aviation progressed, maintenance and construction of airplanes became more reliable, and today the prospect of an engine failure is quite remote. Meanwhile, the environment in which we fly has become much more demanding. All-weather operations are the norm, adding instrument piloting skills and procedures to the tasks that a well-traveled pilot needs to master. Airplanes are much faster and aerodynamically much cleaner, meaning events happen much more quickly; unplanned contact with the ground or an obstacle happens at a faster speed with deadly impact force. Mechanical factors as the primary causes of accidents have been overshadowed by human factors. We would be foolish to say that mechanical systems can stand little improvement, but we would be wise to say that in order to make substantial reductions in the number of accidents, we need to improve on the human factor (Turner, 1995, p. 4).

In addition to the factors noted by Turner, numerous and ever-changing Federal Aviation Regulations, airspace classifications, aeronautical charts, weather, and the effects of flight on our own bodies must be addressed. Recently, additional subjects such as decision making and crew resource management (CRM) have been added to the body of knowledge required of Private Pilots by the FAA.

These new areas were added because of the increased awareness of "human factors" as a primary cause of the majority of aircraft accidents. As the aircraft themselves became better and more reliable, and with the introduction of jet aircraft into military and civil fleets, the causes of accidents was found to be less frequently the machine and much more frequently the human operators. Figure 1 clearly indicates that from 1959 through 1989 large commercial jet transports were most likely to be lost because of failures attributable to the flightcrew. Similarly, between 1982 and 1988 the vast majority of accidents among the smaller general aviation aircraft fleet were most frequently because of "pilot related" issues (Figure 2).

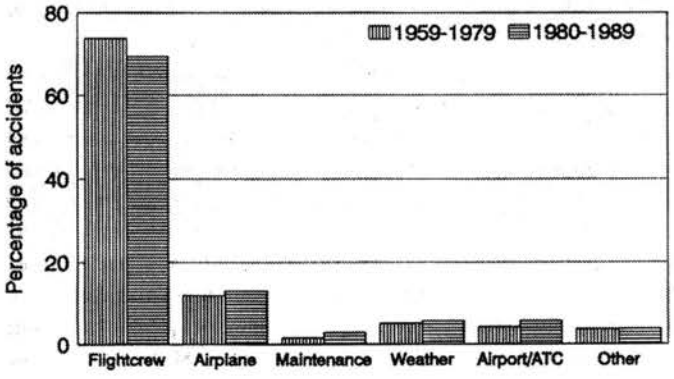

Figure 1. Primary causes of hull loss accidents (excluding military and sabotage): worldwide commercial jet fleet, 1959-1989. Data from Boeing Aircraft Company. (From Weiner, Wiener, Kanki, and Helmreich, 1993, p. 5)

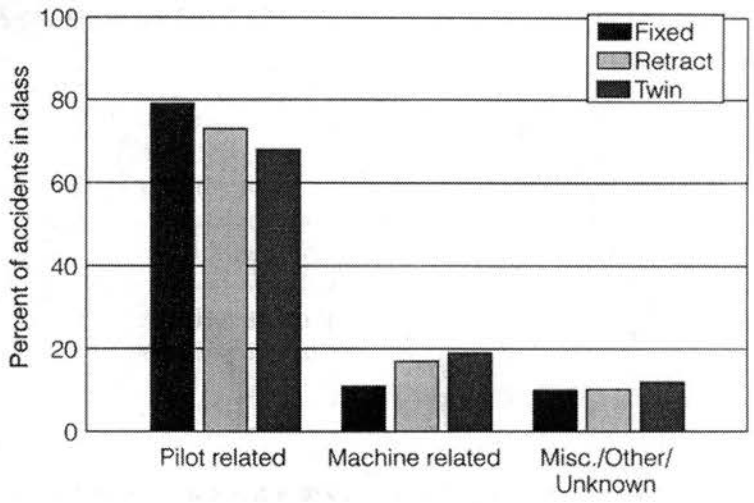

Figure 2. Major causes in general aviation accidents: 1982-1988
(Data from AOPA Air Safety Foundation, in Turner, 1995, p. 2)

Whereas flying in the military and when learning to fly in the civilian world it became quite clear to this author that not all pilots, or even instructors, had a solid grasp of all of the various aspects of aviation. This lack of knowledge was to be expected to some degree. Not every pilot or even instructor will be an expert in every area. However, several common threads became evident through research.

One thread, anecdotally at least, was that most pilots had a firm understanding of the capabilities and limitations of their aircraft and they could safely and confidently pilot them ***most of the time***. Also, most pilots, civilian and military alike, seemed to be very confident that they could carry out any mission given them. Unfortunately, it is not usually the mechanics of the aircraft or of flying itself that causes pilots trouble. Rather, it is understanding and dealing with their own limitations (i.e. "human factors" or "physiology"). Robert L. Helmreich and H. Clayton Foushee point this out in the first chapter of Cockpit Resource Management: "The conclusion drawn from these investigations was

that 'pilot error' in documented accidents and incidents was more likely to reflect failures in team communication and coordination *than deficiencies in 'stick-and-rudder' proficiency"* [italics added] (Helmreich and Foushee in Wiener, Kanki, and Helmreich, 1993, p. 7). And again: "The primary conclusion drawn from the study was that most problems and errors were induced by breakdowns in crew coordination rather than by deficits in technical knowledge and skills" (Helmreich and Foushee in Wiener et al, 1993, p. 17). Whereas these comments were made regarding commercial air carrier operations, the same trends can be seen in general aviation.

A second thread was the realization that many pilots and instructors possess only a rudimentary level of knowledge in areas other than those directly concerned with flying the aircraft. These pilots understand enough of each of these subjects to function effectively under most circumstances, but if you probe some areas deeper than the surface, no firm foundation of knowledge or understanding of fundamental principles exists. Weather and the Federal Aviation Regulations were two of the most obvious areas where this lack of depth of knowledge was noticed. Later, when speaking to colleagues about this problem, several other possibly deficient areas presented themselves. Physiology, or Human Factors, eventually became the area we suspected was the least understood by pilots of all types and possibly the most important because, as we have seen, human failings are now the single largest factor in aircraft accidents.

A third thread concerned the concept of the "culture of safety." To some extent both military aviators and scheduled airline pilots come from a culture where recurrent training and annual and no-notice checkrides are the norm. This culture and the routine of

regular flying encourages these pilots to remain vigilant (see *Organizational Safety Culture: Implications for Aviation Practice* by Pidgeon and O'Leary in Johnson, McDonald, and Fuller, 1994). Compared to their military and airline counterparts, civilian aviators often live in a far less structured training environment with less frequent checkrides (typically two years between biennial flight reviews (FAR Part 61.56)), fewer regular opportunities for formal training, and a generally less demanding safety culture.

This less demanding culture is clearly evident in Hunter's survey where he found that the median number of hours flown by general aviation pilots (i.e. noncommercial and nonmilitary pilots) was only 2.5 hours per month (Hunter). In *Cockpit Resource Management: The Private Pilot's Guide*, author Thomas P. Turner also finds this same lack of dedication to what he refers to as the "profession" of being a pilot. He notes:

> This is where I draw the distinction between refresher and recurrent training. The function of the first is to "refresh" to bring a pilot back to the minimum standards of the privileges he or she enjoys, and recurrent instruction is a regular meeting meant to knock the rust off latent skills but challenging and frequent enough that the pilot doesn't have to be brought up to minimum standards; pilots instead can actually advance their competence to the next level. In my experience, pilots who train at the minimum times required (biennial flight reviews, etc.) tend to need "refresher" training, while those who go the extra mile and seek out instruction annually or even every six months generally get better with each added session. *Unfortunately, few lightplane pilots feel the need for this sort of recurrency training.* [italics added]
>
> In another example of the reluctance (and perhaps fear?) of regular training, several independent industry sources tell me that only about 5 percent of Beech Bonanza pilots ever seek out type-specific training, such as that offered by the American Bonanza Society, FlightSafety International, and the like. To be sure, many of the remaining Beech pilots are certainly logging time with local instructors, but *how many simply fly these high-performance airplanes with the minimum instruction required, when (again in my experience) the legal minimums generally don't even allow a pilot to maintain the skills required to pass the private*

> *or instrument checkride if it were suddenly required again*? [italics added]
>
> A third illustration: An informal poll of companies offering high-performance homebuilt airplanes revealed that very few would even consider creating a detailed pilot checkout syllabus. I've heard "My airplane flies like a Cessna 182" from half a dozen kit manufacturers. I got a feeling that if a company offered a training program to pilots of its design, customers might interpret that to mean the airplane is difficult to fly and take their kit monies elsewhere. Again, my experience as a flight instructor - teaching pilots who already had their certificates and ratings, who came from all over the country and even overseas, and who are regularly flying VFR and IFR in the system - showed that *few students could adhere to the standards of their certificates without some effort to get back up to speed.* [italics added] (Turner, 1995)

The weak link in aviation safety is the human operator. What is also suspected is that a significant number of pilots and more specifically, CFI's, lack knowledge and/or confidence in one or more of the areas needed to safely train Private Pilots, most specifically in the area of human factors or physiology.

Even some of the more traditional subjects areas which have been included in the FAA's Practical Test Standards (PTS) for some time, such as weather, are often taught at a rudimentary level. The CFI's themselves may only posses a basic level of knowledge in some of these areas with only enough knowledge to assure that they and their students pass the FAA written test and the checkride. This author's experience parallels that of Turner, finding that many CFI's posses only this rudimentary level of knowledge in several of the knowledge and performance areas. Beyond the knowledge needed to "pass the test" these instructors cannot accurately answer in-depth questions about "why" the correct answer is correct.

This lack of knowledge was demonstrated once again when discussing the subject of with colleagues. Specifically, when discussing the subject of physiology, Conway states:

> The current Federal Aviation Regulation (FAR) requirement concerning pilot training does not specifically address the issue of physiology for the students (Federal Aviation Regulations 61.87 (b), 61.105, 61.125, 61.153, and 61.185). The requirement is *covertly* expressed throughout the regulations. The Certified Flight Instructor must assess if the student has sufficient knowledge to pass the written and practical test. These tests include physiological factors. No specific requirement exists, except for flight above 25,000 feet, for pilots to receive training on hypoxia, hyperventilation, spatial disorientation, and decompression sickness. Each flight instructor is individually responsible for the development of the lesson plan to accomplish pilot training. *An informal survey by this author of ten flight instructors indicates a wide variance in personal knowledge in this subject and a lack of formal training in this area. Furthermore, when asked if they were comfortable in teaching this subject, seven of the ten responded "NO."* [italics added] (Conway, unpublished, in Conway, 1995)

This author believes that many more areas of important knowledge exist in which a significant number of instructors believe that they do not have a sufficient degree of knowledge to have confidence in their ability to teach in these subject areas. Further, even when possessing sufficient knowledge, it is hypothesized that some significant number of CFI's still do not have confidence in their ability to teach this material to new private pilot students. This lack of instructor confidence can often be detected by the student and affect their confidence or even lead to dangerous attitudes about the need for continual training.

Private Pilot Training - FAR Requirements

If we are to study the knowledge and confidence of CFI's, it will be helpful to briefly describe the basics of Private Pilot training. The rules concerning the certification process for Private Pilots are defined in FAR Part 61, Subpart C - Student Pilots (FAR 61.81 -61.101) and Subpart D - Private Pilots (FAR 61.102 - 61.120). These regulations ex-

plain the requirements for obtaining a certificate, the number of hours required, the prerequisites for taking the written and the practical examination, and so on.

Private Pilot Training - Written and Practical Examination

The written examination for a Private Pilot, single engine land rating, consists of 60 multiple choice questions drawn from a bank of 711 questions. The minimum passing score for the examination is 70%. The questions cover a variety of topics and the FAA has devised a system to describe which topic area the question refers to as well as the source of the information (e.g. Advisory Circulars or FAR's). The FAA system is rather complex but a number of private firms, which publish the test questions along with the answers and explanations for study purposes, generally divide the questions into much more useful groupings. These knowledge areas, as organized by one such publisher, Irvin N. Gleim, are shown in Table 1. In addition to the various knowledge areas the number of questions within each area is shown. Simply from the number of questions in the Private Pilot test bank FAR's are considered important by the FAA whereas Aero-medical Factors are not.

Chapter	# of Questions	Knowledge Area
Chapter 1:	35	Airplanes and Aerodynamics
Chapter 2:	77	Airplane Instruments, Engines, and Systems
Chapter 3:	83	Airports, Air Traffic Control, and Airspace
Chapter 4:	182	Federal Aviation Regulations
Chapter 5:	57	Airplane Performance and Weight and Balance
Chapter 6:	15	Aeromedical Factors
Chapter 7:	56	Aviation Weather
Chapter 8:	73	Aviation Weather Services
Chapter 9:	58	Navigation: Charts, Publications, Flight Computers
Chapter 10:	29	Radio Navigation
Chapter 11:	46	Cross-Country Flying
Total Questions:	711	

Table 1. Number of FAA questions per knowledge area
(As organized by Gleim, 1997).

All of the Private Pilot questions and the correct answers are public information and are available through various commercial publishers. Several of these publishers print not only the questions and answers but add an explanation and the reference source where the correct answer may be found. Many students report that it is possible to memorize and pass the test without a firm understanding of the underlying theories.

The number of questions from each area which will appear on the 60 question exam is defined by an internal FAA document. The following approximations (Table 2) were obtained from the Airman Testing Standards Branch (AFS-610) at the FAA's Mike Monroney Aeronautical Center in Oklahoma City, OK (M. Jacobs, personal communication, July 22, 1997).

20%	Federal Aviation Regulations
20%	Principles of Flight
20%	Weather
20%	Navigation
20%	Operations

Table 2. Percentage of questions by area on an
FAA Private Pilot Written Exam (M. Jacobs, personal communication, July 22, 1997)

All FAA testing is now accomplished by computer. According to the FAA fifteen different versions of the Private Pilot Written Exam exist, each containing a different selection of the various questions available from the question bank but generally conforming to the form shown in Table 2 (M. Jacobs, personal communication, July 22, 1997). Students schedule their exam with a contractor (e.g. Sylvan, Lasergrade, and CATS) and one of the 15 unique versions of the test is downloaded by the FAA to that contractor.

The practical examination is much more comprehensive and open ended than the written exam. The specific areas to be examined are defined by the FAA, but an evaluator may probe to various depths in order to assure themselves that a student meets all of the requirements. The specific knowledge and task areas to be examined during a Private Pilot practical examination are described in Private Pilot, For Airplane Single-Engine Land, Practical Test Standards (FAA-S-8081-14S), more commonly known as PTS. PTS defines each area to be examined, the conditions under which it must be accomplished and the parameters which define success.

Practical Test Standards not only delineates every task or knowledge area to be tested but it also cites the sources of the knowledge or regulations in question. Unfortunately, this author has found that a number of CFI's do not make full use these materials and often do not even have all of them available. All of the sources cited within the PTS manual for examining CFI's are listed in Figure 3.

FAR Part 61	Certification: Pilots and Flight Instructors
FAR Part 91	General Operating and Flight Rules
FAR Part 97	Standard Instrument Approach Procedures
NTSB Part 830	Notification and Reporting of Aircraft Accidents and Incidents
AC 00-2	Advisory Circular Checklist
AC 00-6	Aviation Weather
AC 00-45	Aviation Weather Services
AC 60-14	Aviation Instructor's Handbook
AC 61-13	Basic Helicopter Handbook
AC 61-21	Flight Training Handbook
AC 61-23	Pilot's Handbook of Aeronautical Knowledge
AC 61-27	Instrument Flying Handbook
AC 61-65	Certification: Pilots and Flight Instructors
AC 61-67	Stall and Spin Awareness Training
AC 61-84	Role of Preflight Preparation
AC 61-94	Pilot Transition Course for Self-Launching or Powered Sailplanes (motorgliders)
AC 67-2	Medical Handbook for Pilots
AC 90-48	Pilots' Role in Collision Avoidance
AC 91-13	Cold Weather Operation of Aircraft
AC 91-23	Pilot's Weight and Balance Handbook
FAA-S-8081 -1	Private Pilot Practical Test Standards
FAA-S-8081-2	Commercial Pilot Practical Test Standards
FAA-S-8081-4	Instrument Rating Practical Test Standards
AIM	Airman's Information Manual
IAP's	Instrument Approach Procedures (charts)
SID's	Standard Instrument Departures
STAR's	Standard Terminal Arrivals
AFD	Airport Facility Directory
NOTAM's	Notices to Airmen

Pertinent Pilot Operating Handbooks and FAA-Approved Flight Manuals

Figure 3. References cited in Practical Test Standards: Flight Instructor, For Airplane Single-Engine Land (FAA-S-8081-6AS)

The Need for a New Study

After examining CFI training, no research was found in the specific area of CFI attitudes toward their knowledge and level of confidence to teach. In order to answer all of the questions we had generated about this level of knowledge and confidence, original

research was needed. This study was developed to gain a more accurate view of how Certified Flight Instructors assess their own level of knowledge and confidence in their ability to teach the material just noted by the FAA. Because a similar study has not been conducted this study will provide a baseline for future studies. Insofar as CFI's are concerned, it is hypothesized that any deficiencies in knowledge or ability to teach in any particular area will be detected and quantified and assist the FAA and CFI's to improve the training and certification of CFI's and the instruction of private pilots. This study can represent the first step toward answering these questions.

The National Transportation Safety Board (NTSB) has the authority to make binding recommendations after fatal accident investigations (Ellis, 1984). The relatively recent addition of aeromedical factors (or physiology), cockpit management and decision making skills to the private pilot Practical Test Standards are three examples of knowledge areas which have been added upon NTSB recommendation. Because many CFI's, especially older CFI's, have not been explicitly trained in these areas, many of them could be inadequately prepared to teach these subjects. Even younger CFI's, who should have received training in cockpit management, decision making, and physiology, may have been instructed and examined by CFII's and evaluators who themselves may have limited knowledge and confidence in these areas. In addition, because human factors are responsible for the majority of all aircraft accidents and incidents it is likely that many pilots are not part of the "culture of safety" which would encourage them to continue to hone and build their skills in all areas. These factors will likely affect the knowledge and confidence level of some instructors.

Statement of the Problem

Are certified flight instructors knowledgable and confident in all of the knowledge and performance areas required by the FAA to teach private pilot students? If not, what information indicates that particular flight training backgrounds may produce more knowledgable and/or confident instructors with respect to other methods? Unfortunately, no studies or surveys have directly asked these questions of CFI's. Data concerning the capabilities or quality of the instructor force once in the field have only been inferred through accident statistics but they have never been directly measured (R. Kopece, personal communication, April 16, 1997). In addition, no evidence exists that individual instructor attitudes about their own capabilities and confidence have ever been measured. This study was designed to ask Certified Flight Instructors to assess their level of knowledge and confidence to teach the required material to a private pilot student in each of the thirteen knowledge and eight performance areas delineated by the FAA in publication FAA-S-8081-14S, 1 May, 1995, Private Pilot, For Airplane, Single Engine Land, Practical Test Standards.

Purpose of the Study

This research will gauge how Certified Flight Instructors assess their abilities to teach private pilot students. Specifically, this study will assess CFI abilities as to the depth and breadth of knowledge in each of the various areas required for the instruction of private pilot students and how confident they are when teaching the material in each of these areas. Because learning to fly involves academic knowledge as well as the performance

of various tasks, this survey will ask questions in both of these areas.

Also, it is hypothesized that a correlation exists between how confident a CFI is and where the CFI obtained their original flight training. Because military aviators and commercial airline pilots (FAR Part 121 and 135 carriers) often receive far more in-depth training in weather, physiology, aerodynamics, decision making, and crew coordination, these aviators should be more knowledgable and confident when dealing with these topics (See Appendix E for excerpts from the Joint USAF/USN Undergraduate Pilot Training Syllabus). Further, these aviators are often operating in a culture that rewards recurrent training and an emphasis on safety. This, too, may have a positive effect on their level of knowledge and confidence.

Significance of the Study

If a significant number of instructors report that they are not adequately prepared to teach in all areas, then the degree to which this is true and the deficient areas need to be quantified. A much larger follow-on study should then be completed to more accurately assess which areas of training need to be improved or expanded. If the vast majority of CFI's indicate that they are adequately prepared to teach, or if no significant difference exists between military and civilian trained CFI's, then it is important to know this as well. Money could be better spent in other areas of pilot training. If CFI's who earned their wings and instructor status in the military are significantly more confident in their knowledge and/or their ability to teach, and, after further study, it can be confirmed that they are indeed more knowledgable and confident, then it may indicate that more emphasis needs to be placed on civilian CFI training and experience requirements for those

without this type of training background. This could be significant as the relative percentage of pilot production shifts from the military to the civilian sector as the number of pilots trained in the military continues to decrease (Fulghum, 1991).

Because fewer and fewer military pilots are being trained and fewer available to the airlines and as civil instructors, the number of instructors trained exclusively in a civilian environment will grow. We must insure that these instructors are fully competent and confident in their abilities. Much of the experience, knowledge, confidence, and ethic which former military aviators posses is simply not available to young CFI students. If this experience, knowledge, confidence, and ethic is found to be significant, it is possible that the requirements for CFI training and certification may need to be modified.

Assumptions of the Study

The following assumptions were made when planning and conducting this survey and when interpreting the results:

1. Because some specific action needs to be taken every two years in order to remain current as a CFI (FAR Part 61.197) it was assumed that the FAA list of current CFI's would represent the greater population of CFI's from which to select subjects for this survey.

2. Because the survey promised anonymity it was assumed that the respondents would be truthful in their responses to the survey questions.

3. Because all CFI's should be familiar with the terms and acronyms common to the field of aviation it was assumed that no additional or amplifying information would be required to explain these acronyms, technical terms, or FAA nomenclature.

4. Because all CFI's should be familiar with the FAA publication Practical Test

Standards and the various knowledge and performance areas mentioned within it, it was assumed that no additional explanations would be needed in order for respondents to comprehend and accurately complete the questionnaire.

Limitations of the Study

Due to financial limitations, only 700 surveys were distributed and no follow-up mailing was accomplished. 81 surveys were returned but only 73 contained fully usable data. The return rate of 10.43% represents only 0.097% of the greater CFI population of 75, 422 instructors. In addition, the absolute numbers of females and CFI's with military experience is very small; only 11 females responded and 15 with military experience.

By comparison, Hunter (1995) was attempting to obtain a large sample from the population of all pilots currently registered with the FAA (561,486 pilots with a private certificate or higher) and mailed out to a random sample of 19,248. His return rate was about 35% with 6,735 responding. Approximately 1.2% of the total pilot population participated in Hunter's survey. The small sample size of this survey limits any generalizations which may be derived.

Even though an individual may be on the FAA rolls as a CFI, this does not mean that they are actively teaching or, more specifically, that they are actively teaching Private Pilot students. Some may only teach students seeking additional ratings or are airline instructors or check airmen with little or no recent experience teaching Private Pilot students. Unless specifically stated in their written comments, no information exists to document their status.

Definition of Terms

Aeromedical Factors. The area of knowledge which deals with human performance and limitations in an aviation environment which is used to improve safety. This includes information from the medical field as well as information from the fields of psychology and sociology. My be used interchangeably with the terms "Physiology" and "Human Factors."

Airline Transport Pilot (ATP). An FAA rating required of pilots who fly for scheduled airlines or Part 121 carriers. Except for being an astronaut this is the highest rating a pilot can achieve.

Aircraft Owners and Pilots Association (AOPA). The AOPA is a large membership organization dedicated to the needs of general aviation aircraft owners and pilots. The organization organizes lobbying efforts in Washington DC and educational forums and operates the AOPA Air Safety Foundation.

Certified Flight Instructor (CFI). A Certified Flight Instructor is a pilot who has demonstrated both the academic and practical knowledge to instruct student pilots and recommend them for their written and practical tests.

CFII. A person holding a Certified Flight Instructor, Instrument rating allowing them to instruct students in instrument procedures.

Checkride. A checkride is a practical examination of knowledge and flying skills required before a license or rating may be granted. The required knowledge and skills as well as the minimum passing requirements for a checkride for each license or rating (e.g. Private Pilot, Instrument, Commercial, etc.) are contained in the Practical Test Standards (PTS) for that rating published by the FAA.

Civil Aeromedical Institute (CAMI). The Civil Aeromedical Institute is part of the FAA and is located at the Mike Monroney Aeronautical Center in Oklahoma City, OK. Personnel at CAMI conduct research into the various aspects of human performance in aviation, maintain the medical certification system for civilian pilots, and develop educational medical programs.

Commercial Aviation. Any aviation activity performed for hire. Most often commercial aviation refers to the scheduled airlines or commuter airlines but it may also refer to cargo flights (e.g. Federal Express), charter flights and sight seeing.

Crew Resource Management (CRM). A relatively new concept in aviation safety (since the late 1970's) where the focus is placed upon the group instead of on individuals to reduce the number of mishaps. Various concepts such as team building, communications, leadership/followership, line-oriented flight training (LOFT), and the SHEL model are all involved to try to reduce the number of accidents in aviation. John K. Lauber of the NTSB defined CRM as: "Using all available resources - information, equipment, and people - to achieve safe and efficient flight operations (Lauber in Wiener, et al, 1993).

Experimental Aircraft Association (EAA). The EAA is an organization dedicated to encouraging the construction and use of amateur built aircraft. The EAA also works to lobby Congress and promote safety in general aviation. The EAA organizes the largest flying event in the world, the annual EAA fly-in at Whitman Field in Oshkosh, WI.

Federal Aviation Administration. The agency of the Federal Government responsible for the formulation and enforcement of regulations concerning all non-military aviation operations in the United States. The FAA also licenses all U.S. civil pilots.

Federal Aviation Regulations (FAR's). The general name for the body of rules governing civil aircraft and airmen in the United States under Title 14 of the Code of Federal Regulations (CFR). Some of the various parts and subparts of the FAR's which concern the certification of Private Pilots and Certified Flight Instructors are defined below.

FAR Part 61 - Certification, Pilots and Flight Instructors. This part defines the pre-requisites and requirements for obtaining Student, Private, Commercial, Instrument, Instructor and Airline Transport Pilot certificates.

FAR Part 91 General Operating and Flight Rules. This part of the FAR's defines how civil aircraft must conduct operations within the United States.

FAR Part 121. The rules concerning the operation of commercial air carriers flying large transports along scheduled routes.

FAR Part 135. Part 135 deals with "commuter" or "on demand" airline operations.

FAR Part 141 Pilot Schools. Rules covering the operation of formal flight training schools meeting certain FAA requirements.

General Aviation. Any aircraft which is not owned or operated by the government or the military or is not a scheduled or commuter aircraft belongs to general aviation. General aviation represents the largest segment of aviation in the United States when defined by the number of aircraft, the number of pilots and the number of operations (AOPA).

Human Factors. See "Aeromedical Factors."

Knowledge Areas. The thirteen areas defined in the Private Pilot PTS in which the student must demonstrate adequate knowledge.

MEI. A person holding a Multi-Engine Instructor certificate allowing them to in-

struct students in the operation of multi-engined aircraft.

National Association of Flight Instructors (NAFI). The National Association of Flight Instructors publishes the monthly magazine Flight Training.

Performance Areas. The eight areas defined in the Private Pilot PTS in which the student must demonstrate he or she can operate the aircraft.

Practical Tests Standards. A series of FAA publications defining the areas to be examined on a practical test, the conditions under which they must be accomplished, and the standards within which they must be performed. Each FAA license or rating will have its own practical test standard. The two PTS volumes used within this study are: Flight Instructor, For Airplane Single-Engine Land Practical Test Standards (FAA-S-8081-6AS) and Private Pilot, For Airplane Single-Engine Land, Practical Test Standards (FAA-S-8081-14S).

Physiology. See "Aeromedical Factors."

University Aviation Association. An association of institutions of higher education with programs in aviation.

Statement of the Hypothesis

The primary hypothesis of this study is that a significant number of CFI's believe that they are not adequately prepared to teach in at least one, if not several, of the knowledge and performance areas needed to safely and effectively train private pilot students. It is also hypothesized that a correlation exists between the confidence a CFI reports and where that CFI obtained their original flight training (e.g. military vs. civilian flight school).

Organization of the Study

The remainder of this work contains the following sections. Chapter II Review of the Literature: Discusses the dearth of work concerning the attitudes of CFI's toward their knowledge and confidence to teach. Chapter III, Methodology: Discusses the selection of the subjects, the creation and distribution of the questionnaire and the collection of the data from the questionnaire. Chapter IV, Results: Discusses the data captured from the respondents. Chapter V: Summary, Conclusions and Recommendations: Discusses the significant findings of the study including which hypotheses were or were not confirmed. Recommendations are also made concerning the impact of this survey and implications for additional research.

CHAPTER II

REVIEW OF THE LITERATURE

A dearth of information exists concerning the perceptions and attitudes of CFI's with regard to the instruction of Private Pilot students. To the best of my knowledge, no research has been conducted into the perception and attitudes of instructors with respect to how competent and confident they are to teach new Private Pilot students. The only statistical data which is collected is collected by the FAA and this data only indirectly hints at CFI capabilities in that it consists of the results of all FAA written examinations administered as well as whether a student passed or failed their practical examination.

The data includes the gross number of individuals who pass and fail the practical and written examinations and statistical data on the number of correct and incorrect answers given for each of the 711 possible individual questions on the 60 question Private Pilot written examination (R. Kopecke, personal communications, April, 16 1997). Whereas this type of statistical data is collected by the FAA and reveals the overall rate of success and failure on private pilot written tests, it does not provide data on how confident or well prepared each instructor is when performing their mission on a day to day basis. For the future the FAA is developing a form which will be filled out by flight examiners during the course of a check flight. This new information will allow the FAA to track the successful completion of each aspect of the check flight, or its failure, during each indi-

vidual check flight. Today the only information available is whether the student passed or failed their practical examination and an annotation as to which area or areas caused the failure to occur. Again, no ongoing direct evidence exists indicating how well prepared instructors are to teach their students (R. Kopecke, personal communications, April, 16 1997). Moreover, no information exists about the level of confidence exhibited by CFI's.

The effectiveness of what and how well CFI's are teaching is most often ***inferred*** through the previously mentioned monitoring of written and practical tests results as well as indirectly through accident investigations. The NTSB investigates all ***fatal*** general aviation accidents and then makes recommendations to the FAA if they believe that specific changes in training, rules or equipment are warranted. While all accidents are within the scope of the NTSB's mandate, the NTSB typically defers the investigation of nonfatal accidents to the FAA (DeHart, 1996, Ellis, 1984). In both cases accident trends are used to evaluate possible changes in training. In addition, if the FAA notes that the students of one particular instructor recorded an unusually high number of accidents, they may investigate the instructor. But, once again, no ***direct*** measure of the CFI's capability or confidence is ever actually measured.

No surveys or reports address CFI attitudes about perceived abilities or levels of confidence to teach students. Reports were concerned with instructor-student learning styles which sought to determine if the learning styles of instructors and students could reduce the time needed to solo and obtain a private pilot certificate (Kreienkamp, 1994, 1983), and surveys comparing specific collegiate aviation programs against national

norms (Kuhns, 1994). In addition, one survey looked specifically at the teaching of physiology in University Aviation Association (UAA) affiliated schools by Conway (Conway, 1995) and another in which the prevalence of "*Pilot Judgment and Decision-Making Training in Post-Secondary Educational Institutions*" was examined (Bowman, 1993). Unfortunately, none of these studies directly addresses the question of CFI knowledge and confidence to teach. However, while little could be found which pertained directly to this subject, it should be noted that it was Conway's survey (*Aviation Physiology in General Aviation: A Study of College and University Curricula Requirements and Recommendations*), and the discussions which ensued concerning some CFI's perceived lack of knowledge of physiology, which became the genesis of this survey.

The one recent general large-scale survey of pilots was conducted in 1995 by Dr. David R. Hunter of the FAA's Office of Aviation Medicine. Hunter surveyed almost twenty thousand pilots (possessing Private Pilot through ATP certificates) and received 6,735 responses. The study was designed to obtain baseline data to support research on aeronautical decision making. While very useful for this purpose and for providing background baseline data for this study, Hunter's survey did not specifically address CFI's or their attitudes toward knowledge and/or confidence when teaching.

In an effort to uncover any additional material germane to this subject numerous organizations were queried. The Aircraft Owners and Pilots Association (AOPA), the Experimental Aircraft Association (EAA), the National Association of Flight Instructors (NAFI), the staff of Flight Training Magazine, and various offices within the FAA, including the Airman Certification Branch, the Airman Testing Standards Branch and the

Civil Aeromedical Institute (CAMI) at the Mike Monroney Aeronautical Center in Oklahoma City, Oklahoma, were contacted. None of the persons contacted in any of these organizations knew of any research into CFI attitudes. The only survey of CFI's which was mentioned was noted by the editor of Flight Training Magazine and that survey was merely inquiring into CFI pay rates (S.M. Spangler, personal communications, April 16, 1997).

CHAPTER III

METHODOLOGY

Introduction

This study is based on the results of a questionnaire mailed to seven hundred CFI's throughout the United States. The following sections detail the process used to develop the survey instrument, distribute the questionnaire, collect the data and then to interpret the data. In addition, the target population of the research and the manner in which the smaller sample was selected is discussed.

Subjects

The subjects are all Federal Aviation Administration (FAA) licensed Certified Flight Instructors (CFI) selected from all those CFI's residing in the fifty states and the District of Columbia. The subjects's names were obtained from the publicly available list of all currently licensed CFI's available through an FAA contractor, Aerodata, Inc. A random subset of this group (700 or slightly less than 1% of the 75,422 individuals currently licensed as instructors) were selected. This relatively small number of subjects was used because of financial limitations imposed on the researcher.

The subjects were selected from the population of all current FAA Certified Flight Instructors. A CFI is considered "current" by the FAA if, within the past two calendar years, they:

1. Have been issued their original CFI certificate.
2. Have taken a CFI renewal checkride.
3. Have graduated from an approved flight instructor refresher course.
4. Have obtained an additional flight instructor rating (e.g. CFII or MEI).
5. Show evidence that they are a company check pilot, chief flight instructor, company check airman or flight instructor in a Part 121 or Part 135 operation, or regularly evaluate pilots

(FAR Part 61.197 Renewal of flight instructor certificates)

The FAA records which were used to obtain the sample (current as of 31 December, 1996) showed 75,422 current Certified Flight Instructors in the United States. Again, to be on this list a CFI must have obtained their CFI rating or taken some action to renewed it within the preceding two years. The FAA no longer provides direct access to its Airman Certification data. Instead, AeroData, a private company, contracts with the FAA to distribute the Airman Certification data. Cost constraints determined that only about seven hundred names could be selected and mailed questionnaires. Of the 75,422 current CFI's AeroData randomly selected 700 names and forwarded mailing labels to this author. AeroData randomly selected the names by dividing the total number of names on the list (75,422) by the number of names requested (700). This resulted in the number 107.74. Rounding down to 107, AeroData then selected every 107th name from the list until reaching the 700th name. Because the list is sorted alphabetically by postal zip code, a random geographical distribution of names was generated (W. Culberson, personal communications, January 22, 1997).

Instrument

A survey instrument was developed with assistance from the faculty of the Department of Aviation and Space Education at Oklahoma State University (see Appendix A). The data gathered with the questionnaire falls into four groups:

1. Biographical data (age, gender, flying hours, sources of flight training).
2. Self reported assessment of each CFI's knowledge and confidence in their ability to teach the material that is required by the FAA.
3. Several write in questions to determine the reasons behind their answers on the self assessment portion of the questionnaire.
4. Several general questions concerning the current state of CFI certification and the instruction of private pilot students.

No identifying information such as names, Social Security Numbers, or addresses were on any of the questionnaires and none were solicited. The only personal information collected was the respondent's age, number of hours they have flown, whether they had any prior military service, and, if yes, in which service. The ability to accurately link any individual with their questionnaire would be exceedingly difficult if not impossible.

The survey begins with twenty basic biographical questions including data about flying hours, military experience and sources of training. The next portion asks respondents to grade the depth and breadth of their knowledge in thirteen "Knowledge" and eight "Performance Areas" on a five point scale. These Knowledge and Performance Areas are taken from FAA publication FAA-S-8081-14S, 1 May, 1995, Private Pilot, For Airplane, Single Engine Land, Practical Test Standards. The areas are:

Knowledge Areas

1. Aeronautical Charts
2. Airspace
3. Navigation
4. Weather
5. Operations
6. Performance
7. Weight & Balance
8. Aerodynamics
9. Aircraft Systems
10. Stall Awareness & Spins
11. Federal Aviation Regulations
12. Physiology
13. Decision Making

Performance Areas

1. Preflight
2. Normal & Crosswind Takeoffs & Landings
3. Maximum Performance Takeoffs & Landings
4. Ground Reference Maneuvers
5. Slow Flight & Stalls
6. Cross Country
7. Basic Instrument Maneuvers
8. Emergency Procedures

For each of these areas the respondent were asked to grade themselves according to the following scale:

1 = "Very little knowledge"
2 = "Some knowledge"
3 = "Average knowledge"
4 = "Good knowledge"
5 = "Excellent knowledge"

A similar series of questions asked the respondent's about confidence in their ability to teach in each of the thirteen Knowledge and eight Performance Areas.

Eleven questions follow the self-grading of each area. The first two questions ask the respondent to rank order each Knowledge Area and Performance Area with respect to the depth and breadth of knowledge they posses. These rankings are graded from "most knowledge" to "least knowledge." Following this ranking, the questionnaire then asks them to explain, in their own words, where they obtained the training for the areas they report being the most and least competent in. Next, the respondent rank ordered the same Knowledge and Performance Areas but this time they rate their confidence to teach the material in each area. These rankings are graded from "most confidence" to "least confidence." Again, respondents are asked to explain in their own words where they obtained the training for the areas in which they were the most and least confident. The majority of the data discussed in this study comes from these four rank-ordering questions: Questions 21, 22, 26, and 27 (see Appendix A).

Three multiple choice questions follow. The first two ask where the respondent acquired the majority of the skills they use to train private pilot students for their written and oral examination and for their practical examination. The third asks the respondent if they were confident in their ability to teach new private pilot students immediately upon passing their initial CFI check ride.

Finally, a series of questions is asked which allow the respondent to explain how confident they were upon becoming a CFI, what they think of the current rules concerning the training of CFI's and private pilots, and if they have any recommendations concerning training in general. These questions, and most of the other write in questions, were primarily included for background and to guide the researcher in future studies in

this area. In addition, these comments allowed the respondents to include any information which they considered germane to the topic (The full text of these comments are contained in Appendix C).

Early versions of the survey were distributed among approximately ten of the flight instructors at the Flight Training Center of Oklahoma State University (OSU) and among those OSU faculty who possess a CFI certificate. In addition to the actual responses generated by this "pilot" survey, information was also solicited from these test respondents as to the amount of time required to complete the survey and the difficulty in obtaining the various information requested on flying hours. Comments concerning the layout, ease of completion, directions and any other facet of the survey were also encouraged. The feedback from the pilot survey was used to clarify several sections of the survey and make it easier and less confusing to complete.

Collection of Data

Seven hundred questionnaires and cover letters were mailed to the randomly selected individuals in February of 1997. The questionnaires were returned via business reply mail. Sixteen were returned with expired forwarding addresses, one was returned by the respondent stating that they did not actively teach students, and 81 were returned either fully or partially filled out. Of these 81, eight contained either partially or completely unusable objective information and were rejected. This yielded 73 questionnaires with fully usable data for a useful return rate of 10.43% which represents only 0.097% of the total CFI population. Although several of the questionnaires were incomplete and were not, therefore, used in the objective section of the survey, many of the eight otherwise

unusable questionnaires still contained useful comments. All of these have been included in Appendix C: "Respondent Comments."

Data Compilation and Analysis

The objective data from the 73 usable questionnaires were entered into a PC based computer database and checked for errors. In addition to data entry and coding errors respondent errors were examined. Several respondents inadvertently ranked a specific Knowledge or Performance Area item twice and, thus, eliminated another item. This type of error was easily detected. When these errors were discovered, the original questionnaire was reviewed for coding errors. If the error was made by the respondent, an effort was made to correct the data. Because the "Depth and Breadth of Your Knowledge" section and the "Confidence in Your Ability to Teach" section often closely tracked one another an effort was made to determine where the error took place. Typically this was obvious and the erroneous responses on the questionnaire were corrected. This only occurred on about five questionnaires. All changes were noted on the affected questionnaires in the margins and the original information remains intact. All of the raw data from the questionnaires is available upon request.

Finally, the database was collapsed to yield frequency data for each Knowledge and Performance Area. The frequency data consists of the frequency, or number of respondents, who ranked a particular Knowledge or Performance Area as first, second, third, etc. Four pairs of frequency polygons were constructed for each Knowledge and Performance Area. The first pair contain the data obtained from all 73 respondents. The first of these two graphs comprise the data from the "Depth and Breadth of Your Knowledge"

section of the questionnaire (Questions 21 and 22) and the second from the "Confidence in Your Ability to Teach" section (Questions 26 and 27). The next three pairs of graphs restrict the data to males respondents only, female respondents only, and respondents with military flying experience only.

A total of twenty one Knowledge and Performance Areas exist. As each area generates eight frequency polygons there are a total of 168 individual graphs to review. Each graph depicts the relative frequency (how many respondents selected that ranking) along the ordinate or *y* axis and the ranking (from 1 to 13 for Knowledge Areas and from 1 to 8 for Performance Areas) along the abscissa or *x* axis. The total number of respondents varies within the four groupings. The first pair of graphs reflect all 73 respondents. The second pair reflects the responses from males only (62 respondents), the third pair reflects females only (11 respondents), and the final pair reflects data from those who responded that they had military flying experience (15 respondents).

For the purposes of this survey the null hypothesis was assumed. That is, it is assumed that, on average, no significant pattern will occur in the rankings elicited from the respondents. In other words, as many respondents will rank a given area "high" as other will rank it "medium" or "low." The results would be the same as if the rankings were filled in at random. If the rankings were indeed filled in randomly, the median ranking would be 7.0 for all of the Knowledge Areas and 4.5 for all of the Performance Areas. In addition, on average, each ranking in a Knowledge Area frequency polygon would garner 5.615 hits (73 respondents / 13 Knowledge Areas) and each ranking in a Performance Area would garner 9.125 hits (73 respondents / 8 Performance Areas). This would result

in a flat distribution and indicate that no pattern existed. Thus, respondents would be just as likely to rate any given area "high" as they would "low." These null hypothesis theoretical distributions are shown in Figures 4 and 5.

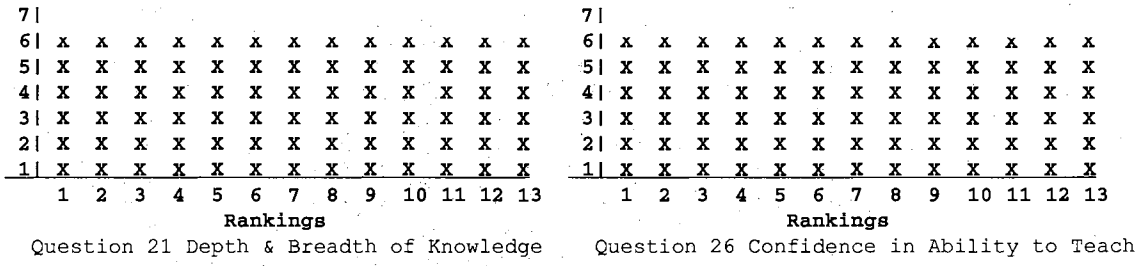

Figure 4. Null Hypothesis Theoretical Distribution
Knowledge Areas - All Respondents

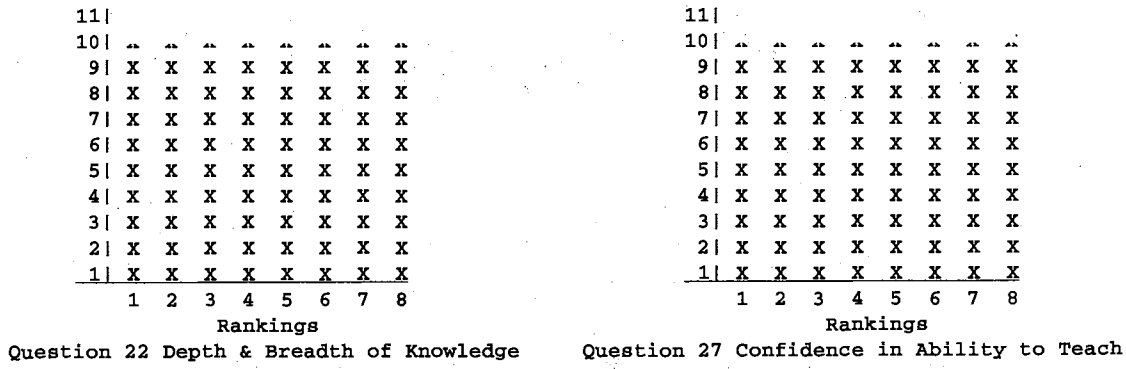

Figure 5. Null Hypothesis Theoretical Distribution
Performance Areas - All Respondents

Based on this assumption two statistics were calculated for each area. First, the median rank was calculated for each Knowledge and Performance Area for each group yielding a ranking for the 50th percentile rank. Again, because the Knowledge Areas have 13 areas to rank a median rank of 7.0 would be expected if the rankings were distributed evenly across all thirteen of the Knowledge Areas. Similarly, for the eight

Performance Areas, assuming the null hypothesis, a median ranking of 4.5 would be expected. The second statistic was a *chi-squared* analysis. Because a flat distribution is assumed, a frequency of 5.615 would be expected within each "Depth and Breadth" and "Confidence" ranking for the thirteen "Knowledge Areas." Similarly, a frequency of 9.125 should be expected in each "Depth and Breadth" and "Confidence" ranking for the eight "Performance Areas" (See Figures 1 and 2). The *chi-squared* test will tell us how well the actual frequency distributions (frequency observed) match or fit our theoretical flat distribution (frequency expected). Because the sample size is so small, a very small value of alpha was selected so that only extreme deviations from the theoretical distribution would show significance ($\alpha = 0.001$).

In addition, because so few individual female and military respondents were sampled the *chi-squared* analysis will only be discussed for the main group with all 73 respondents. However, the *chi-squared* data is presented for all of the groups in the "Summary of the Data" section of Chapter IV.

Lastly, in order the determine if the sample of 73 CFI's obtained in this survey are representative of the larger CFI population, age and gender information was also obtained for all 75,422 CFI's from AeroData (see Table 1 for the entire CFI population and Table 2 for the 73 CFI's in this sample). This data from the larger population consisted of the numbers of male and female CFI's who fell within six age groupings (i.e. under 25, 25 to 34, 35 to 44, 45 to 54, 55 to 64, and 65 and older). This data was converted into percentages for each age-group and age-by-gender group and these percentages were applied to the sample of 73 respondents. This yields the theoretical number of individuals within

the sample of 73 who would be expected to fall within each age and gender category if the sample was representative of the larger population. A *chi-squared* analysis was performed to determine if the samples (e.g. male by age, females by age, and age for all respondents) did actually match the respective larger population from which they were drawn.

Tables 3 through 8 indicate the results of the sample vs. population analysis. Even though obvious differences exist between the full sample of 73 and the population at large the *chi-squared analysis,* with alpha set to 0.05 ($\alpha = 0.05$) yields a non-significant result (Table 5). This indicates that our sample does not differ statistically in any significant way from the larger population from which it was drawn. Similarly, the male sample, with 62 respondents, did not differ in any statistically significant way either (Table 6). The female sample, however, did differ significantly from the female population as did the male/female mix between the sample and the population (Tables 7 and 8).

AGE	#	%	#male	%male	#female	%female
<25 :	1994	2.64	1776	2.35	218	0.29
25-34:	17454	23.14	15899	21.08	1555	2.06
35-44:	19124	25.36	17323	22.96	1801	2.39
45-54:	20382	27.02	18846	24.99	1536	2.03
55-64:	10796	14.31	10253	13.59	543	0.72
>=65:	5672	7.52	5478	7.26	194	0.26

Total in population	= 75422	100%
Total Males	= 69575	92%
Total Females	= 5847	08%

Table 3. Age and Gender Data - 1996 FAA Data

AGE	#	%	#male	%male	#female	%female
<25:	3	4.11	2	2.74	1	1.37
25-34:	15	20.55	12	16.44	3	4.11
35-44:	14	19.18	11	15.07	3	4.11
45-54:	26	35.62	25	34.25	1	1.37
55-64:	10	13.70	8	10.96	2	2.74
>=65:	5	6.85	4	5.48	1	1.37

Total in sample	= 73	100%
Total Males	= 62	85%
Total Females	= 11	15%

Table 4. Age and Gender Data - 1997 Survey

$\alpha = 0.05$ $\quad df = 5$

$X^2 = 3.96 \quad < \quad X^2_{\text{critical}} = 11.0705$

Table 5. Total Sample vs. Total Population by Age - No Significance

$\alpha = 0.05$ $\quad df = 5$

$X^2 = 5.97 \quad < \quad X^2_{\text{critical}} = 11.0705$

Table 6. Male Sample vs. Male Population - No Significance

$\alpha = 0.05$ $\quad df = 5$

$X^2 = 13.05 \quad > \quad X^2_{\text{critical}} = 11.0705$

Table 7. Female Sample vs. Female Population - Significant Difference

$\alpha = 0.05$ $\quad df = 1$

$X^2 = 5.46 \quad > \quad X^2_{\text{critical}} = 3.841$

Table 8. Male & Female Sample vs. Male & Female Population - Significant Difference

CHAPTER IV

RESULTS OF THE STUDY

Introduction

This chapter is divided into three sections. The first examines the data from questionnaire questions 21, 22, 26, and 27. This represents the bulk of the data collected and the major focus of this study. The second section contains the responses from questions 17, 18, 32, 33, 34 and 37. These questions deal with the respondent's sources of training and how confident they felt upon become a CFI. This section also includes a short summary of any amplifying comments the respondents may have made. The third section contains tabular summaries of the data in questions 21, 22, 26, and 27.

In examining the data it should be recalled that the substance of this questionnaire is contained in the rankings in questions 21, 22, 26, and 27 (see Appendix A for the complete questionnaire). The first two questions ask the respondent to rank the "Depth and Breadth" of their knowledge in the 13 Knowledge and eight Performance Areas. The next two questions ask the respondent to rank their level of "Confidence" in their ability to teach each of the Knowledge and Performance Areas. Each Knowledge and Performance Area will then have a frequency polygon depicting how many of the 73 respondents ranked that area first (i.e. most knowledge or most confidence), second, third, ... and last (i.e. least knowledge or least confidence). Each Knowledge and Performance

Area will also have frequency polygons depicting the same data but with the respondents restricted to males only, females only, and only those with military flying experience. Because there are 21 individual Knowledge and Performance Areas and each area generates eight frequency polygons there are 168 graphs to examine. We will examine the information contained within each graph and consider both the "Depth and Breadth of Knowledge" (DB) and the "Confidence" (C) questions in tandem for each area and each group.

The second section contains tables depicting the number and percentage of respondents based on where they received their initial flight training (question 17), where they received their CFI training (question 18), where they received the majority of the skills or knowledge they use to teach (questions 32 & 33), and how confident they felt upon originally becoming a CFI (question 34). In addition, the results of the write in question concerning the current state of CFI training (question 37) and a summary of relevant additional comments are included in Section II. Again, Section III contains tabular summaries of the data in questions 21, 22, 26, and 27.

Section I

Knowledge Areas

The first Knowledge area is "Aeronautical Charts." The median response is 5.31 for Depth & Breadth and the graph appears to be slightly negatively skewed indicating that more respondents ranked this area as higher rather than lower. The median for the Confidence graph is an even more favorable 4.71 but the graph indicates that a number of respondents ranked charts seventh and tenth. The *chi-squared* analysis does not indicate significance for the DB graph, as it is relatively flat, but it does indicate significance for the Confidence graph. However, this significance occurs because of the steep peaks and valleys and is not a clear trend favoring or disfavoring this area. None of the respondents rated this area as last (thirteenth) in the Depth and Breadth question and none ranked it last (thirteenth) or second to last (eleventh) in the Confidence question whereas many rated this area highly. Both graphs, however, have spikes at the tenth ranking indicating that a significant fraction of the respondents report being neither knowledgable nor confident in this area.

When the genders are separated, males rank charts with a slightly less favorable median response of 5.50 for DB and 5.30 C. The females, however, rank charts with more favorable medians of 4.75 DB and 3.88. None of the females ranked charts lower than 8th in DB and only one (ranked seventh) ranked their confidence in charts at less than 5th! When those with military experience are examined alone their median responses are very close to the exact middle at 6.75 DB and 6.67 C. The graphs are very flat and indicate evenly distributed rankings.

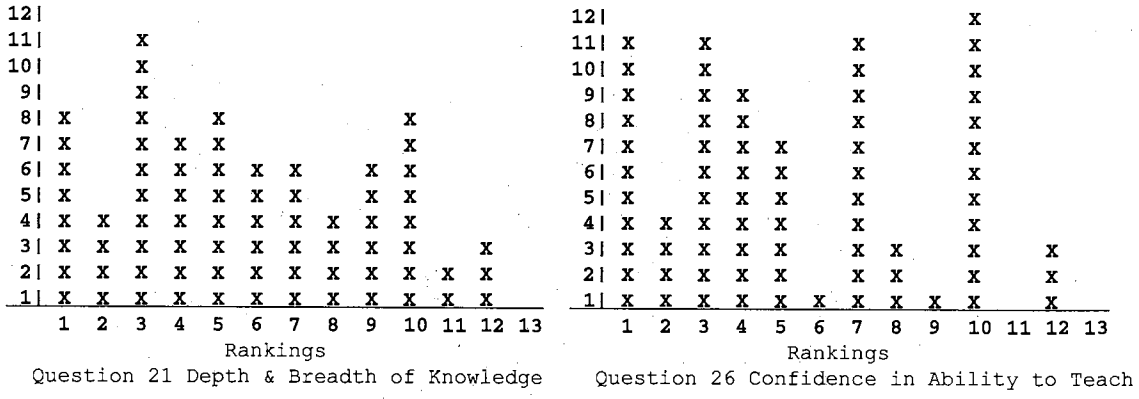

Figure 6. Aeronautical Charts - All Respondents

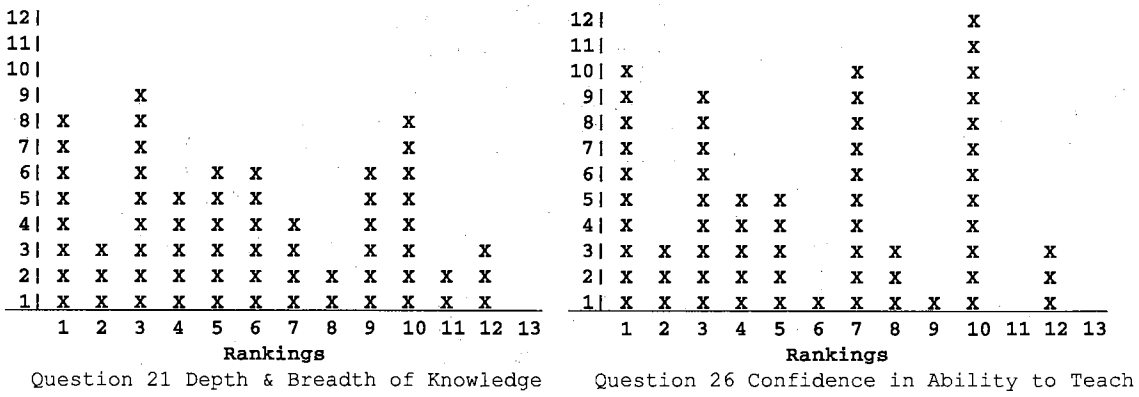

Figure 7. Aeronautical Charts - Male Respondents

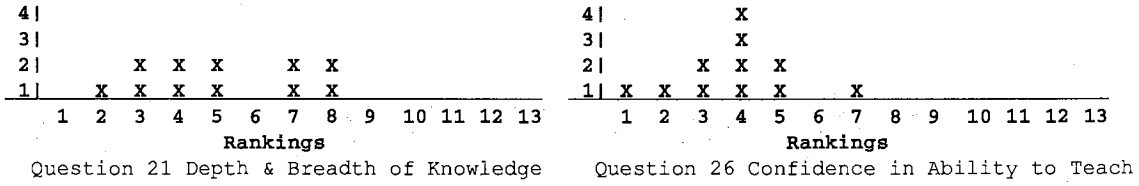

Figure 8. Aeronautical Charts - Female Respondents

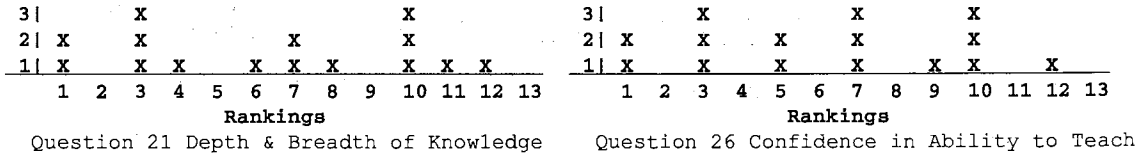

Figure 9. Aeronautical Charts - Military Respondents

The second area is "Airspace." Surprisingly, with all the confusion resulting from the recent change in airspace designations, both the DB and the C graphs indicate a relatively

even distribution. The medians responses are 7.33 and 6.62, respectively, which are both very close to what one would expect of a random distribution of rankings. Similarly, the *chi-squared* analysis yields no significance for either graph. The graphs for males, females and respondents with military experience are all similarly flat with medians of 7.50, 7.00, and 7.00 for males, females and military Depth and Breadth respectively and 6.36, 7.25, and 6.25 for Confidence.

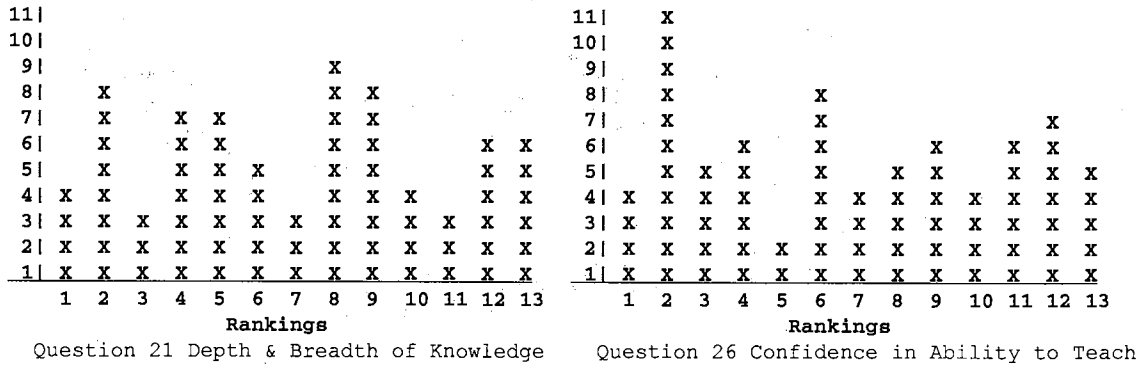

Figure 10. Airspace - All Respondents

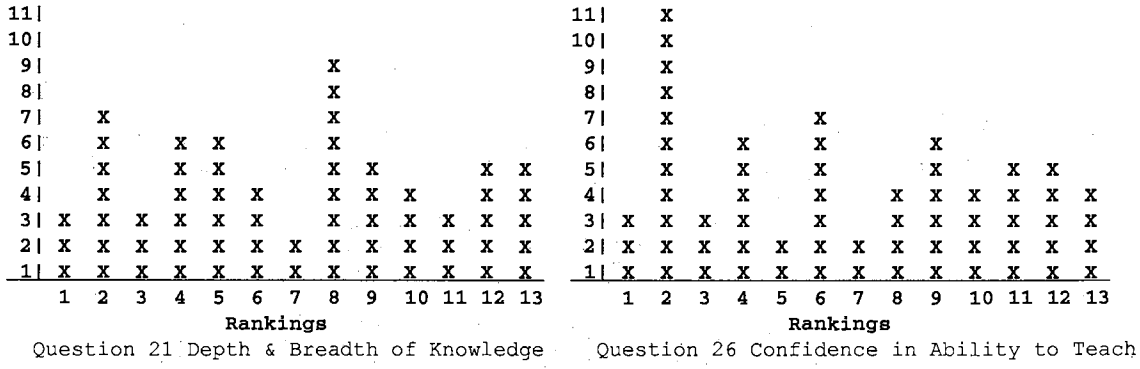

Figure 11. Airspace - Male Respondents

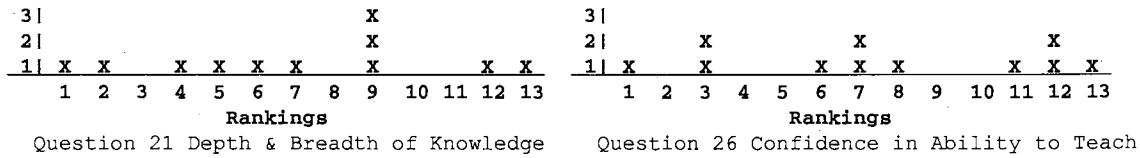

Figure 12. Airspace - Female Respondents

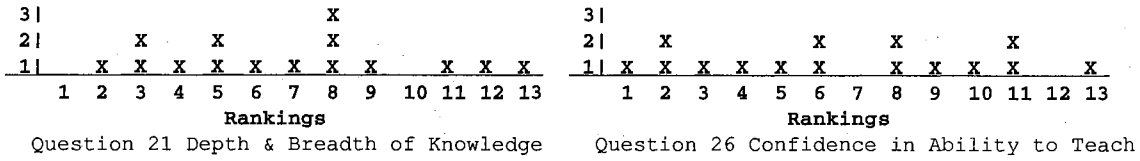

Figure 13. Airspace - Military Respondents

The third Knowledge Area is "Navigation." The median responses are 4.27 for DB and 3.89 for C. Both graphs are very negatively skewed and indicate that most respondents clearly rank this area much higher than average. The *chi-squared* analysis also indicates that both of these graphs differ significantly from the theoretical flat distribution. The Depth and Breadth and the Confidence medians indicate that the "Navigation" Knowledge Area is the single area favored the most by all of the respondent groups. Males alone also ranked navigation very highly with a median of 4.40 Depth and Breadth and 4.07 Confidence. These were the highest median ranking for the males. Females were even more confident with medians of 2.33 Depth and Breadth and 2.38 Confidence. These medians both represent the highest rankings of any area for the female respondents. Finally, those with military experience ranked charts as their most knowledgable and confident area as well with medians of 3.75 Depth and Breadth and 3.20 Confidence. Clearly, "Aeronautical Charts" is the Knowledge area where all respondents feel the most knowledgable and confident.

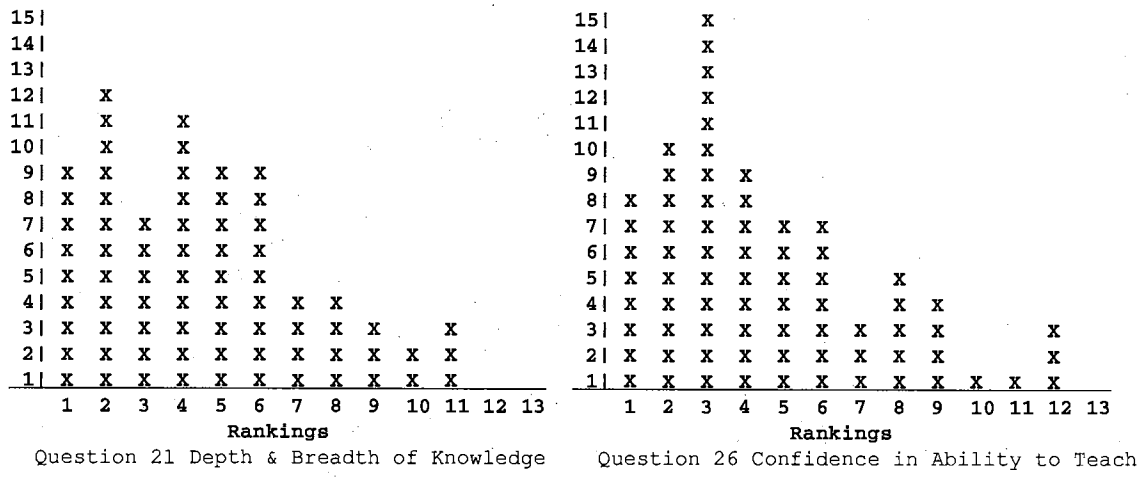

Figure 14. Navigation - All Respondents

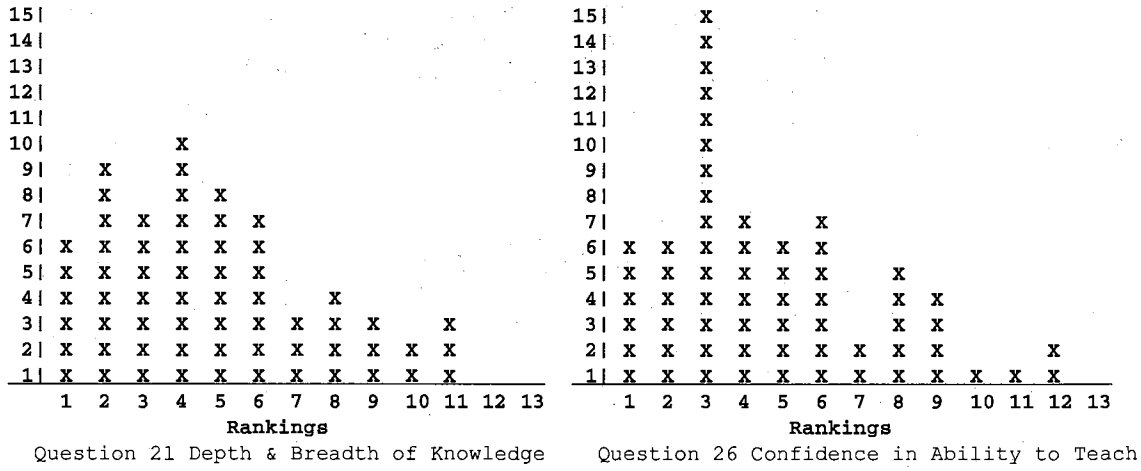

Figure 15. Navigation - Male Respondents

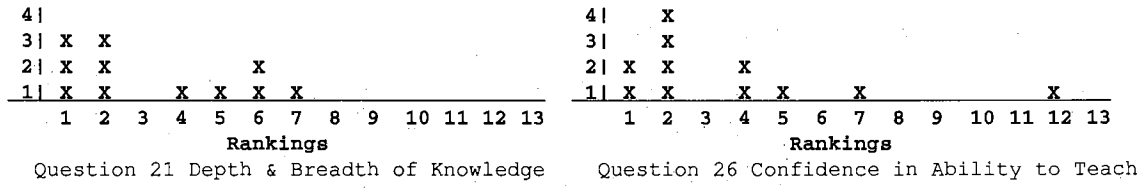

Figure 16. Navigation - Female Respondents

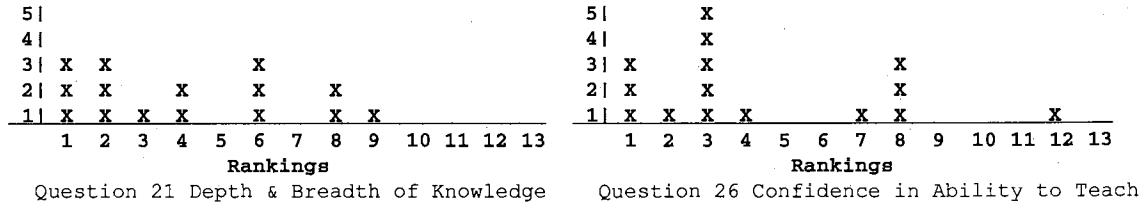

Figure 17. Navigation - Military Respondents

The fourth Knowledge Area is "Weather." The median responses for weather are 8.64 DB and 8.82 C. Both graphs are positively skewed and have the largest peaks at the 9th and 10th rankings. These peaks account for 22 of the 73 responses in both graphs representing 30% of the respondents. In addition, only one person ranked weather first in both the DB and C graphs. Weather is not a popular subject but the *chi-squared* analysis does not indicate that the graphs are significant. Males alone ranked weather a median 8.50 DB and 8.75 C, females ranked it 8.88 DB and 9.00 C whereas military respondents ranked it 9.00 DB and 9.00 C.

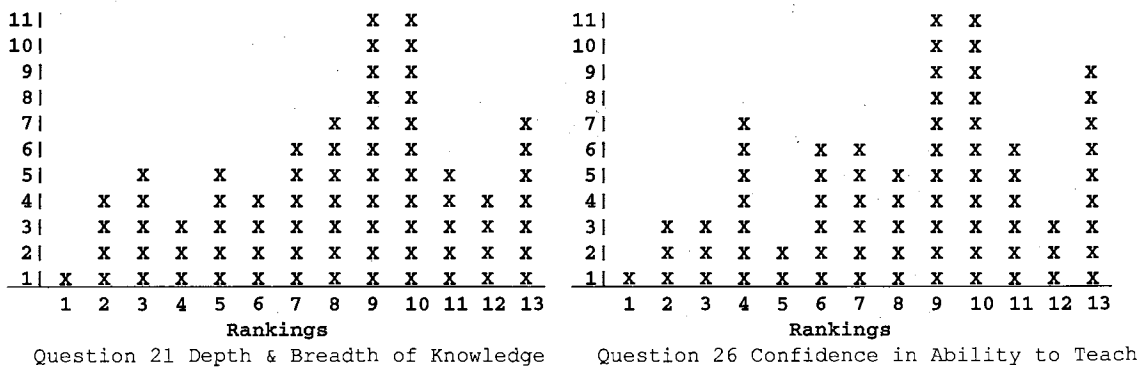

Figure 18. Weather - All Respondents

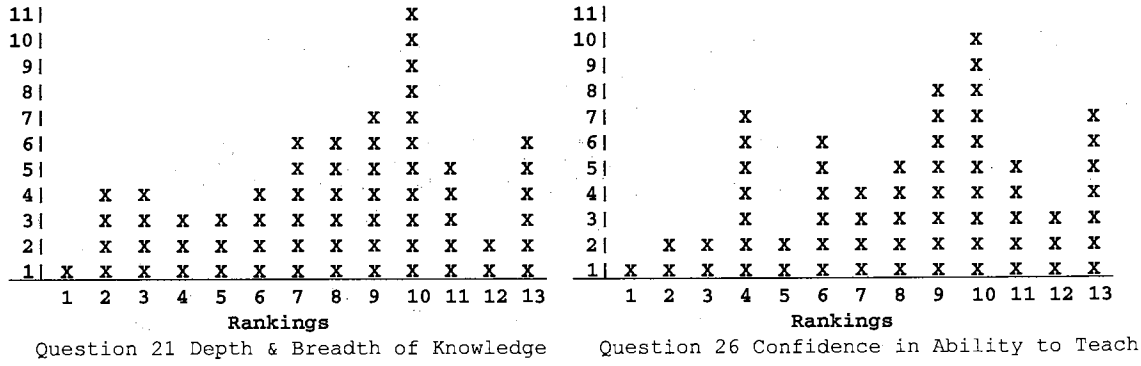

Figure 19. Weather - Male Respondents

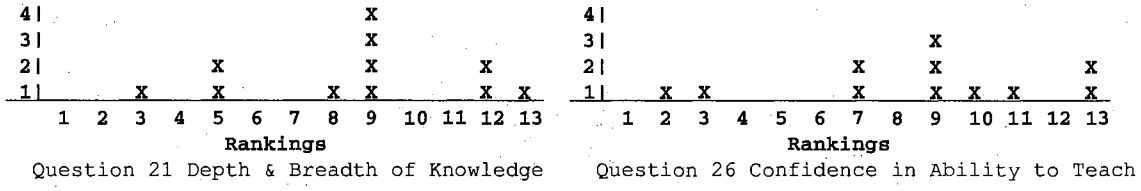

Figure 20. Weather - Female Respondents

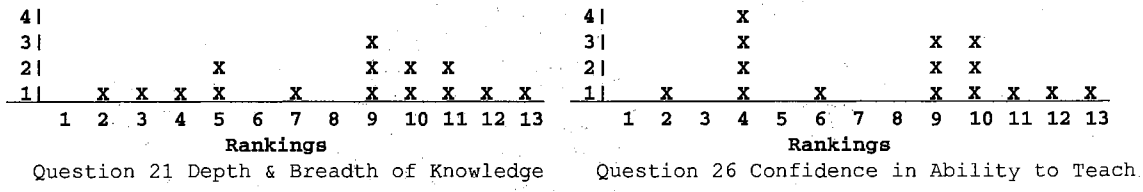

Figure 21. Weather - Military Respondents

The fifth Knowledge Area is "Operations." The median responses are 5.11 DB and 5.21 C. Both graphs are negatively skewed with large groups clustered in the middle rankings. The *chi-squared* analysis for the "Depth and Breadth" graph indicates no significance but significance is indicated for the "Confidence" graph. However, while more people favored operations than disfavored it the graphs indicate an uneven distribution rather than a clear dislike of the area is the cause of the significance. Males seemed to mirror the larger group with median rankings of 5.28 DB and 5.33 C. Females seemed to favor Operations with median rankings of 3.75 for both DB and C. Military respondents were closer to the middle with median rankings of 6.67 DB and 5.00 C.

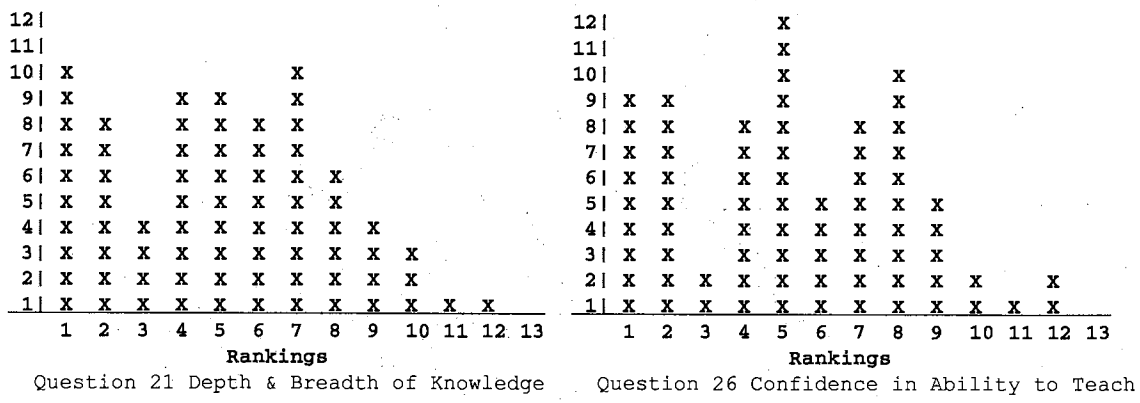

Figure 22. Operations - All Respondents

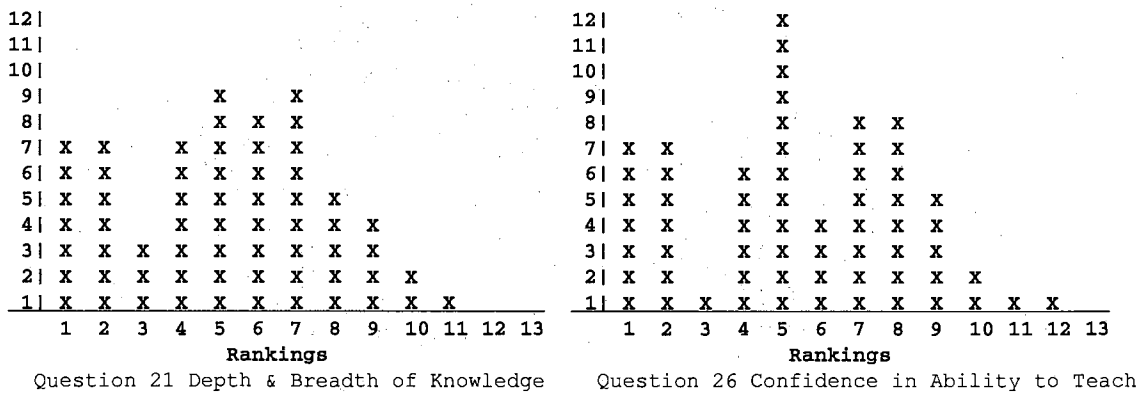

Figure 23. Operations - Male Respondents

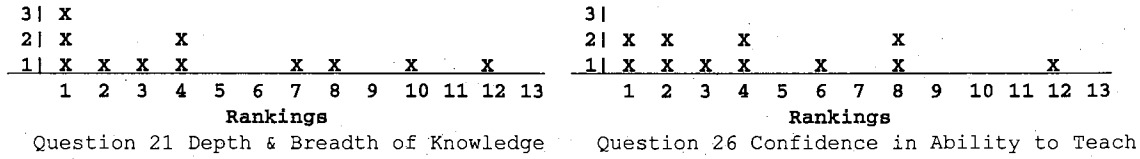

Figure 24. Operations - Female Respondents

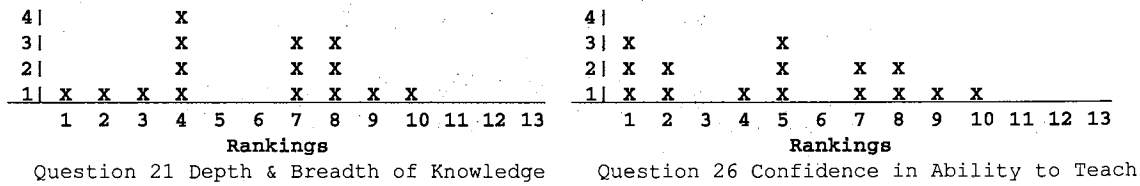

Figure 25. Operations - Military Respondents

The sixth Knowledge Area is "Performance." The median responses are 5.67 DB and 5.28 C. The DB graph indicates that only six respondents (8.2%) ranked performance in the last four rankings and that most respondents ranked it as moderately favorable. In the C graph, as with the DB graph, slightly less than 10% of the respondents ranked performance tenth, eleventh, or twelfth, and none ranked it last. The Confidence graph, however, does have a significant spike at the 5th rank. Almost 22% of the respondents chose this rank. The *chi-squared* analysis indicates no significance for "depth and Breadth" but significance for "Confidence." Although the graph differs significantly from the theoretical flat distribution the central tendency indicates a slightly favorable confidence level among respondents as a whole. Again, males seem to mirror the larger group with median rankings of 5.83 DB and 5.43 C. The female respondents show much more favor with this area with medians of 4.00 DB (the third highest ranked area for females) and 3.75 C (tied with operations as the second highest ranked area for females). Military respondents favorably ranked performance over all as their third highest area with medians of 5.12 DB and 5.25 C.

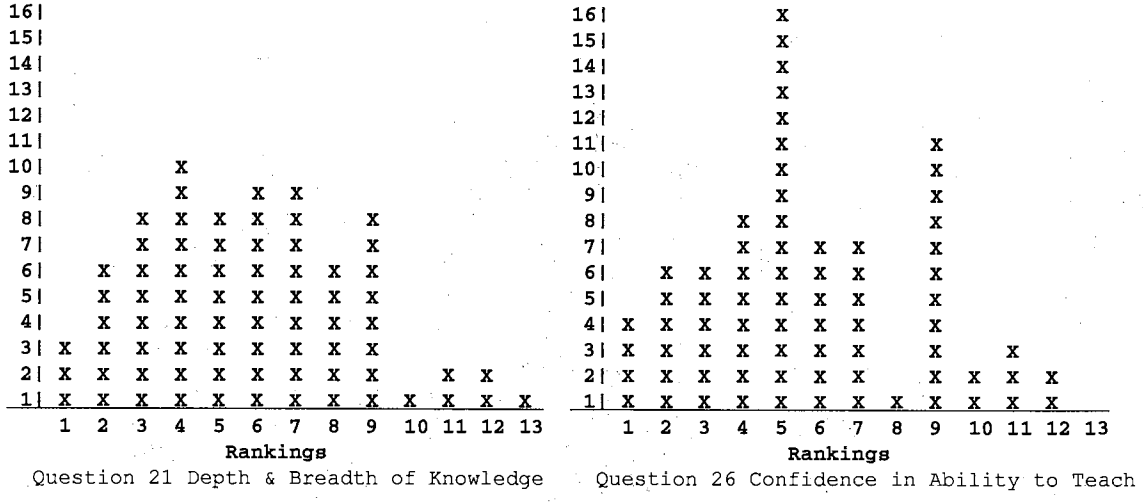

Figure 26. Performance - All Respondents

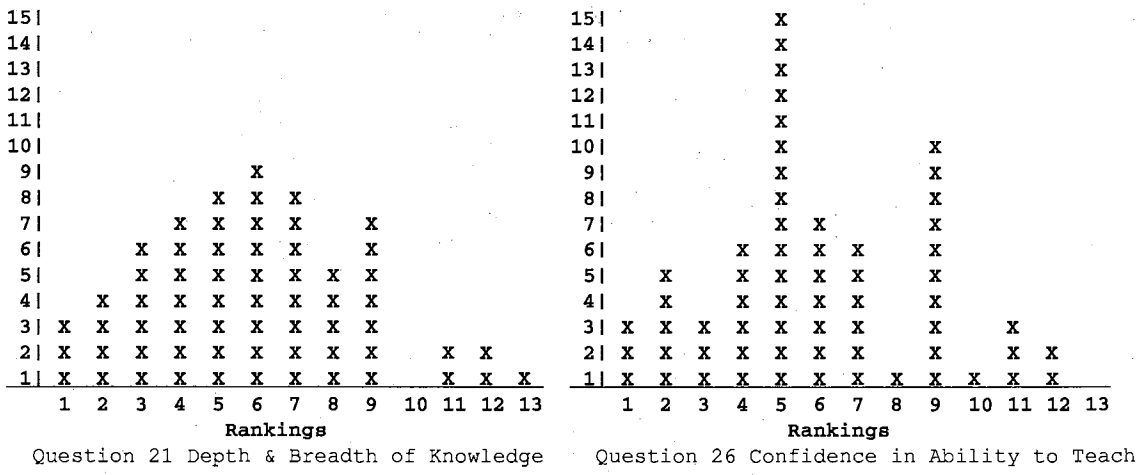

Figure 27. Performance - Male Respondents

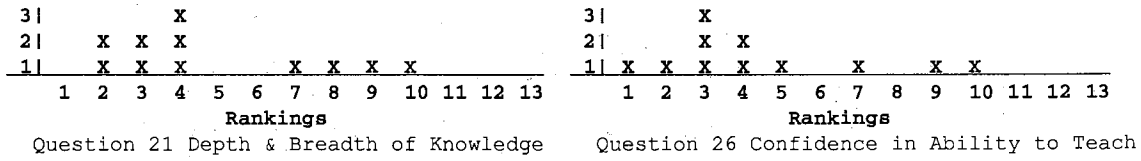

Figure 28. Performance - Female Respondents

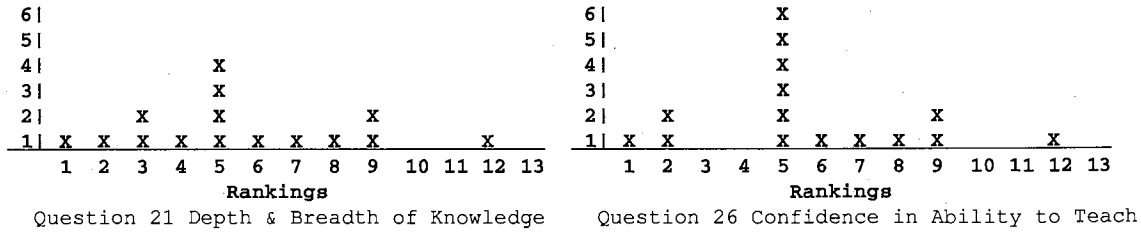

Figure 29. Performance - Military Respondents

The seventh Knowledge Area is "Weight and Balance." The median responses for weight and balance are 6.40 DB and 6.38 C placing it fifth over all in the rankings. Both graphs are similar and indicate that the majority of the respondents ranked weight and balance between the fourth and ninth rankings. Fully two thirds of the respondents (68.5%) ranked weight an balance here and the *chi-squared* analysis shows no significance. Males also ranked weight and balance fifth overall in both Depth and Breadth and Confidence with median rankings of 6.25 and 6.00 respectively. Females ranked this area seventh and sixth with medians of 7.75 DB and 8.25 C. Military respondents ranked weight and balance eighth overall in DB with a median rank of 7.25 and fifth overall in C with a median of 6.25.

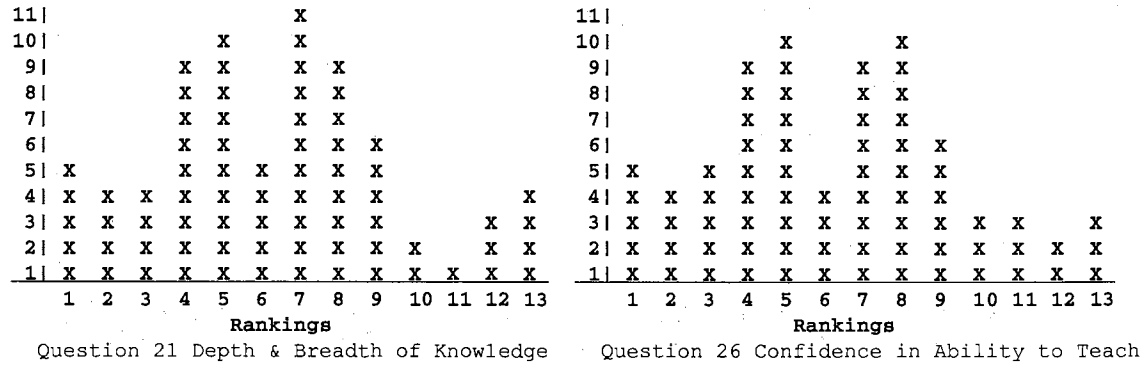

Figure 30. Weight & Balance - All Respondents

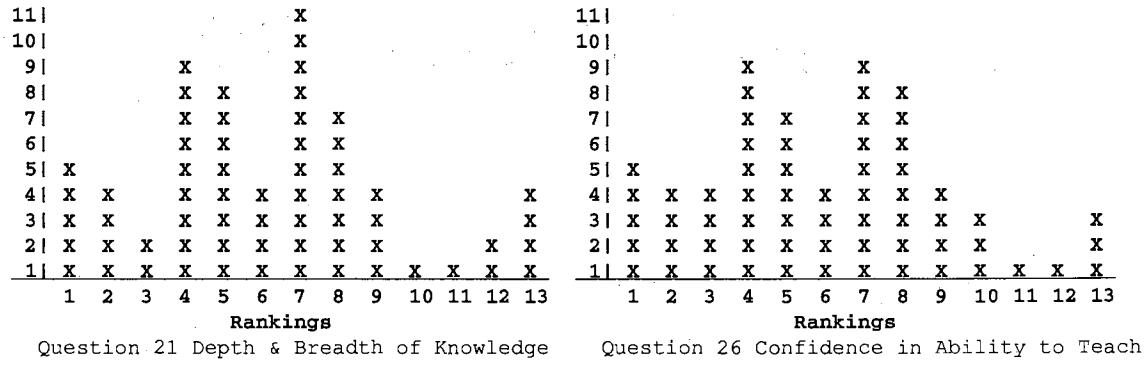

Figure 31. Weight & Balance - Male Respondents

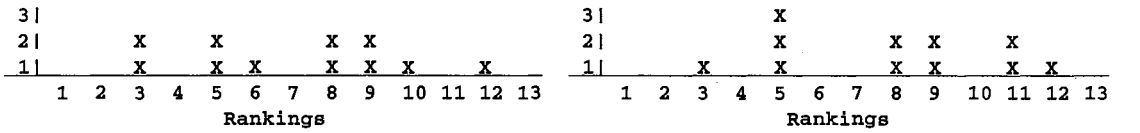

Figure 32. Weight & Balance - Female Respondents

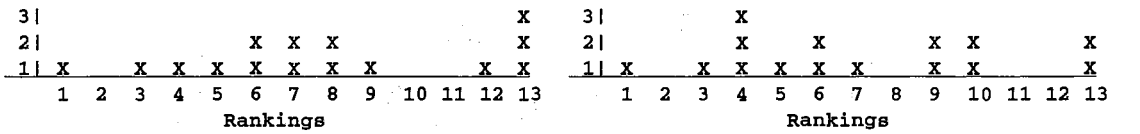

Figure 33. Weight & Balance - Military Respondents

The eighth Knowledge Area is "Aerodynamics." The median response for the "Depth and Breadth" of knowledge is 8.38 yielding an overall ranking of tenth. The graph clearly shows the majority of responses clustered between the ninth and thirteenth rank. Thus, 49.3% of the respondents ranked aerodynamics in the last five positions. The "Confidence" median response is 7.25 resulting in an overall ranking of eighth. This graph indicates a much flatter and more evenly distributed response. Whereas half of the respondents ranked the depth and breadth of their aerodynamics knowledge to be low, their confidence ranking was more evenly distributed. The *chi-squared* analysis was not significant for either graph. As a group the males ranked their Depth and Breadth of aerodynamic knowledge seventh with a median ranking of 7.50. Their Confidence was ranked 8th with a median rank of 6.90. Females ranked aerodynamics eleventh and ninth with a DB median of 11.00 and a C median of 10.25. The Military respondents ranked aerodynamics much higher at 4th on both questions with median rankings of 6.00 for both DB and C.

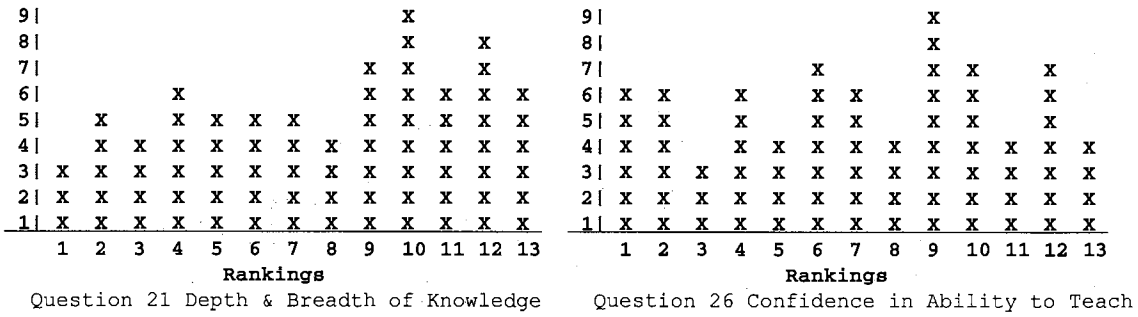

Figure 34. Aerodynamics - All Respondents

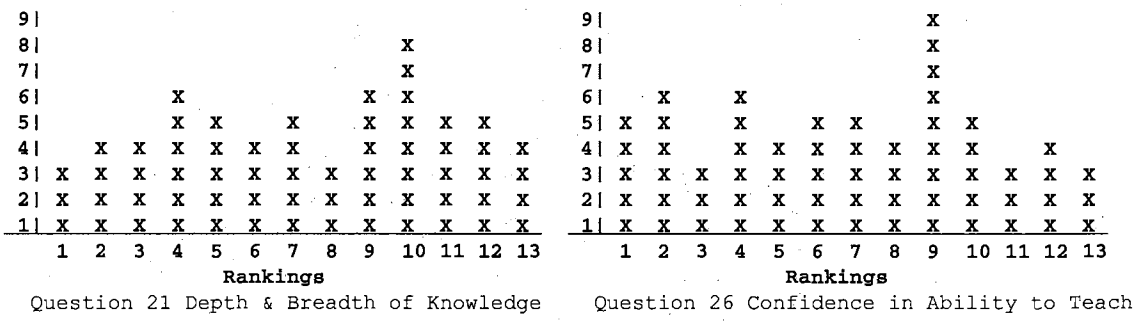

Figure 35. Aerodynamics - Male Respondents

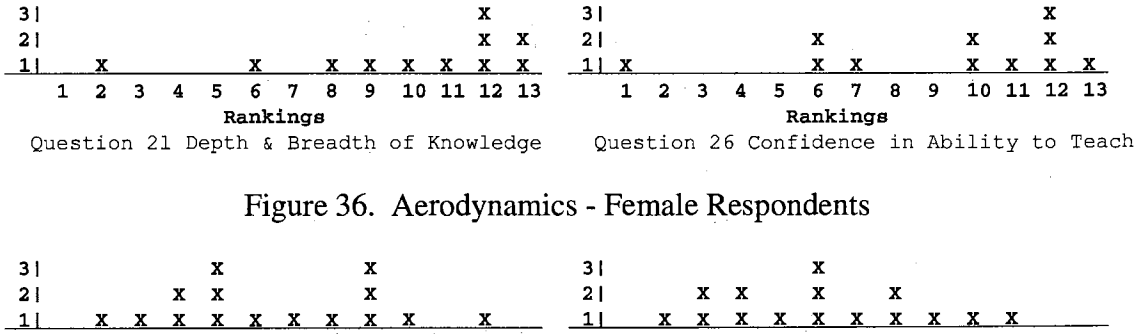

Figure 36. Aerodynamics - Female Respondents

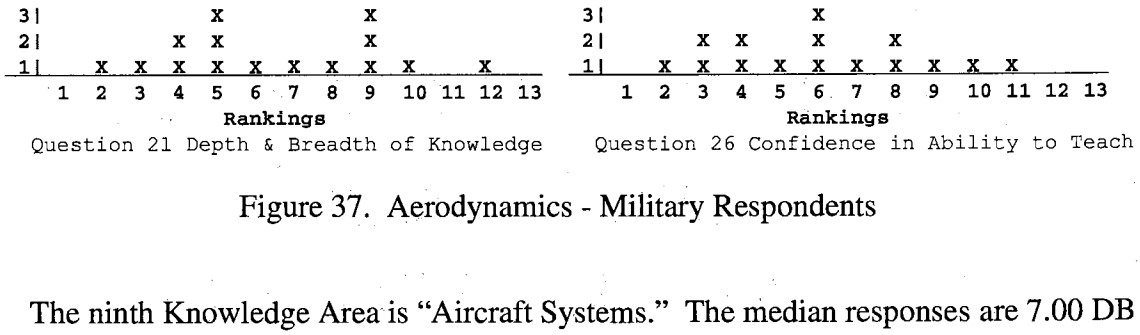

Figure 37. Aerodynamics - Military Respondents

The ninth Knowledge Area is "Aircraft Systems." The median responses are 7.00 DB and 6.44 C and both graphs show distributions weighted toward the extremes. This area received an overall ranking of sixth in both Depth and Breadth as well as Confidence. In the Depth and Breadth graph 35.6% of the respondents ranked aircraft systems in the top three categories while the remainder of the responses tend toward the lower rankings. In

the Confidence graph 28.8% of the respondents ranked aircraft systems in the top three positions while the remainder were more evenly distributed. Neither graphs showed any significance with the *chi-squared* analysis. Once again, the males mirror the larger group and rank systems 6th overall. Females, however, rank systems tenth overall in DB and eighth in C with medians rankings of 10.25 and 9.25 respectively. At the other extreme the military respondents ranked systems as their second best area overall in both questions with median ranks of 5.00 for both DB and C. Clearly there is a vast difference in this area between the female respondents and those with a military background.

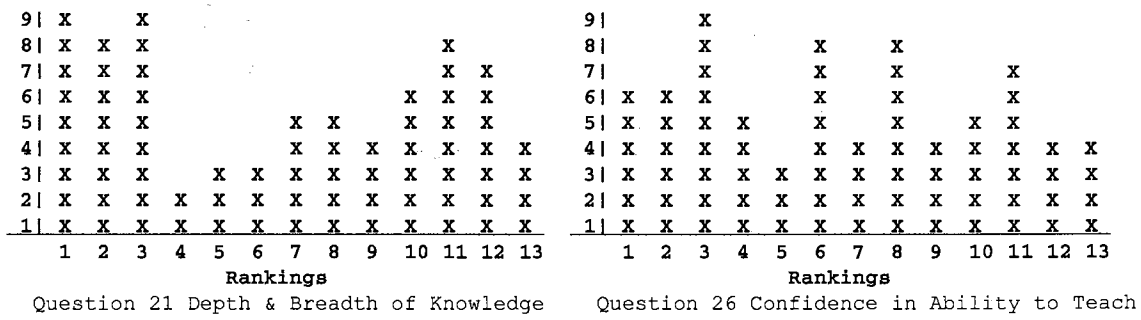

Figure 38. Aircraft Systems - All Respondents

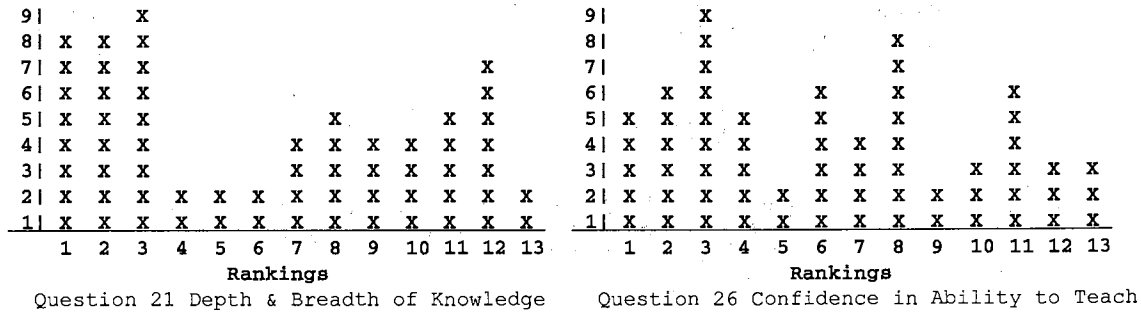

Figure 39. Aircraft Systems - Male Respondents

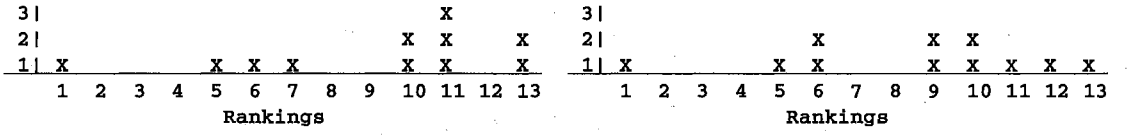

Figure 40. Aircraft Systems - Female Respondents

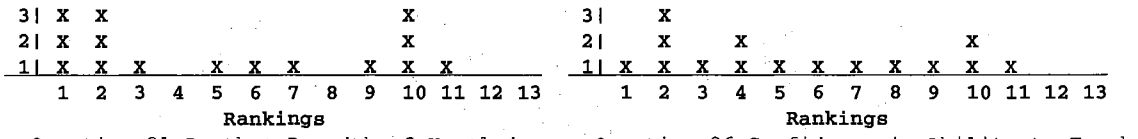

Figure 41. Aircraft Systems - Military Respondents

The tenth Knowledge Area is "Stall Awareness and Spins." The median responses are 7.67 DB and 7.73 C resulting in overall rankings of eighth and ninth. The DB graphs shows a relatively normal distribution with no *chi-squared* analysis significance. The C graph is more uneven with two significant spikes at the eighth and tenth ranks. These two spikes alone comprise 30% of the responses. The *chi-squared* analysis was not significant for either graph. Males also rank Stall Awareness and Spins eighth and ninth with median rankings of 8.00 DB and 7.88 C. Females ranked Stall Awareness and Spins higher overall at fifth DB and fourth C with median rankings of 5.75 and 7.00 respectively. The military respondents ranked Stall Awareness and Spins much lower. They gave this area an overall ranking of tenth and ninth with medians of 9.25 DB and 10.00 C. Those with military experience did not report either the knowledge or confidence to teach in this area.

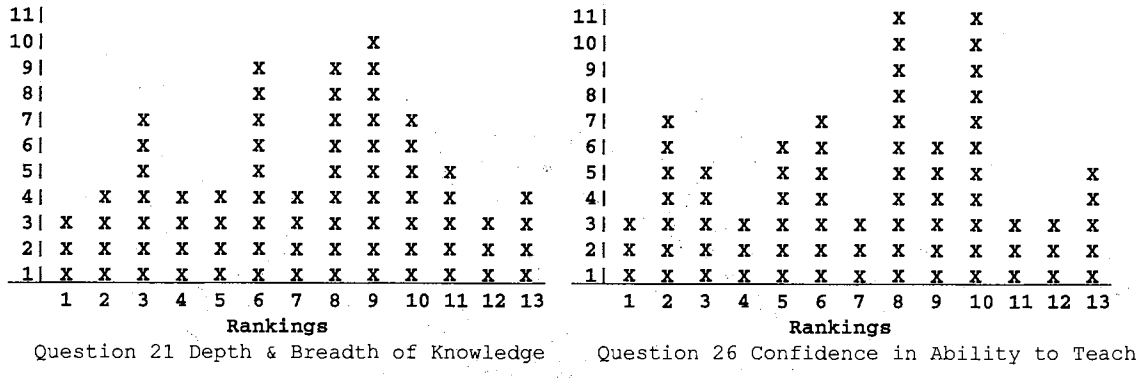

Figure 42. Stall Awareness and Spins - All Respondents

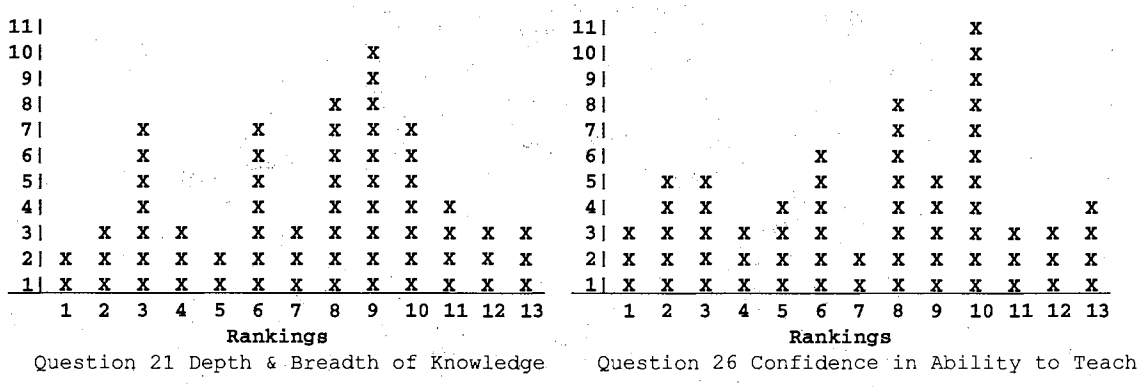

Figure 43. Stall Awareness and Spins - Male Respondents

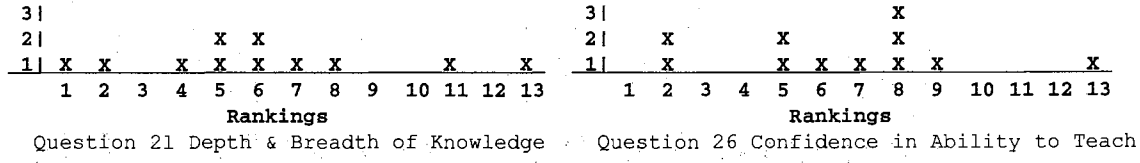

Figure 44. Stall Awareness and Spins - Female Respondents

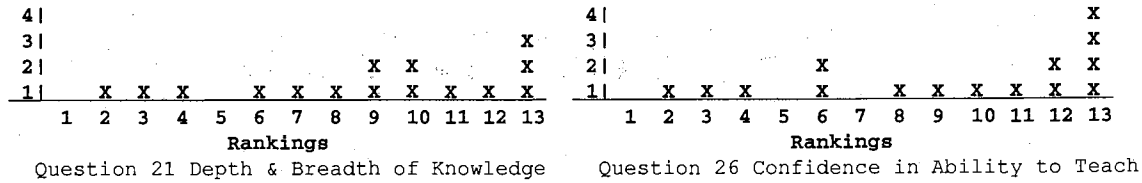

Figure 45. Stall Awareness and Spins - Military Respondents

The eleventh Knowledge Area is the always popular "Federal Aviation Regulations" or FAR's. That the vast majority of respondents report being neither knowledgable nor confident when it comes to the FAR's. The median response for FAR's are 10.62 DB and 10.67 and as a group the 73 respondents rank FAR's next to last in both Depth and Breadth of knowledge and in their Confidence in their ability to teach in this area. The graphs clearly indicate the very few respondents report that they have a good depth and breadth of knowledge of the FAR's nor do they report confidence in their ability to teach FAR's. As the Depth and Breadth graph indicates, only eleven respondents (15%) ranked FAR's in one of the top five rankings whereas forty eight (65.8%) ranked FAR's in the bottom four positions. The Confidence graph depicts even less confidence than knowledge. Only nine respondents ranked their confidence to teach FAR's in any of the top five positions (12.3%) and none of the seventy three respondents ranked it as second, fourth or fifth. At the bottom of the ranking scale forty five respondents (61.6%) ranked their confidence to teach FAR's in one of the last four positions. Not surprisingly, the *chi-squared* analysis was significant for both graphs. Males also ranked FAR's as next to last overall with medians of 10.80 DB and 10.88 C. The females were more confident in this area ranking it eighth on both questions with median rankings of 8.00 DB and 9.25 C. The military respondents, however, ranked this area dead last overall with median rankings of 11.00 DB and 11.33 C. Presumably this could result from their lack of familiarity with civilian rules but more study is needed.

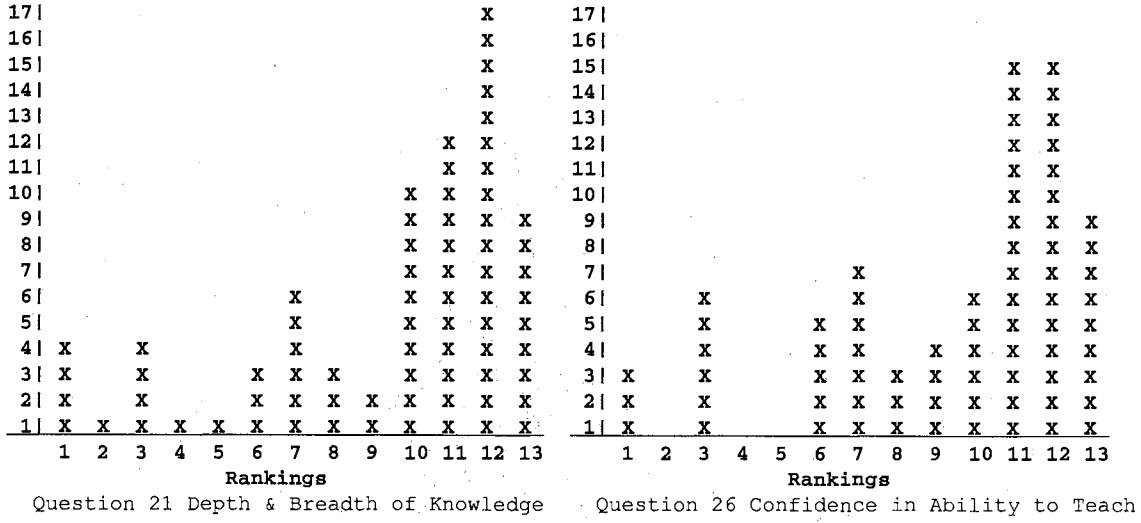

Figure 46. Federal Aviation Regulations - All Respondents

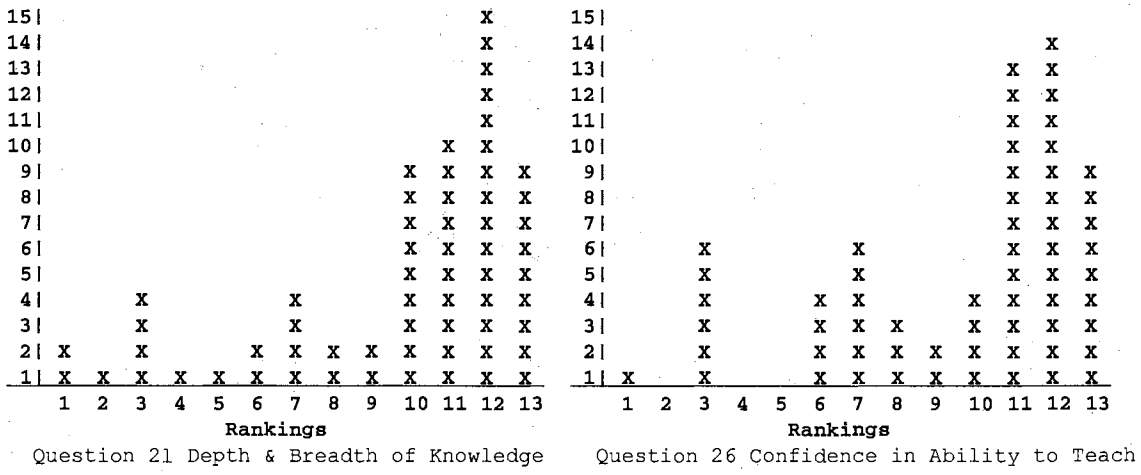

Figure 47. Federal Aviation Regulations - Male Respondents

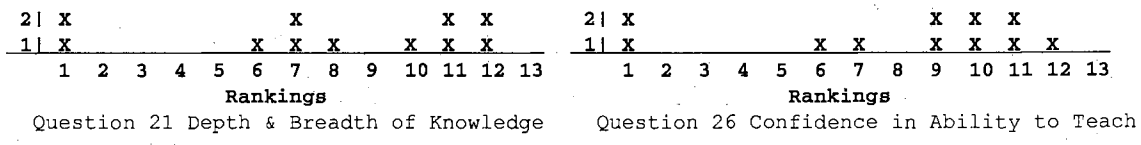

Figure 48. Federal Aviation Regulations - Female Respondents

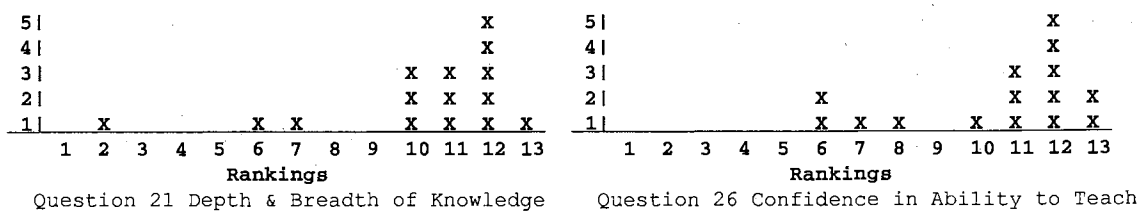

Figure 49. Federal Aviation Regulations - Military Respondents

The twelfth Knowledge Area is "Physiology." This area produced the most extreme negative scores in the survey across all categories of instructors with the exception of the military respondents. CFI's report the lowest levels of knowledge and confidence in the area of physiology. (It is interesting to note that discussions concerning this very subject area, arising out of Conway's (1995) research, were the genesis of this survey.) CFI's report they feel even more uncomfortable with their knowledge and confidence in this area than they do with FAR's. The median responses for physiology are 11.23 for Depth and Breadth and 11.22 for Confidence. Physiology is not only the lowest ranked area in the study but the median responses represent the most extreme scores in the entire survey. The graphs indicate that more of the respondents lack knowledge in physiology than in any other single area. Twenty six of the seventy three respondents, or 35.6%, ranked this area dead last for Depth and Breadth of knowledge and twenty four, or 32.9%, ranked it dead last for Confidence in their ability to teach. Only fourteen (19.2%) ranked it in the top half on the Depth and Breadth graphs and only eleven (15%) ranked it in the top half for Confidence in their ability to teach it. The *chi-squared* analysis was significant.

By groups, males, females, and the military respondents all unanimously agree that their knowledge and confidence in this area are at the bottom of the scale. Only the military ranked one area (FAR's) lower. The males median ranking for physiology was 11.30 DB and 11.27 C. Female median rankings were 11.00 for both DB and C. The military respondents median rankings were 10.88 DB and 10.88 C.

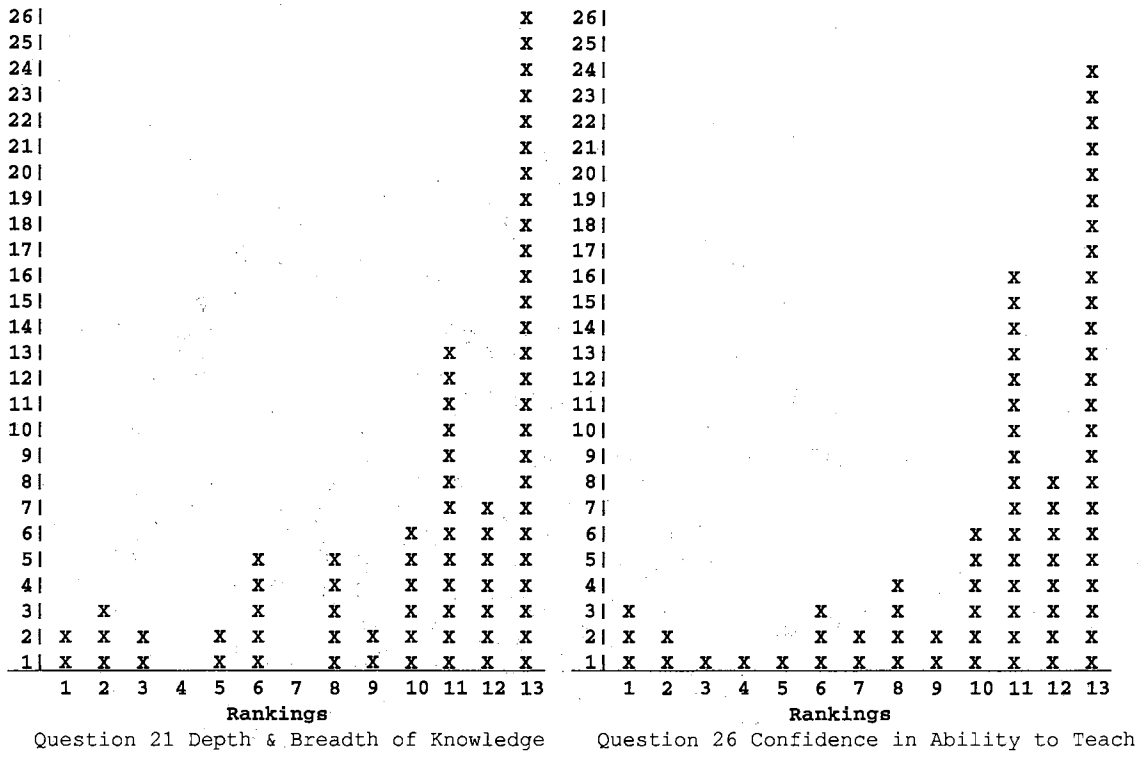

Figure 50. Physiology - All Respondents

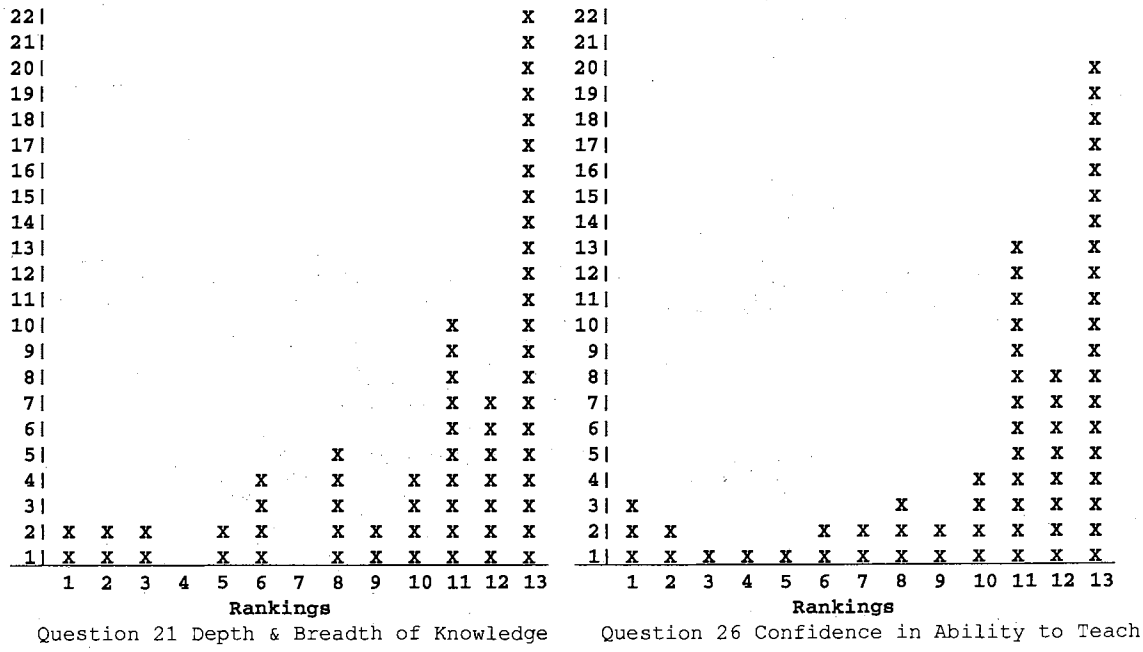

Figure 51. Physiology - Male Respondents

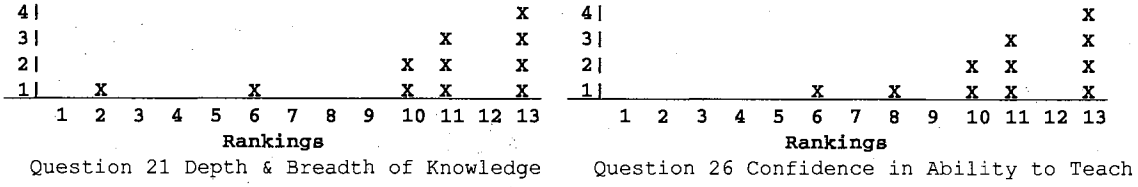

Figure 52. Physiology - Female Respondents

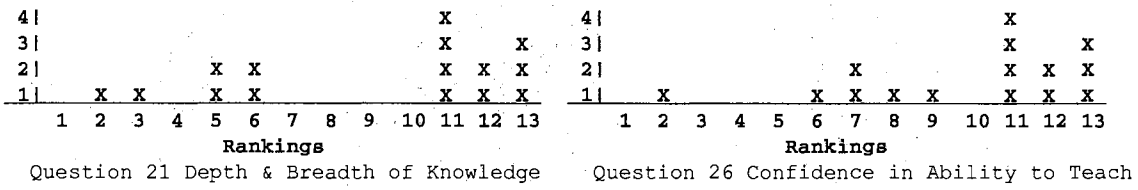

Figure 53. Physiology - Military Respondents

The thirteenth and final Knowledge Area is "Decision Making." The median responses for decision making are 8.25 DB and 9.12 C for an overall ranking of ninth and eleventh. Both graphs indicate a bimodal distribution with most of the respondents clustered around the extremes. Both graphs indicate that while many CFI's are knowledgable and confident in this area, far more report less knowledge and confidence. The *chi-squared* analysis was significant for both graphs because of the bimodal distribution of the rankings in the graph. CFI's seem to be polarized toward the extremes in this area with very few in the middle ranks. Males also ranked decision making ninth and eleventh overall with median rankings of 8.25 DB and 9.12 C. Females ranked decision making sixth and fourth overall with median rankings of 7.00 for both DB and C. The military respondents ranked this area as seventh on both questions with median rankings of 7.00 DB and 8.00 C.

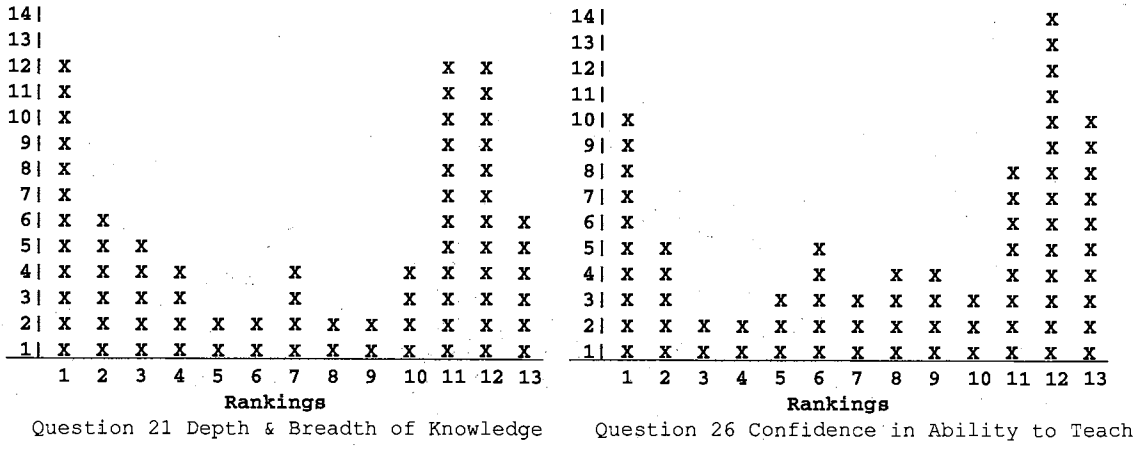

Figure 54. Decision Making - All Respondents

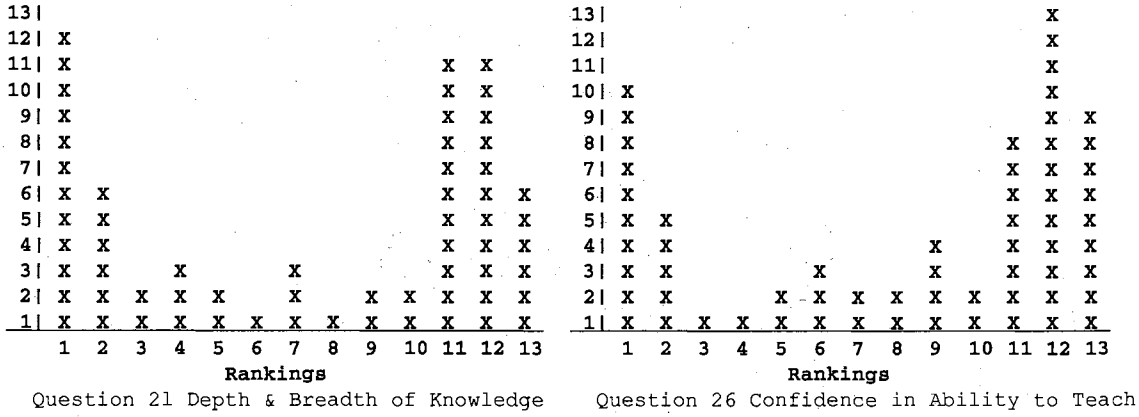

Figure 55. Decision Making - Male Respondents

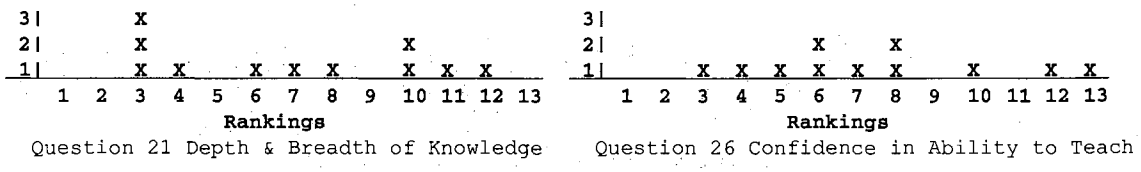

Figure 56. Decision Making - Female Respondents

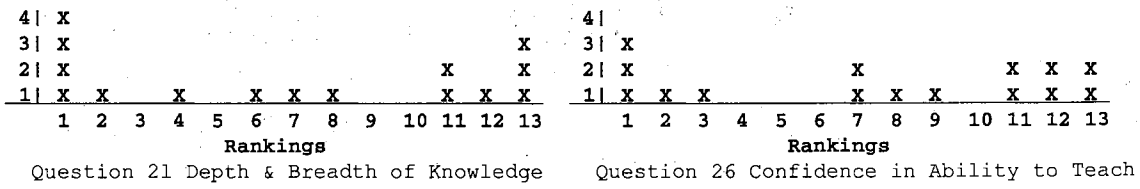

Figure 57. Decision Making - Military Respondents

Performance Areas

The first Performance Area is "Preflight." The median responses for this area are 2.31 Depth and Breadth and 3.14 for Confidence. (Please note that because only eight Performance Areas exist there are only eight rankings and, thus, the theoretical median ranking is 4.5.) Twenty six respondents (35.6%) ranked preflight as their best Performance Area for depth and breadth of knowledge and twenty three (31.5%) ranked it as the Performance Area in which they had the most confidence in their ability to teach. The Depth and Breadth median is the highest performance median ranking in the survey and the Confidence ranking was the second highest. The graphs demonstrates that most respondents report being both knowledgable and confident in this area. The *chi-squared* analysis was significant for both graphs.

Males also ranked this as their best area in Depth and Breadth and second best in Confidence with median rankings of 2.28 DB and 3.14 C. Females also ranked preflight as best in DB and second best in C with medians of 2.38 and 3.00 respectively. Surprisingly, the military respondents ranked their Depth and Breadth of knowledge as seventh best overall with a median ranking of 5.62 and their Confidence as fourth best overall with a median ranking of 5.00.

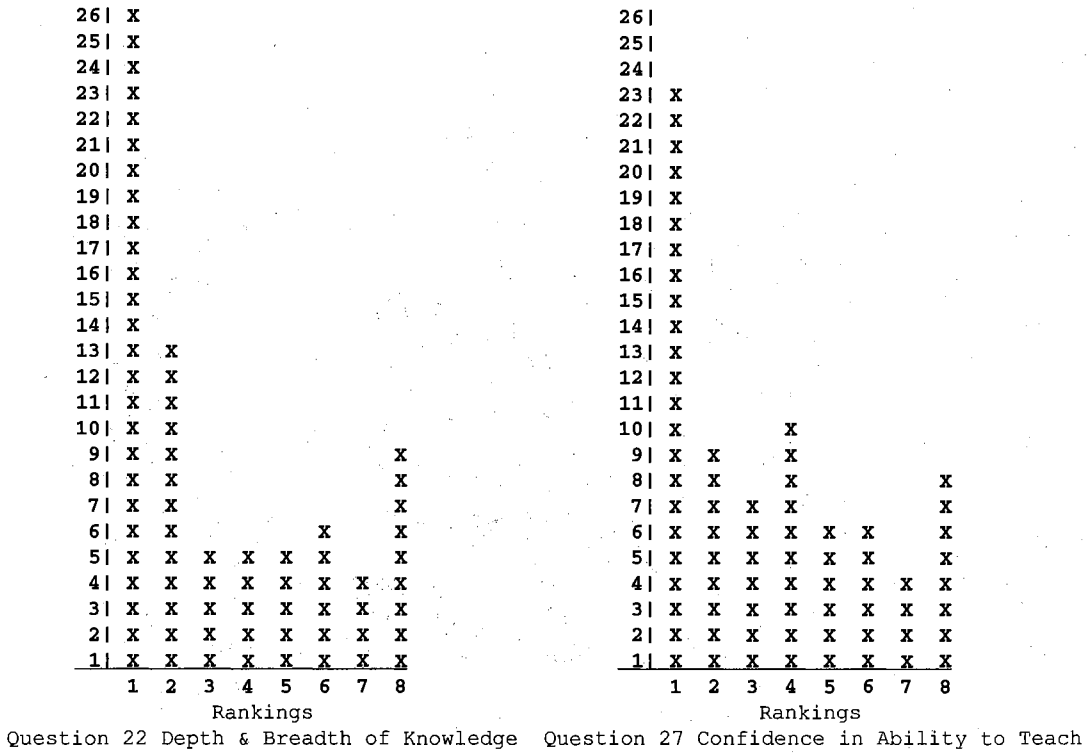

Figure 58. Preflight - All Respondents

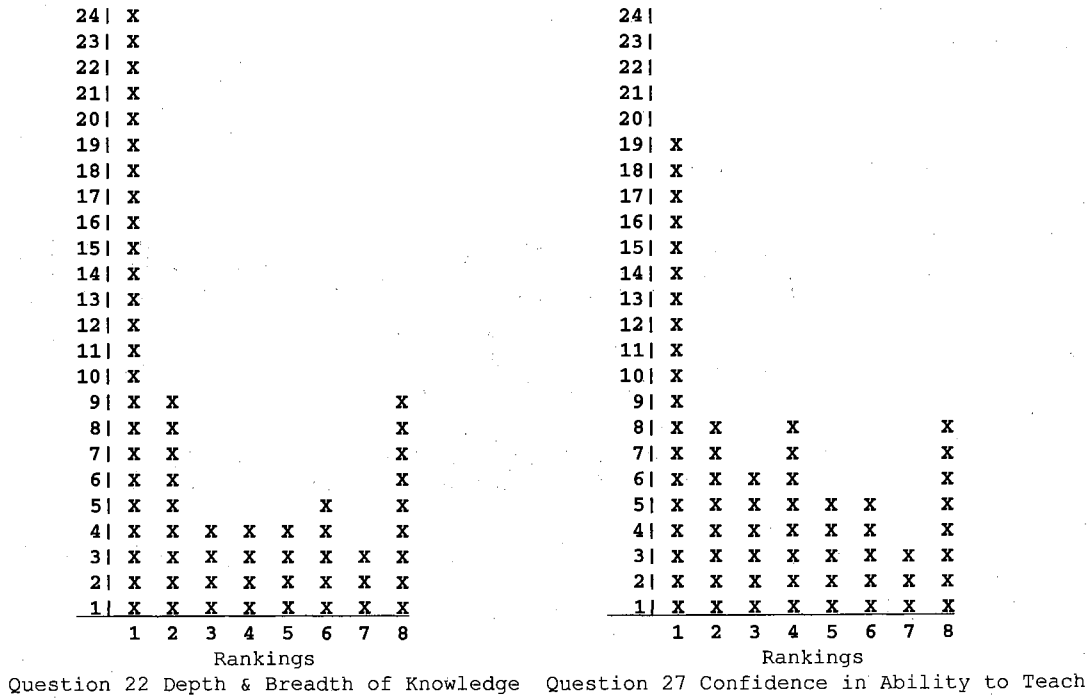

Figure 59. Preflight - Male Respondents

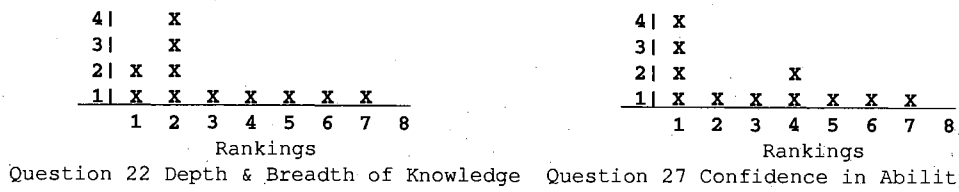

Figure 60. Preflight - Female Respondents

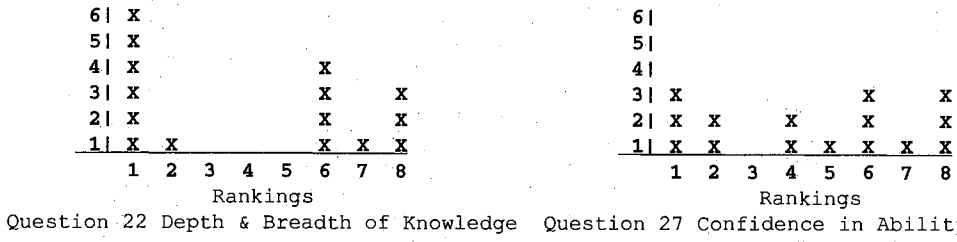

Figure 61. Preflight - Military Respondents

The second Performance Area is "Normal and Crosswind Take Off's and Landings." Even more dramatic than the Preflight area, the overwhelming response is that CFI's report being both knowledgable and confident when it comes to teaching normal and crosswind takeoffs and landings. The median responses are 2.61 for Depth and Breadth (the second most favorable Performance Area DB ranking) and 2.42 for Confidence (the most favorable Performance Area C ranking). The graphs are unambiguous in showing that this area is popular with CFI's and, as a group, they rank this area second in Depth and Breadth and first in Confidence. Notably, none of the respondents ranked this area as last in either the Depth and Breadth or Confidence categories. Not surprisingly, the *chi-squared* analysis was significant for both graphs. Males also ranked this area second and first for DB and C respectively with median rankings of 2.50 and 2.44. Females also mirrored the larger group with medians of 2.80 DB and 2.25 C. The military respondents followed suit with a DB median ranking of 3.62 and C of 3.25.

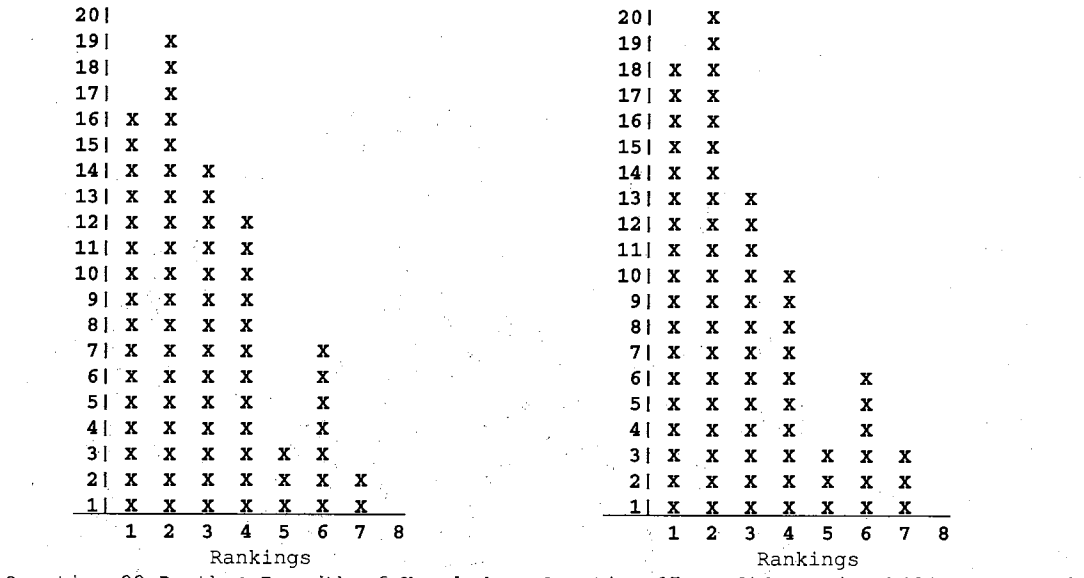

Figure 62. Normal & Crosswind Takeoffs & Landings - All Respondents

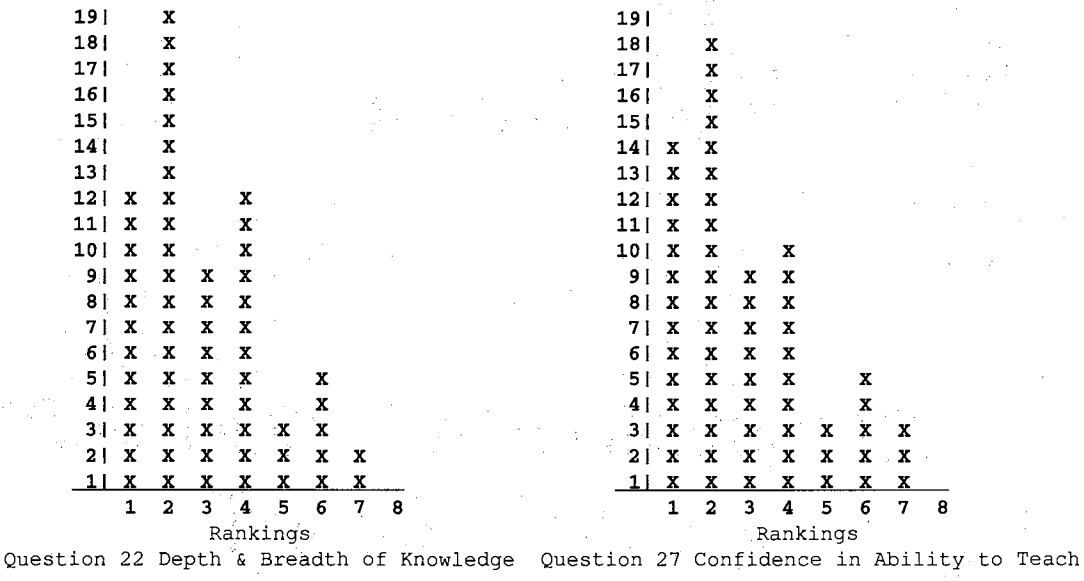

Figure 63. Normal & Crosswind Takeoffs & Landings - Male Respondents

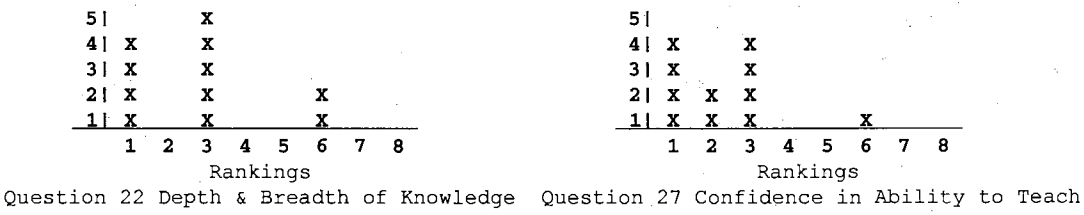

Figure 64. Normal & Crosswind Takeoffs & Landings - Female Respondents

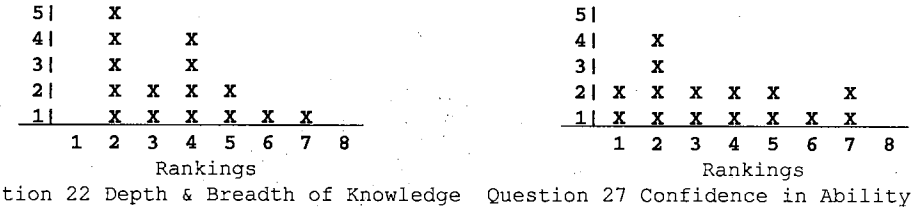

Figure 65. Normal & Crosswind Takeoffs & Landings - Military Respondents

The third Performance Area is "Maximum Performance Takeoffs and Landings." The median responses in this area are 4.20 DB and 4.04 C resulting in an overall ranking of third for this area. Both of these medians are close to the theoretical flat median of 4.5 and the graphs show no clear pattern. The DB graph looks evenly distributed with two groups converging around the middle of the graph. The C graph definitely shows a bimodal distribution but again, these groups surround the middle of the graph. Whereas the *chi-squared* analysis was significant for both graphs no clear preference exists among CFI's in this area. Males also ranked this area third with median rankings of 4.00 DB and 3.72 C. Female respondents ranked this area much lower at seventh on both Depth and Breadth and Confidence with median rankings of 6.00 DB and 6.25 C. The military respondents report being much more comfortable about their Depth and Breadth of knowledge in this area giving it an overall ranking of second with a median ranking of 3.67. Their confidence in the ability to teach, however, ranked fourth overall with a median ranking of 5.00.

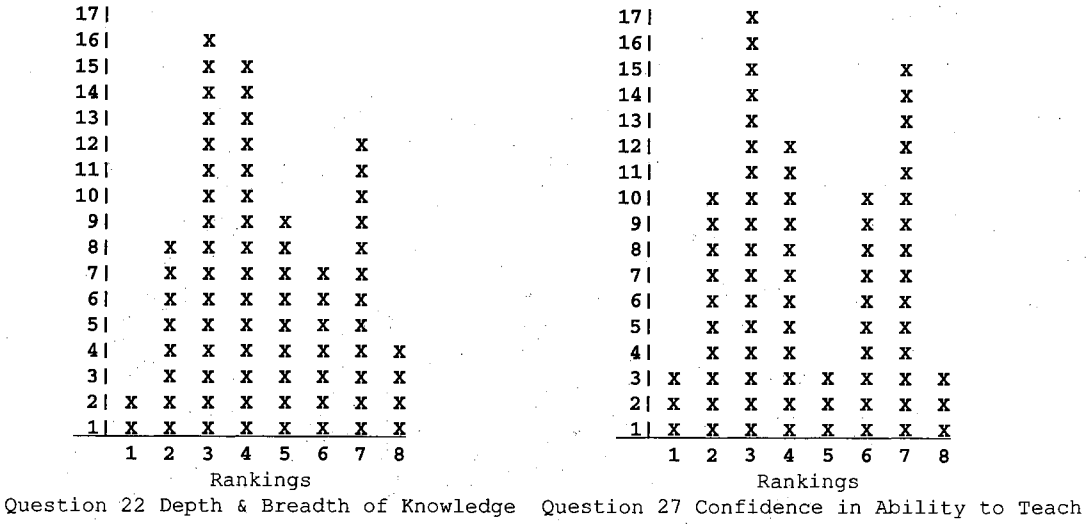

Figure 66. Maximum Performance Takeoffs and Landings - All Respondents

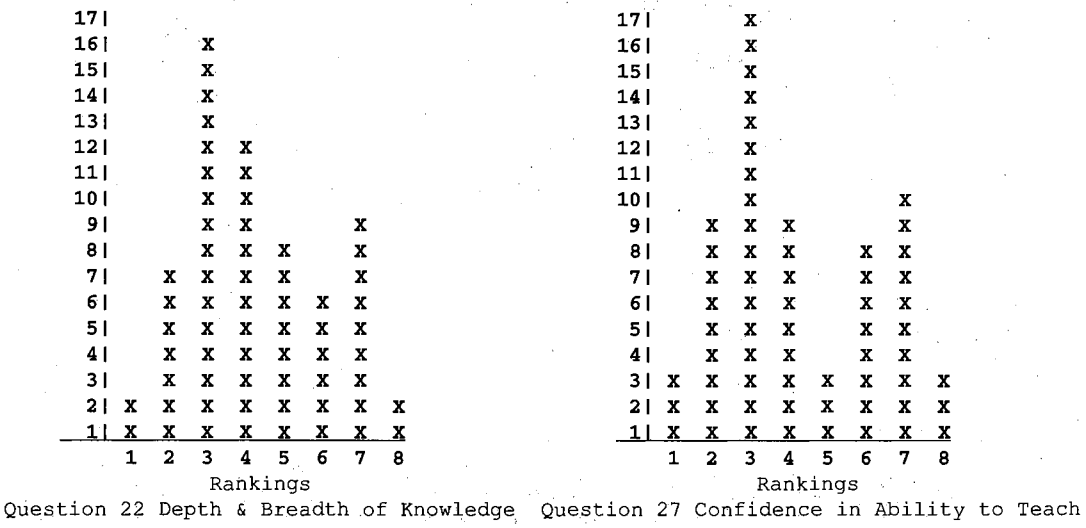

Figure 67. Maximum Performance Takeoffs and Landings - Male Respondents

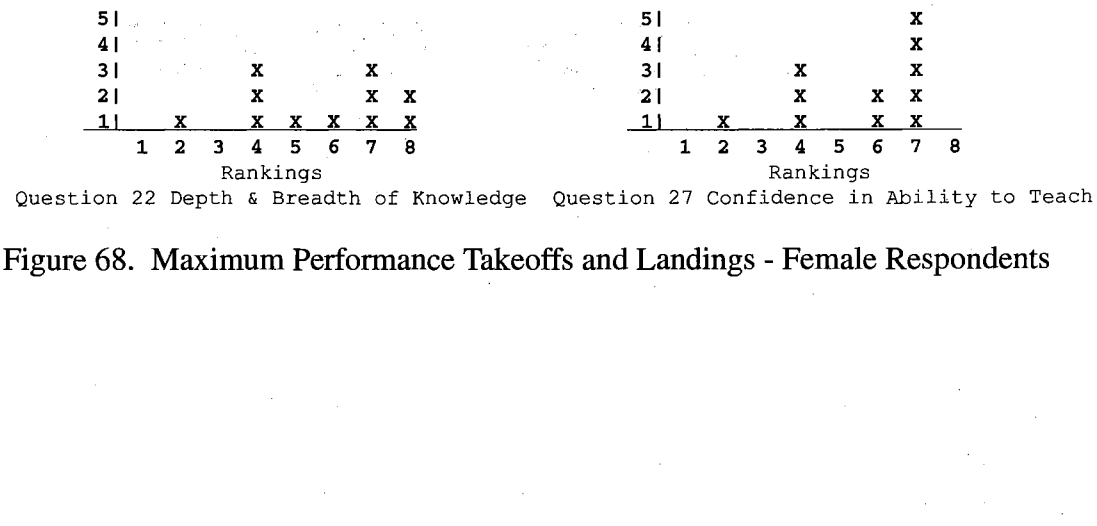

Figure 68. Maximum Performance Takeoffs and Landings - Female Respondents

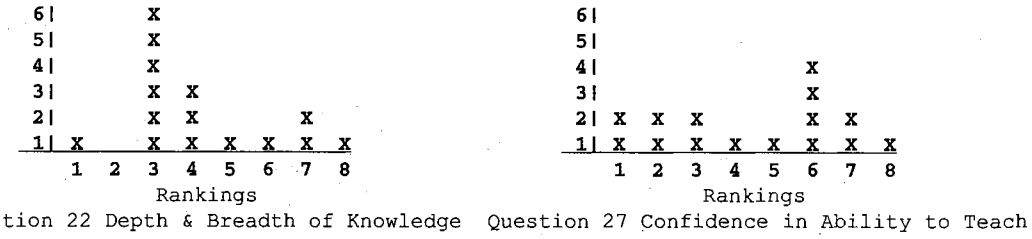

Figure 69. Maximum Performance Takeoffs and Landings - Military Respondents

The fourth Performance Area is "Ground Reference Maneuvers." Interestingly, Ground Reference Maneuvers generated the lowest rankings of all of the Performance Areas on both questions for all respondent groups. The median responses are 6.36 for Depth and Breadth of knowledge and 6.45 for Confidence in ability to teach resulting in overall rankings of dead last for all groups. 24 respondents (32.9%) ranked ground reference maneuvers dead last in both the Depth and Breadth and Confidence categories. Only 19 respondents (26%) ranked ground reference maneuvers in the top four positions. *Chi-squared* analysis was significant for both graphs. Males, females and the military respondents all had similar median DB rankings: 6.30, 6.62, and 6.33 respectively. Confidence medians were also similar for all three groups: 6.40, 6.75, and 6.62.

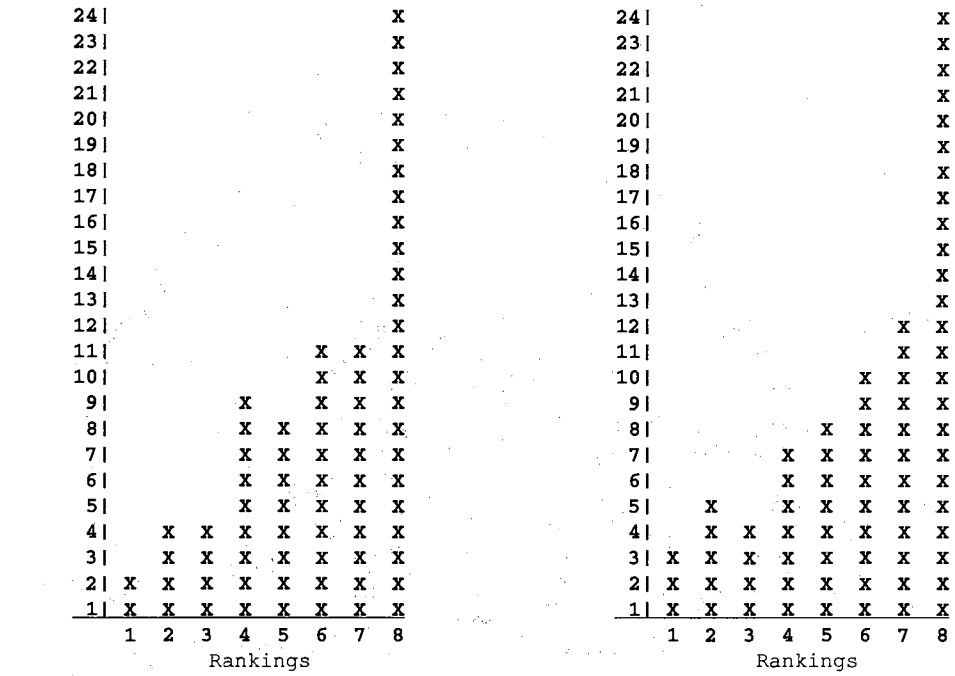

Figure 70. Ground Reference Maneuvers - All Respondents

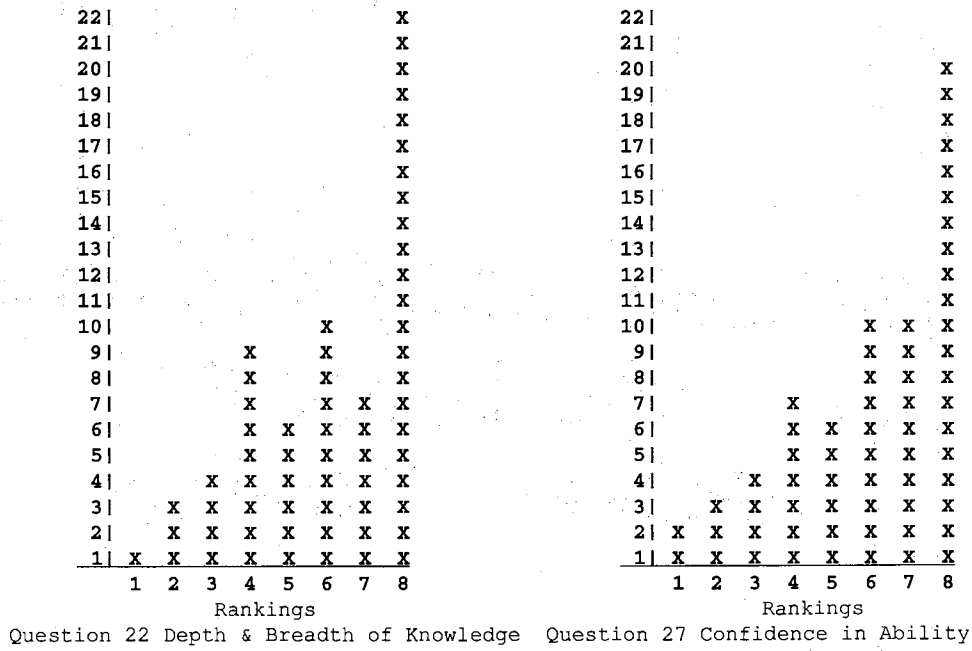

Figure 71. Ground Reference Maneuvers - Male Respondents

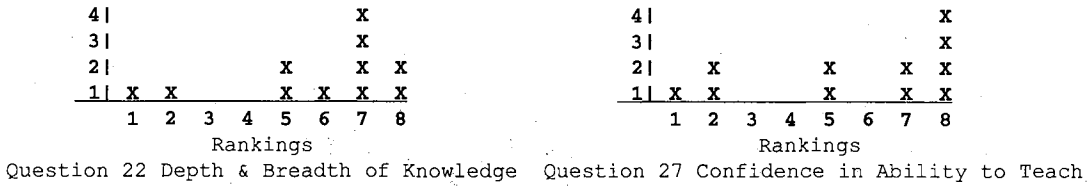

Figure 72. Ground Reference Maneuvers - Female Respondents

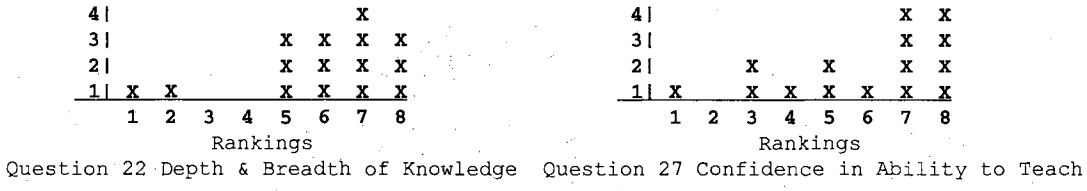

Figure 73. Ground Reference Maneuvers - Military Respondents

The fifth Performance Area is "Slow Flight and Stalls." With median responses of 4.75 DB and 4.82 C slow flight and stalls seems to be right in the middle of the road. As the graphs show, whereas only a few respondents ranked this area as their highest, most of the responses seem evenly distributed. The *chi-squared* analysis was not significant for either graph. Males ranked this area fifth overall with medians rankings of 4.86 for both DB and C. The females ranked this area higher at third overall with median rankings of 3.38 DB and 4.67 C. Military respondents ranked their Depth and Breadth of knowledge at sixth overall with a median ranking of 5.25 and ranked their Confidence at fourth overall with a median ranking of 5.00.

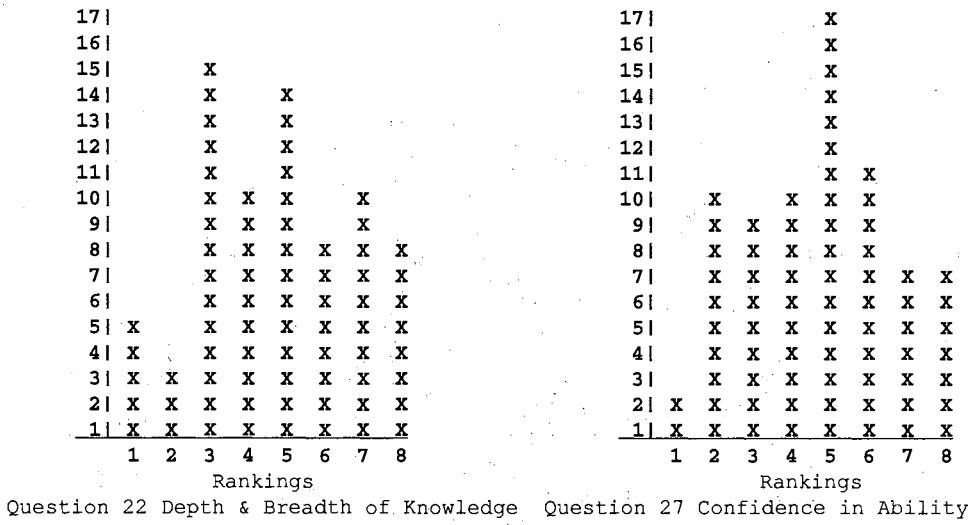

Figure 74. Slow Flight and Stalls - All Respondents

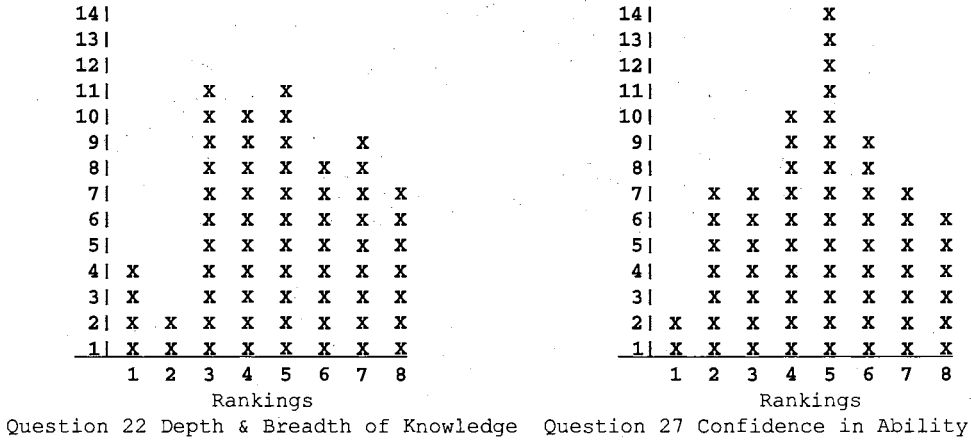

Figure 75. Slow Flight and Stalls - Male Respondents

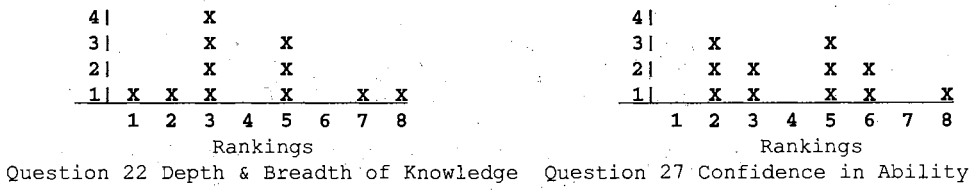

Figure 76. Slow Flight and Stalls - Female Respondents

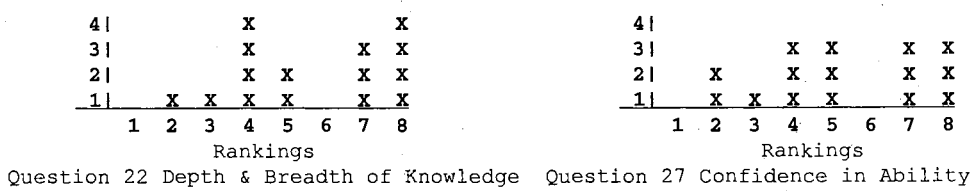

Figure 77. Slow Flight and Stalls - Military Respondents

The sixth Performance Area is "Cross Country." The median responses for cross country are 4.78 DB and 4.84 C resulting in an overall ranking of fifth. Whereas the graphs show that very few respondents ranked this area last and that more ranked it higher than lower, the vast majority ranked it right in the middle of the range. In the "Depth and Breadth" graph twenty seven respondents ranked cross country as either fourth or fifth. This represents 37% of the respondents. In the "Confidence" graph thirty two respondents ranked cross country fourth or fifth for 43.8% of the respondents. The "Depth and Breadth" cross country graph is not significant according to the *chi-squared* analysis, however, the "Confidence" graph is. The "Confidence" graph is not flat and this indicates that CFI's are generally in the middle of the road when it comes to their cross country knowledge and confidence.

Males ranked this area one step higher at fourth in both DB and C with median rankings of 4.81 and 4.83 respectively. Females followed the males in also giving cross country an overall ranking of fourth. Their median rankings were 4.38 DB and 4.88 C. The military respondents ranked cross country at fifth in Depth and Breadth with a median ranking of 4.25 but ranked their Confidence to teach this subject at third with a median ranking of 4.00.

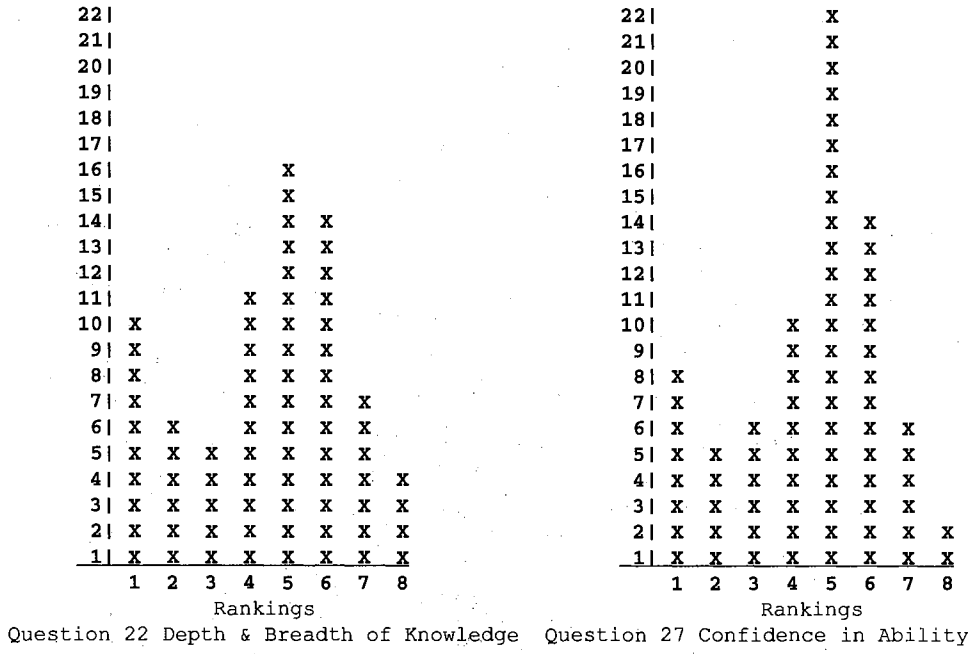

Figure 78. Cross Country - All Respondents

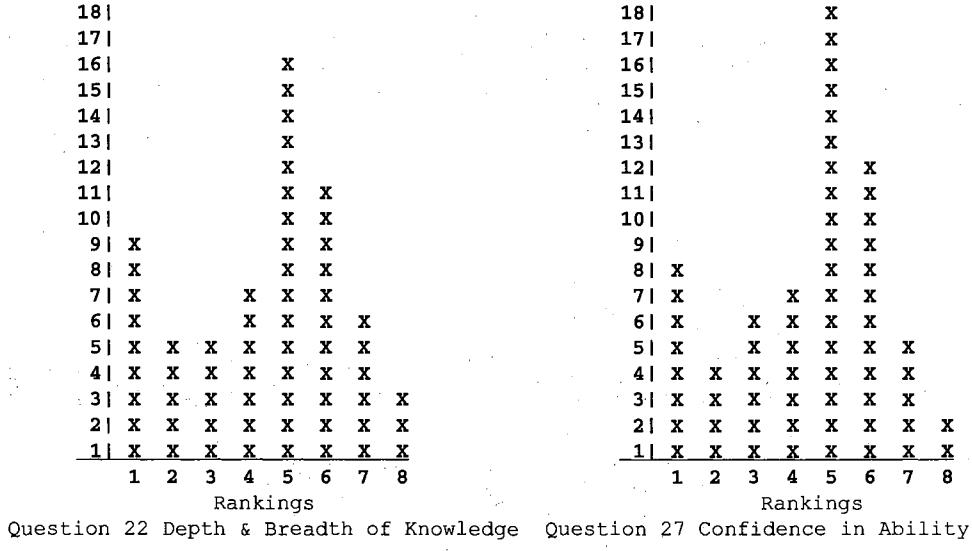

Figure 79. Cross Country - Male Respondents

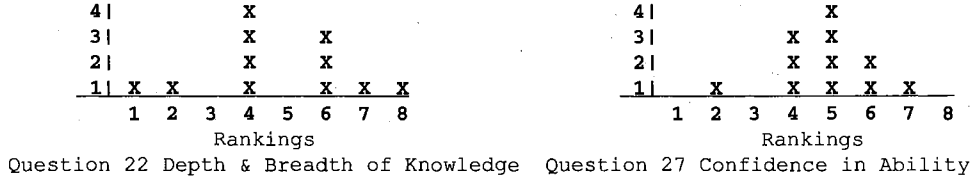

Figure 80. Cross Country - Female Respondents

Figure 81. Cross Country - Military Respondents

The seventh Performance Area is "Basic Instrument Maneuvers." The median responses for this area are 5.35 DB and 5.56 C yielding an overall ranking of seventh. Because all CFI's must be instrument rated pilots, it is somewhat surprising that the central tendency of the respondents in this area was toward the lower end of the scale. The Depth and Breadth median is the third lowest ranking and the Confidence median is the second lowest ranking. Although neither graph showed significance under *chi-squared* analysis, both tend toward the lower end of the scale. The "Depth and Breadth" graph shows that twenty six of the respondents (35.6%) ranked basic instrument maneuvers as last or next to last and twenty eight respondents (38.4%) ranked their "Confidence" in the last two positions. Males ranked this area next to last overall with median rankings of 5.62 DB and 5.64 C. Females ranked this area fifth on both Depth and Breadth as well as Confidence with median rankings of 4.67 DB and 5.00 C. The military respondents went against the trend and ranked basic instrument maneuvers much higher at third. Their median rankings were 4.00 for both DB and C.

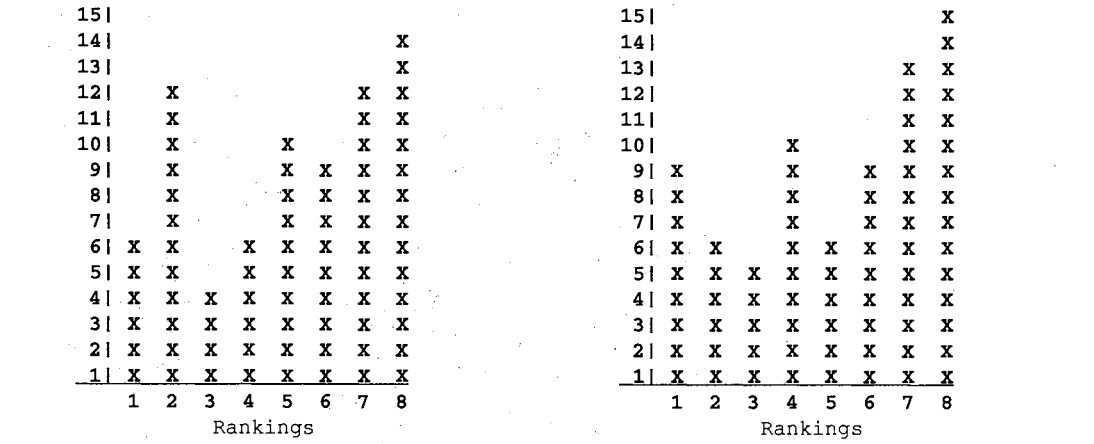

Figure 82. Basic Instrument Maneuvers - All Respondents

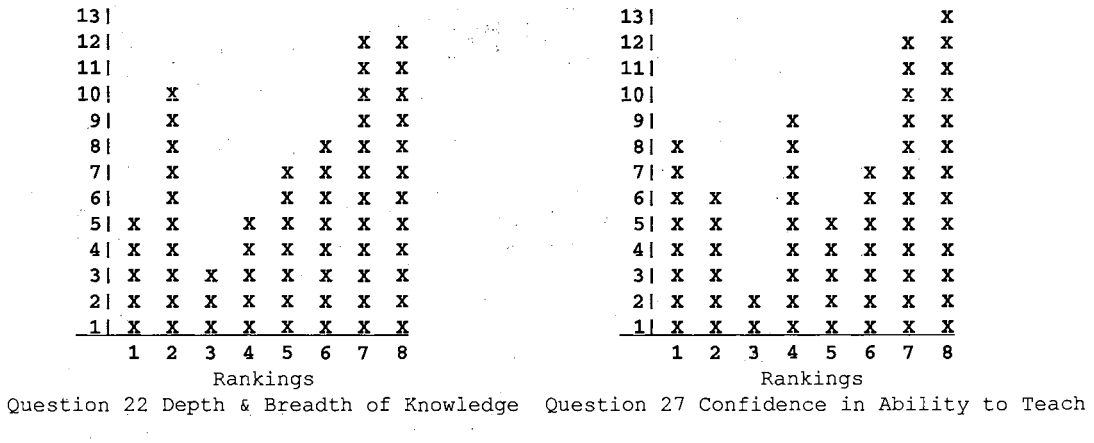

Figure 83. Basic Instrument Maneuvers - Male Respondents

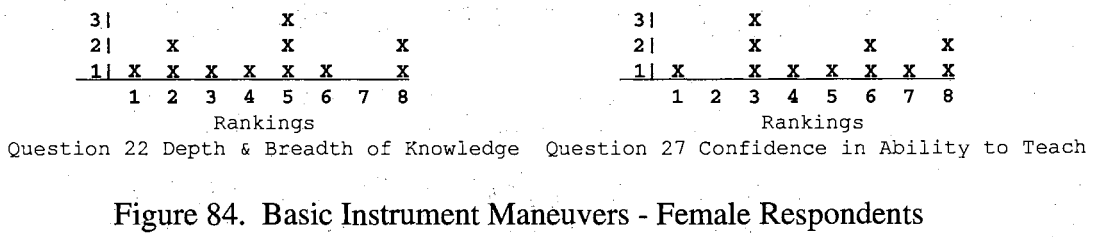

Figure 84. Basic Instrument Maneuvers - Female Respondents

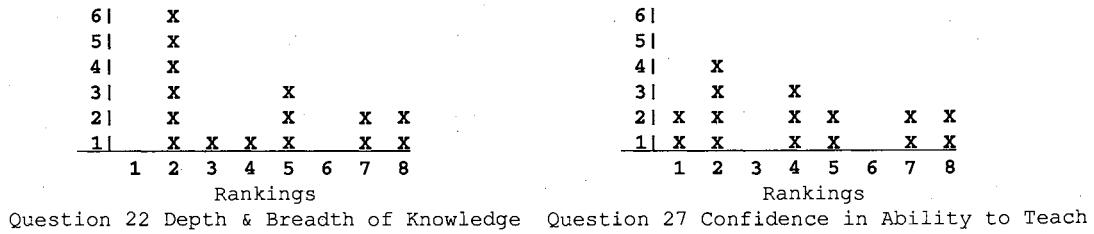

Figure 85. Basic Instrument Maneuvers - Military Respondents

The eighth and final Performance Area is "Emergency Procedures." The median response for the Depth and Breadth graph in this area is 5.44 which represents the second lowest ranking in the DB Performance Areas for an overall ranking of seventh. The median Confidence response of 5.19 is the third lowest ranking or sixth. Both graphs are very similar and indicate that more CFI's lack knowledge and confidence in this area than the reverse. Males ranked emergency procedures sixth with median rankings of 5.36 DB and 5.12 C. Females also ranked this area sixth with median rankings of 5.75 DB and 6.00 C. The military respondents gave emergency procedures an overall Depth and Breadth ranking of fourth with a median ranking of 4.00. The Confidence in their ability to teach this material was much higher, however, with an overall ranking of second and a median ranking of 3.42.

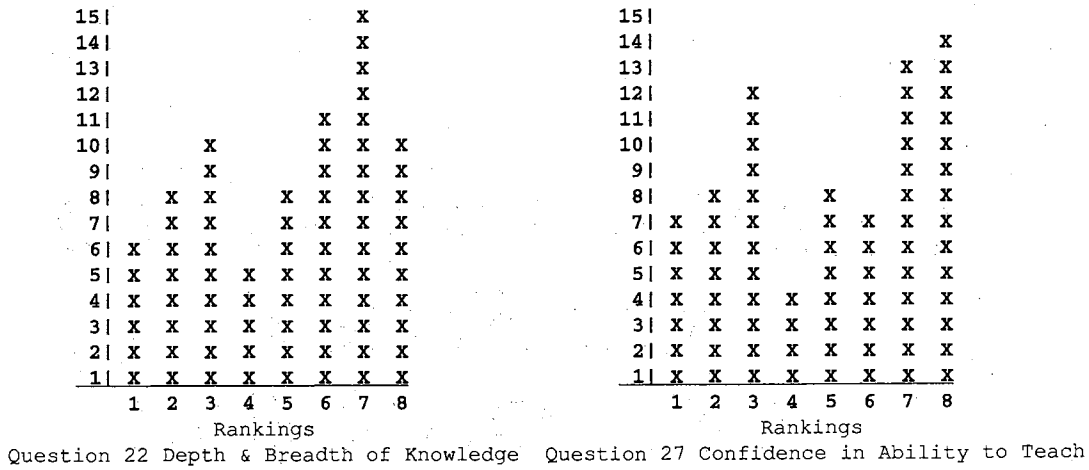

Figure 86. Emergency Procedures - All Respondents

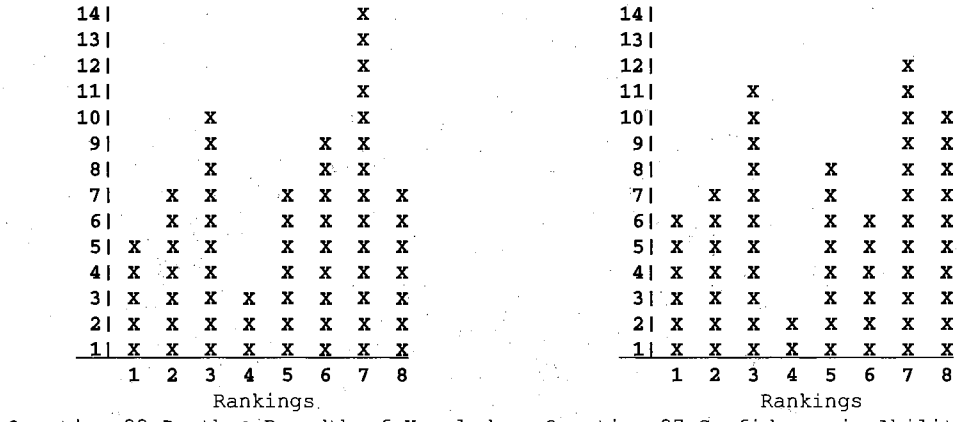

Figure 87. Emergency Procedures - Male Respondents

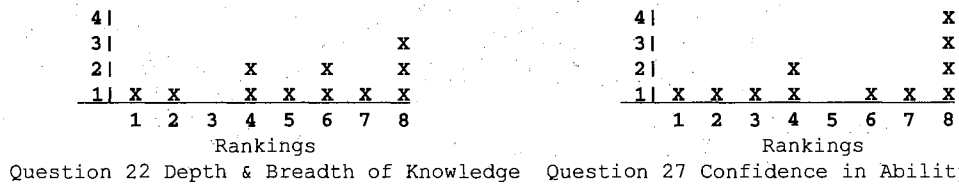

Figure 88. Emergency Procedures - Female Respondents

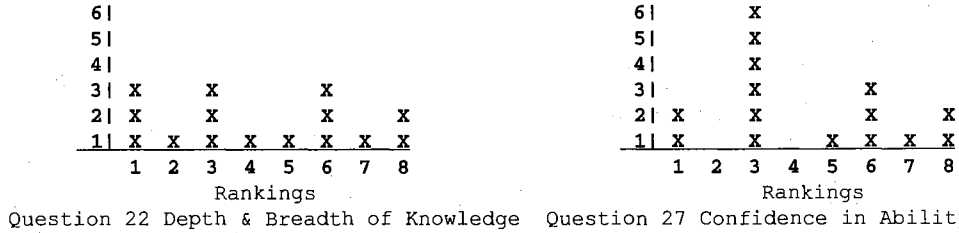

Figure 89. Emergency Procedures - Military Respondents

Areas by Rank Median

For the following analysis the Knowledge Area rankings have been divided into three ranges based on median rankings. Because the median rank of the theoretical flat distribution for a Knowledge areas is 7.0 any median rank falling within ± 1.5 rankings of 7.0 will be considered "average" or unremarkable. This is the area within which we would expect all of the Knowledge Areas to fall assuming the theoretical flat distribution. The following figures (Figures 90 through 97) depict this mid-range area (5.5 to 8.5) as shaded. Any Knowledge Area receiving a median ranking less than 5.5 would be considered "favored." Likewise, any area receiving a median rank greater than 8.5 would be considered "unfavored."

Knowledge Areas

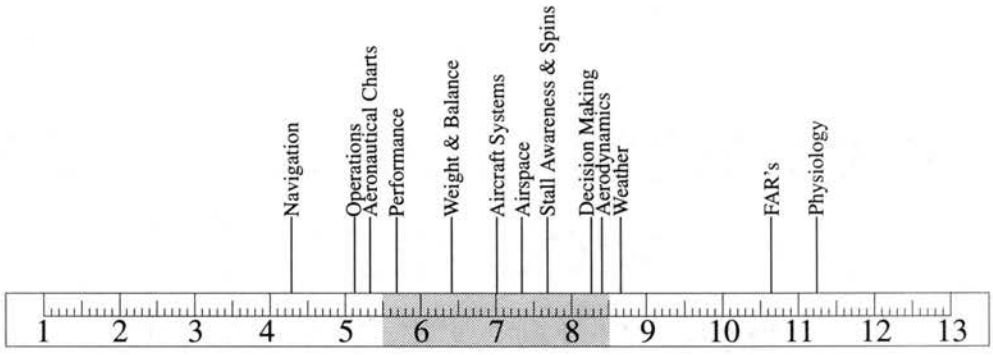

Figure 90. Areas by Rank Median - Question 21 - All Respondents

Figure 90 depicts the thirteen Knowledge Areas ranked by median rankings based on the responses from all of the respondents on the Depth and Breadth question (See also Tables 33 through 40). Navigation was the most highly ranked Knowledge Area followed by

Operations, and Aeronautical Charts. Performance, while ranked high, fell into the mid-range along with Weight & Balance, Aircraft Systems, Airspace, Decision Making, Aerodynamics, and, finally, Weather. By far the two Knowledge Areas ranked the lowest, least favored, are Federal Aviation Regulations and Physiology. Figure 90 indicates that the respondents dislike FAR's and Physiology far more than they like Navigation or Operations. The FAR Knowledge Area was ranked 3.62 rankings below the average of 7.00 and Physiology was ranked 4.23 rankings below average. By comparison, the most favored area, Navigation, was ranked only 2.73 rankings above average. Of the favored areas, only Operations (5.11) and Aeronautical Charts (5.31) fall outside the $\pm$ 1.5 ranking mid-range.

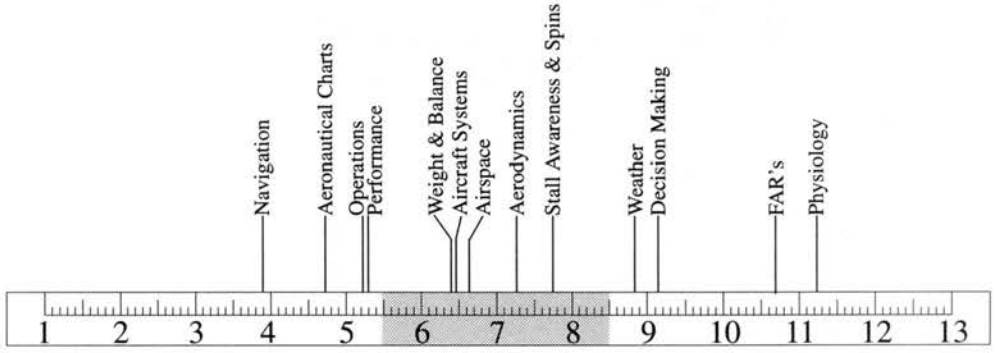

Figure 91. Areas by Rank Median - Question 26 - All Respondents

Figure 91 depicts the thirteen Knowledge Areas ranked by median rankings based on the responses from all of the respondents on the Confidence in Ability to Teach question. Again, Navigation was the most highly ranked Knowledge Area. With the exception of Aeronautical Charts and Operations swapping positions, Navigation, Charts, Operations, and Performance are again ranked highly and this time Performance also falls within the "favored" range. In the mid-range are Weight & Balance, Aircraft Systems, Airspace,

Aerodynamics, and Stall Awareness and Spins. Four Knowledge Areas fall within the "unfavored" range: Weather, Decision Making, FAR's and Physiology.

The two lowest ranked areas are FAR's and Physiology and once again they are ranked far lower than the most favored areas are ranked high. The highest area, Navigation, was ranked 3.89, or 3.11 rankings above average. The second lowest area, FAR's, was ranked 10.67, or 3.67 rankings below average, and Physiology, ranked 11.22 was ranked 4.22 rankings below average.

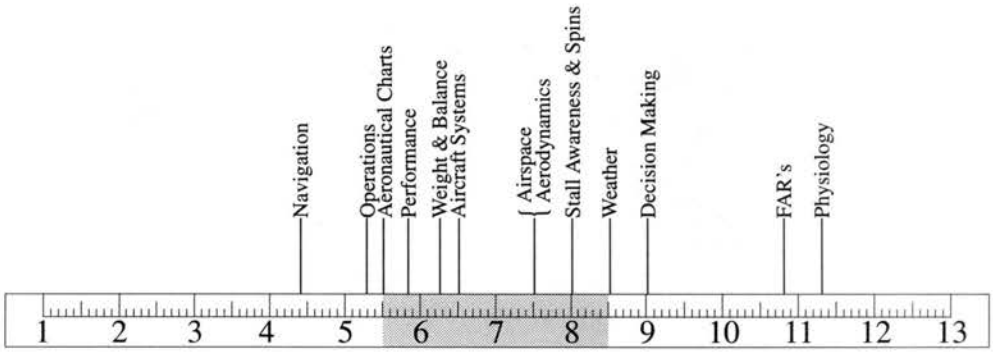

Figure 92. Areas by Rank Median - Question 21 - Male Respondents

Figure 92 depicts the areas by rank median for male respondents on the Depth and Breadth question. Males ranked Navigation highest at 4.40 followed by Operations at 5.28. Aeronautical Charts ranked right on the boundary with a score of 5.50. Solidly in the mid-range were six Knowledge Areas: Performance (5.83), Weight & Balance (6.25), Aircraft Systems (6.50), Airspace and Aerodynamics were tied at 7.50, and Stall Awareness (8.00). Three areas fell into the "unfavored" range: Decision Making at 9.00, FAR's at 10.80 and Physiology at 11.30. The highest ranked area, Navigation, was only ranked 2.60 rankings above average while the worst two areas, FAR's and Physiology, ranked 3.80 and 4.30 rankings below average.

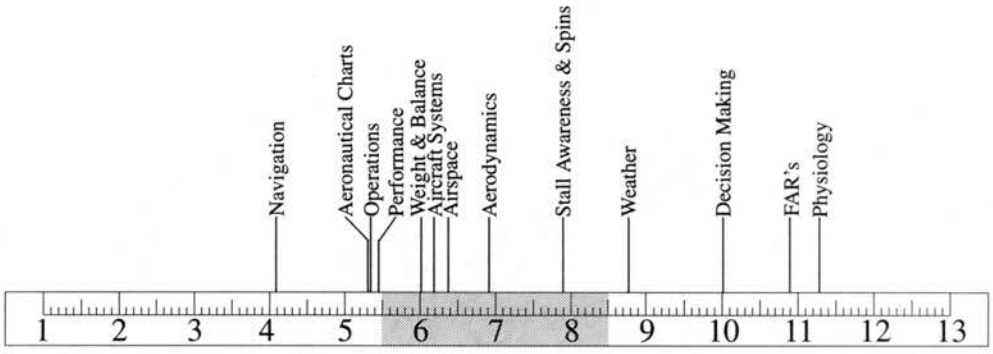

Figure 93. Areas by Rank Median - Question 26 - Male Respondents

Figure 93 depicts the areas by rank median for male respondents on the Confidence in Your Ability to Teach question. The males ranked four areas in the "favored" range for confidence lead by Navigation at 4.07. Aeronautical Charts (5.30), Operations (5.33), and Performance (5.43) rounded out the favored areas. Only five areas ranked in the mid-range: Weight & Balance (6.00), Aircraft Systems (6.17), Airspace (6.36), Aerodynamics (6.90), and Stall Awareness and Spins (7.88). Four Knowledge Areas fell within the "unfavored" range for Confidence: Weather at 8.75, Decision Making at 10.00, FAR's at 10.88, and Physiology at 11.27.

The three least favored Knowledge Areas ranked lower than the highest area ranked high. Navigation ranked 2.93 rankings higher than average whereas Decision making was 3.00 rankings below average, FAR's 3.88 rankings below, and Physiology 4.27 rankings below average. All were ranked much, much lower than the theoretically average score of 7.00.

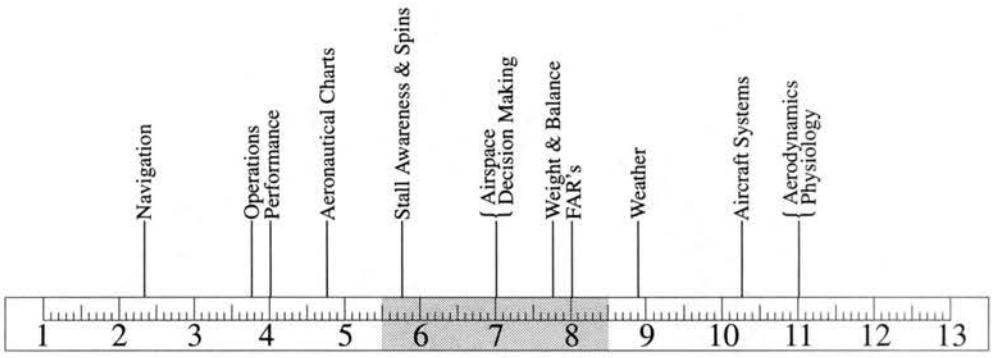

Figure 94. Areas by Rank Median - Question 21 - Female Respondents

Figure 94 depicts the areas by rank median for female respondents on the Depth and Breadth question. The females ranked four areas well into the "favored" range: Navigation, ranked at 2.33, Operations, ranked at 3.75, Performance ranked at 4.00, and Aeronautical Charts, ranked at 4.75. Five areas were ranked in the mid-range: Stall Awareness and Spins at 5.75, Airspace and Decision Making tied at the mid-rank of 7.00, Weight & balance at 7.75, and FAR's at 8.00. The females ranked FAR's far higher than any other group and that they also ranked Decision Making higher as well. Garnering the lowest rankings were Weather at 8.88, Aircraft Systems at 10.25, and Aerodynamics and Physiology tied at 11.00. Females also ranked Aerodynamics and Aircraft Systems lower than any other group.

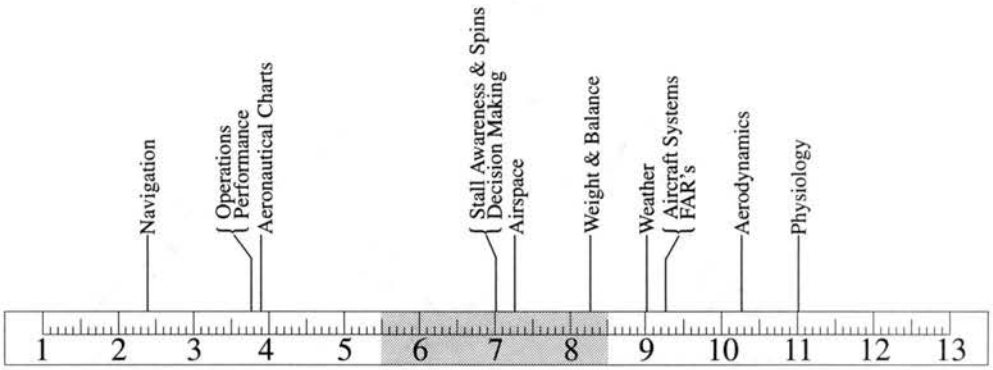

Figure 95. Areas by Rank Median - Question 26 - Female Respondents

In Figure 95 the areas by rank median for females on the Confidence question can be seen. The same four Knowledge Areas are present in the "favored" range, Navigation, Operations, Performance, and Aeronautical Charts, although the females seem to be even more confident in their ability to teach this material than they rate their Knowledge in the same areas. Within the mid-range Stall Awareness & Spins, Decision Making Airspace and Weight & Balance mirror the female Depth and Breadth responses. Whereas the females gave FAR's a median rank of 8.00 in Depth and Breadth (well within the mid-range) their Confidence waned and they ranked it eleventh overall with a mean ranking of 9.25 on the Confidence question. Also falling within the "unfavored" range are Weather (9.00), Aircraft Systems (9.25), Aerodynamics (10.25), and Physiology (11.00).

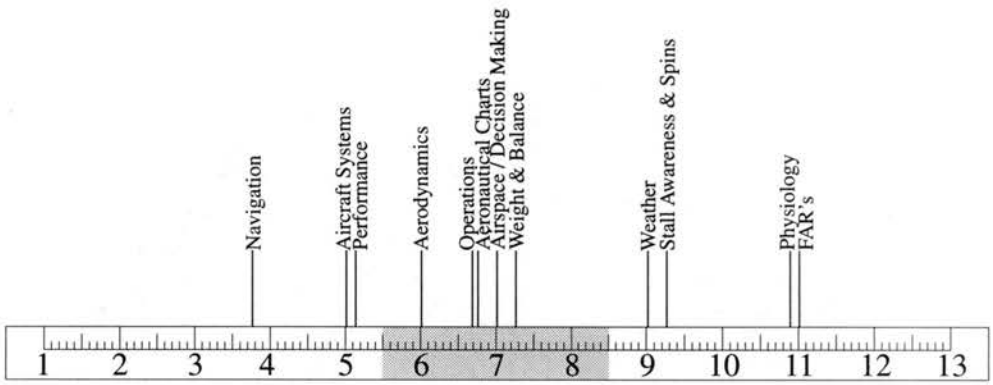

Figure 96. Areas by Rank Median - Question 21 - Military Respondents

The final Knowledge questions depict the responses by those with military flying experience. Figure 96 shows the areas by rank median for the Depth and Breadth question. Navigation was ranked the highest with a median rank of 3.75. Aircraft Systems and Performance were the only two other areas ranking in the "favored" range with median ranks of 5.00 and 5.12. Six areas ranked in the mid-range with five of them closely clustered around the mid-rank of 7.00. Aerodynamics ranked at 6.00, Operations ranked at 6.67, Aeronautical Charts ranked 6.75, Airspace and Decision making tied at the mid-rank of 7.00, and Weight and Balance ranked 7.25. The four remaining areas ranked in the "unfavored" range: Weather (9.00), Stall Awareness and Spins (9.25), Physiology (10.88), and FAR's (11.00). The military respondents were the only group to rank FAR's as last and, hence, the only group where Physiology was not dead last. Nevertheless, Physiology still ranked very low at 4.00 rankings below average.

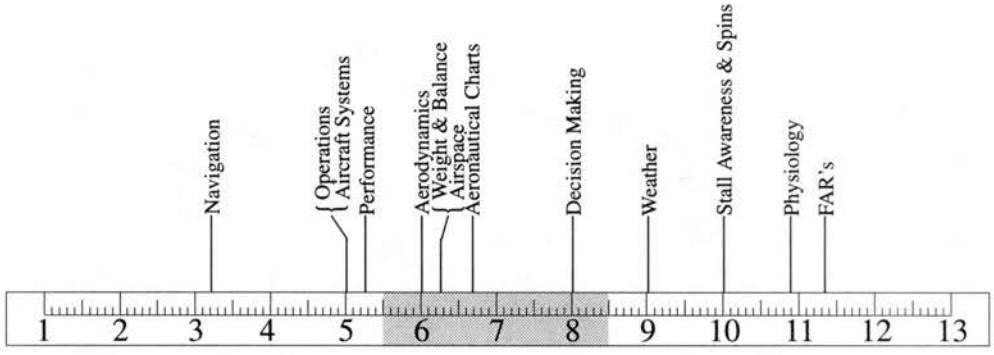

Figure 97. Areas by Rank Median - Question 26 - Military Respondents

Figure 97 depicts the thirteen Knowledge Areas ranked by their median ranking based on the responses from the military respondents on the Confidence in Ability to Teach question. Navigation is still ranked first at 3.20 but Operations jumps up three positions from the Depth and Breadth question to rank second overall with a median rank of 5.00. Aircraft Systems ties Operations at 5.00 and Performance, ranked at 5.25, rounds out the areas in the "favored" range. Aerodynamics (6.00), Weight & Balance and Airspace (tied at 6.25), Aeronautical Charts (6.67), and Decision Making (8.00) all fell within the mid-range. The four Knowledge Areas in the "unfavored" range are the same as in the Depth and Breadth question: Weather (9.00), Stall Awareness and Spins (10.00), Physiology (10.88), and FAR's (11.33).

Although not to the same degree, the military respondents followed the trend of ranking FAR's and Physiology far lower than average than they ranked Navigation above the average. Navigation was ranked 3.80 rankings above average while Physiology and FAR's were ranked 3.88 and 4.33 rankings below average.

Performance Areas

For the Performance Area rank median figures the "mid-range" is ± 1.00 ranking from the theoretical mid-rank of 4.50. Thus, the "favored" range would be from 1.00 to 3.50 and the "unfavored" range would go from 5.50 to 8.00.

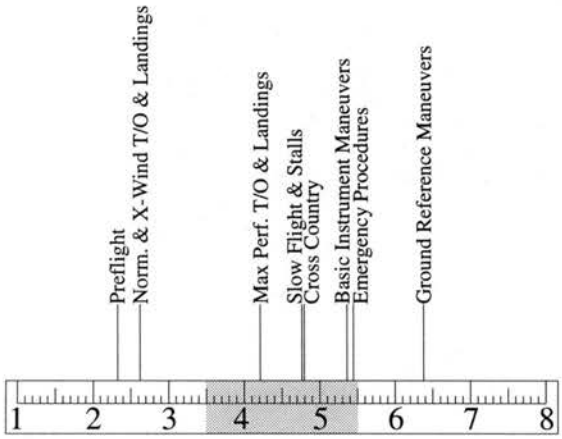

Figure 98. Areas by Rank Median
Question 22 - All Respondents

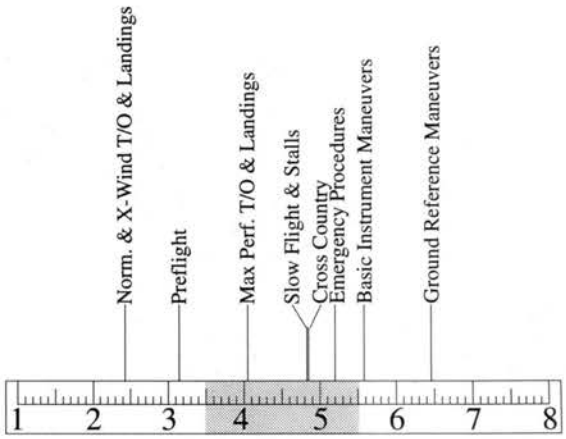

Figure 99. Areas by Rank Median
Question 27 - All Respondents

Figures 98 and 99 depict the eight Performance Areas by rank median for the Depth and Breadth question and the Confidence question with data from all respondents. Only two areas fell within the "favored range in both questions: Preflight and Normal and Crosswind Takeoffs and Landings. In the Depth and Breadth graph five areas fell within the mid-range: Maximum Performance Takeoffs and Landings, Slow Flight & Stalls, Cross Country, Basic Instrument Maneuvers, and Emergency Procedures. The only area to fall into the "unfavored" range for the Depth and Breadth question was Ground Reference Maneuvers. The Confidence graph only has four areas in the mid-range, Maximum

Performance Takeoffs and Landings, Slow Flight & Stalls, Cross Country, and Emergency Procedures. On the Confidence graph both Basic Instrument Maneuvers as well as Ground Reference Maneuvers fall into the "unfavored" range.

Unlike the Knowledge Area graphs, this graph shows that the "favored" area was ranked higher above average than the most "unfavored" area was ranked below average. The Depth and Breadth graph ranked Preflight at 2.31 or 2.19 rankings above average while the lowest ranked area, Ground Reference Maneuvers, ranked 6.36 or 1.86 rankings below average. Even the second highest area, Normal and Crosswind Takeoffs and Landings, was 1.89 rankings above average, virtually the same above as Ground Reference Maneuvers was below.

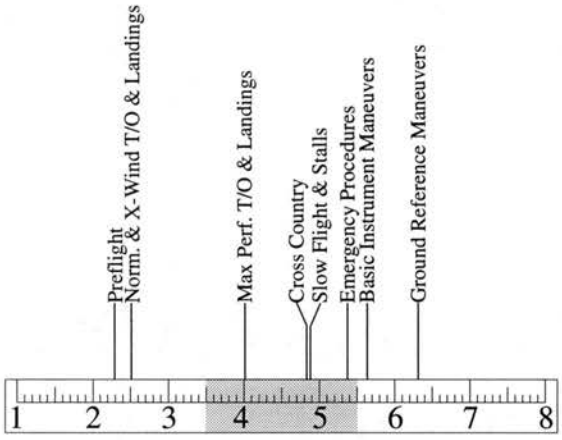

Figure 100. Areas by Rank Median
Question 22 - Male Respondents

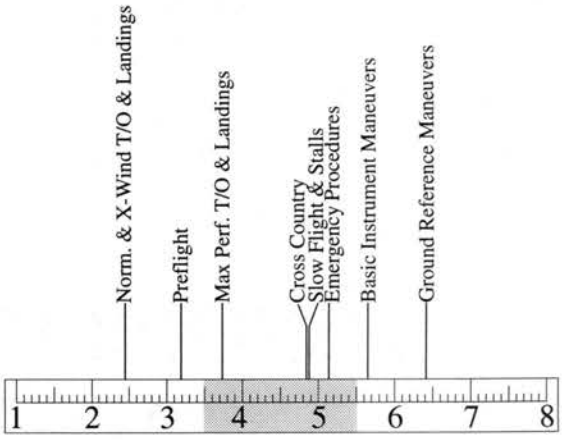

Figure 101. Areas by Rank Median
Question 27 - Male Respondents

Figures 100 and 101 depict the eight Performance Areas by rank median for the Depth and Breadth and the Confidence question for male respondents. Only two areas fell within the "favored" range in both questions: Preflight and Normal and Crosswind

Takeoffs and Landings were the only two ranked in the "favored" range on the Depth and Breadth question. As with the previous two graphs the ranking order was switch in the Confidence graph. The same four areas occupy the mid-range on both graphs: Maximum Performance Takeoffs and Landings, Cross Country, Slow Flight & Stalls, Emergency Procedures. The final two Performance Areas lie with the "unfavored" range: Basic Instrument Maneuvers and Ground Reference Maneuvers. Once again, Unlike the Knowledge Areas, the highest ranked Performance Area is higher than or equally above average than the lowest ranked area.

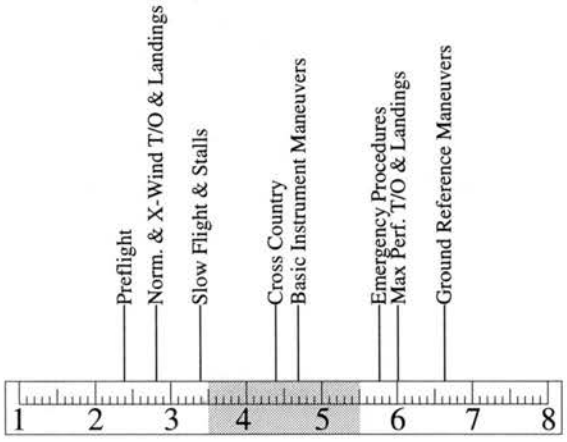

Figure 102. Areas by Rank Median
Question 22 - Female Respondents

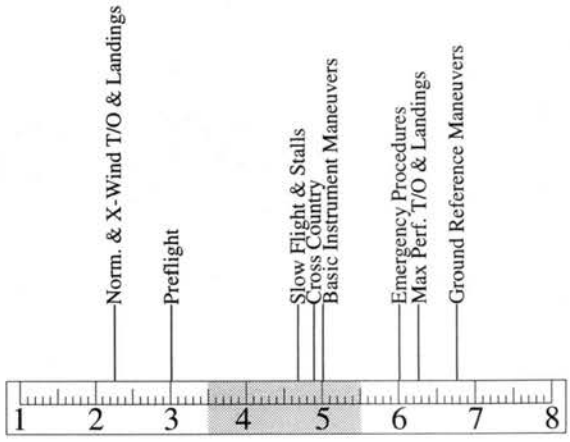

Figure 103. Areas by Rank Median
Question 27 - Female Respondents

Figures 102 and 103 depict the eight Performance Areas by rank median for the Depth and Breadth and the Confidence question for female respondents. Three areas fell within the "favored" range on the Depth and Breadth question: Preflight, Normal and Crosswind Takeoffs and Landings, and Slow Flight & Stalls. On the Confidence graph only Normal and Crosswind Takeoffs & Landings and Preflight fall with the "favored"

range with Preflight and Normal and Crosswind Takeoffs and Landings once again exchanging places. The female respondents only ranked two areas in the Depth and Breadth mid-range: Cross Country and Basic Instrument Maneuvers. However, on the Confidence graph Slow Flight & Stalls is added. Both graphs place Emergency Procedures, Maximum Performance Takeoffs & Landings, and Ground Reference Maneuvers in the "unfavored" range. As with the previous Performance Area graphs the highs and lows seem to balance each other out.

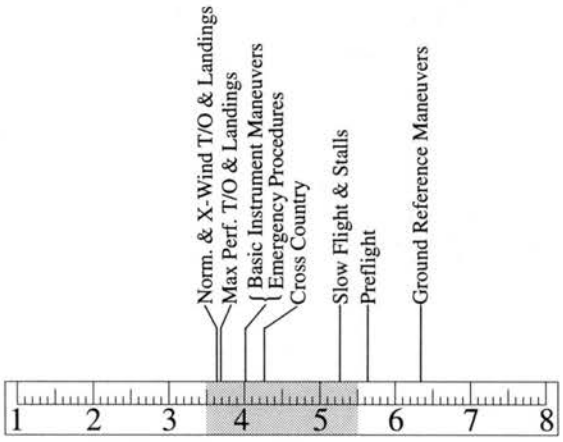

Figure 104. Areas by Rank Median
Question 22 - Military Respondents

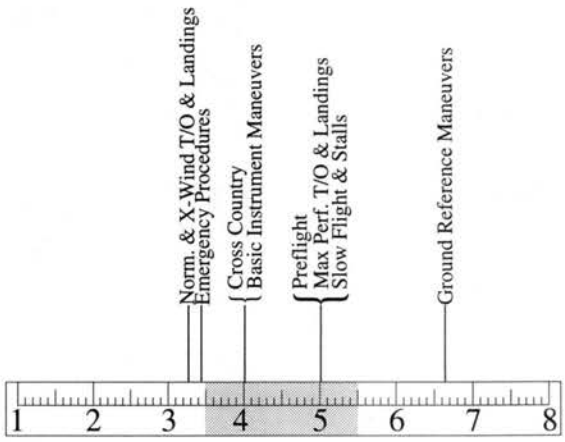

Figure 105. Areas by Rank Median
Question 27 - Military Respondents

The final two graphs, Figures 104 and 105, depict the eight Performance Areas by rank median for the Depth and Breadth and the Confidence question for military respondents. The military graphs are unlike any of the other groups with most of the Performance Areas clustered within the mid-range rankings. The military respondents ranked no Performance Area in the "favored" range for Depth and Breadth and barely ranked Normal and Crosswind Takeoffs & Landings and Emergency Procedures in the "favored"

range. Fully seven of the eight Performance Area were ranked in the mid-range on the Depth and Breadth question and five of the eight on the Confidence question.

In keeping with the trend established by the other three groupings, the military respondents ranked Normal and Crosswind Takeoffs & Landings first on both questions and Ground Reference Maneuvers last. The most remarkable thing about the military graphs is the close clustering of so may areas within the mid-range rankings.

Section II

Questions 17, 18, 32, 33, 34 & 37

Section II contains the responses from questions 17, 18, 32, 33, 34 & 37. The first two questions ask the respondent where they received their initial flight training (question 17) and where they received their initial instructor pilot or CFI training (question 18). Questions 32 and 33 ask the respondent where they obtained the majority of the skills they use to prepare Private Pilot students for their written and oral examinations (question 32) and for their practical examination or checkride (question 33). The final two questions ask each respondent if they felt confident to teach private pilot students immediately upon earning their CFI rating and if they think that the current rules concerning the training and evaluation of CFI's is adequate to produce competent and safe Private Pilots (question 37). (See Appendix A for the full questionnaire.)

Source	Number	Percentage
1. Military:	6	08
2. Part 61:	26	36
3. 141 Private School:	25	34
4. 141 State School:	5	07
5. Accelerated Course:	0	00
6. Self Study:	11	15
No Response:	0	00
TOTAL =	73	

Table 9. Question 17: What was the source of your initial flight training?

The two largest sources of initial pilot training were at private Part 141 schools (34%) and via Part 61 training (36%). Fifteen percent report that they accomplished most of their training through self-study and eight percent (only six respondents) received their initial training through the military. Because fifteen respondents report military flying experience, this indicates that the other nine respondents were either private pilots prior to entering the military or were not pilots in the military (e.g. navigator, flight engineer, loadmaster, etc.).

Source	Number	Percentage
1. Military:	8	11
2. Private School:	56	77
3. State School:	4	05
4. Self Study:	3	04
No Response:	2	03
TOTAL =	73	

Table 10. Question 18: What was the source of your initial instructor pilot or CFI training?

The percentages change substantially when the source of initial Instructor Pilot (IP) or Certified Flight Instructor (CFI) training is questioned. Seventy seven percent of the CFI's report that they received their initial instructor training at private schools. Eleven percent were trained in the military, five percent at State sponsored schools and four percent report being self-taught. For some reason two individuals failed to indicate the source of their training.

Source	Number	Percentage
1. Military:	6	08
2. Civilian School:	19	26
3. Self Study:	39	53
4. Accelerated Course:	1	01
5. Seminars & Lectures:	5	07
6. Other:	3	04
No Response:	0	00
TOTAL =	73	

Table 11. Question 32: Where have you received the majority of the skills that you use to train Private Pilot students for their written examination?

Questions 32 is interesting because it shows that the majority of the skills used to prepare Private Pilot students for their written exams and the oral portion of their check-ride are derived from self study rather than from any formal setting. Fifty three percent report using self study as their primary source whereas only twenty six percent reports deriving this information in some type of formal school setting. Eight percent report obtaining this information from their military experience and seven percent from seminars.

Source	Number	Percentage
1. Military:	6	08
2. Civilian Schools:	28	38
3. Self Study:	26	36
4. Accelerated Course:	0	00
5. Seminars & Lectures:	5	07
6. Other:	8	11
No Response:	0	00
TOTAL =	73	

Table 12. Question 33: Where have you received the majority of the skills that you use to train Private Pilot students for their practical examination?

When the same question is asked, but with respect to the practical examination, a more mixed response is generated but again fully a third obtained their information outside a formal setting. Thirty eight percent report deriving the majority of the information they use to prepare their students from civilian schools and thirty six percent report being self taught. Again, eight percent report receiving their information from their military experience and seven percent from seminars and lectures whereas eleven percent report "other" sources.

Level of Confidence	Number	Percentage
1. Very Confident:	13	18
2. Confident:	20	27
3. Somewhat:	22	30
4. Minimally:	12	16
5. Not At All:	6	08
No Response:	0	00
TOTAL =	73	

Table 13. Question 34: Immediately after earning your CFI rating how confident did you feel about your ability to teach new Private Pilot students?
All Respondents

Question 34, indicates that CFI's, upon earning their new rating, were not universally confident. Whereas only eight percent reported being "not at all confident," sixteen percent reported being "minimally" confident. The largest group, representing thirty percent of the respondents, reported being "somewhat" confident. The good news is that the vast majority, 45%, reported being either "confident" or "very confident" upon earning their CFI rating.

When looking at the same question but restricting the responses to male and female

respondents and to respondents with military experience the results are mixed. The largest group of male respondents (32%) reported that they felt "somewhat" confident upon receiving their CFI certificate. The majority, representing 47%, reported feeling "Very Confident" or "Confident." However, fully twenty one percent reported feeling "Minimally Confident" or "Not At All Confident."

Level of Confidence	Number	Percentage
1. Very Confident:	11	18
2. Confident:	18	29
3. Somewhat:	20	32
4. Minimally:	10	16
5. Not At All:	3	05
No Response:	0	00
TOTAL =	62	

Table 14. Question 34: Immediately after earning your CFI rating how confident did you feel about your ability to teach new Private Pilot students?
Male Respondents

The female respondents presented a much broader distribution of feelings about their new CFI rating. Two females each (18%) selected "Very Confident," "Confident," Somewhat Confident," and "Minimally Confident." Three females (27%), however, selected the bottom category of "Not At All Confident." Because there were only eleven females participating in this study this question shows an essentially flat distribution of confidence levels among the female respondents.

Level of Confidence	Number	Percentage
1. Very Confident:	2	18
2. Confident:	2	18
3. Somewhat:	2	18
4. Minimally:	2	18
5. Not At All:	3	27
No Response:	0	00
TOTAL =	11	

Table 15. Question 34: Immediately after earning your CFI rating how confident did you feel about your ability to teach new Private Pilot students?
Female Respondents

The military respondents, by comparison with their civilian peers, were far more confident upon earning their CFI rating. The largest group of military respondents (33%) rated their confidence at the highest level; "Very Confident." The next largest group (27%) rated themselves as "Confident." Thirteen percent reported their confidence as "Somewhat Confident." This means that 73% of the military respondents report an average or higher level of confidence when they received their CFI rating. About one quarter (27%) reported feeling "Minimally Confident" or "Not At All Confident." By far the military group reported the most confidence upon earning a CFI rating.

Level of Confidence	Number	Percentage
1. Very Confident:	5	33
2. Confident:	4	27
3. Somewhat:	2	13
4. Minimally:	3	20
5. Not At All:	1	07
No Response:	0	00
TOTAL =	15	

Table 16. Question 34: Immediately after earning your CFI rating how confident did you feel about your ability to teach new Private Pilot students?
Military Respondents

The final question we will examine is question 37. Question 37 was in the "write in" section and asked respondents: "Do you think the current rules concerning the training and evaluation of CFI's is adequate to produce competent and safe Private Pilots?" Because this question was in the "write in" section, the actual responses varied greatly, from "*Very good*" to "*No! Absolutely not!*" However, if a respondent answered "yes," "mostly," "yes, except for...," "reasonably," or "it seems to work," these were all counted as "yes" answers. Answers of the form "not really" and the like were counted as "no."

The vast majority, fifty three, of the eighty one respondents answered question 37 with a "yes" indicating that almost two thirds of the CFI's believe the current system is at least adequate if not fully meeting their expectations. Only nine respondents answered "no" (11%) and another nine filled in no answer at all. The remaining ten (12%) wrote in various answers which could not be interpreted strictly as a "yes" or a "no." Several expressed contempt for and others against the FAA's designated examiner program, two stated they were unqualified to answer, and another lamented the poor quality of students produced by Part 141 schools.

Other Comments

The remainder of the write in questions produced several trends (see Appendix C for a full listing of respondent comments). The two most striking were the call for CFI training to incorporate some sort of apprenticeship or mentoring system to allow student CFI's to develop their skills under the direct supervision of a more experienced CFI. Sixteen of the respondents mentioned this in their comments. Thirteen respondents indicated the desire that those seeking a CFI rating should obtain more experience with one

respondent recommending a minimum of one thousand hours before earning a CFI rating!

Nine of the respondents called for more training geared toward teaching CFI's ***how to teach*** as opposed to ***how to fly***. Several of these nine indicated that their major hurdle as a new CFI was with the teaching process itself and with understanding the needs and motivations of their students, not with how to fly the airplane.

The next two most popular comments were tied with seven respondents mentioning each one. The first was a desire for some degree of aerobatic training to be required for CFI's and the second was a desire for more in-depth deep stall and spin training. One of those mentioning aerobatic training even suggested his "dream" of requiring CFI's to learn to fly gliders as a way to improve their understanding of how an aircraft really works.

The final trends in the comments section were a call for increased use of personal computer based simulators for ground and instrument instruction (five mentions) and criticism of the current flight training system in which young CFI's work for low pay in order to build time toward an airline or corporate aviation career (five mentions). Three respondents even called for more pay for CFI's so that flight instruction could become a "profession" or a "calling" as opposed to a stepping stone on the way to a more lucrative career.

After reviewing the comments as a whole the major trend which emerged was that CFI's are obtaining most of the information they deem important on their own rather than through a formal FAA or school based training program. Another general trend is that "more experience" is needed or desirable before a pilot becomes a CFI. Unfortunately, none of the respondents explained how one obtains such experience except through being a CFI. Finally, many agreed that more stall and spin training should be included.

Section III

Summary of Data

This section contains a summary of the rank-order data from questions 21, 22, 26 and 27 from the questionnaire. The first four charts (Tables 18 through 20) depict the relative frequency response rates for each Knowledge Area in the Depth and Breadth question (question 21) along with the median score for each particular area and the *chi-squared* value. As noted previously, *chi-squared* values will only be listed for the full group of 73 respondents. The following four charts (Tables 21 through 24) depict the relative frequency response rates for each Knowledge Area in the Confidence question (question 26) along with the median score for each particular area and the *chi-squared* value. The next four charts (Tables 25 through 28) depict the relative frequency response rates for each Performance Area in the Depth and Breadth question (question 22) along with the median score for each particular area and the *chi-squared* value. The last four relative frequency charts (Tables 29 through 32) depict the response rates for each Performance Area in the Confidence question (question 27) along with the median score for each particular area and the *chi-squared* value.

The final eight charts in this section (Tables 30 through 40) depict the Knowledge and Performance Areas in rank order by their median responses for each group. Each of the last eight figures actually contains two rank orderings. The first four each contain the Knowledge Areas in their rank order by group with questions 21 and 26 side-by-side. The last four contain the Performance Areas in their rank order by group with questions 22 and 27 side-by-side.

Knowledge Area	Rankings <- High												Low ->			
1:	8	4	11	7	8	6	6	4	6	8	2	3	0	N= 73	Median = 5.31	X^2 = 22.000
2:	4	8	3	7	7	5	3	9	8	4	3	6	6	N= 73	Median = 7.33	X^2 = 11.600
3:	9	12	7	11	9	9	4	4	3	2	3	0	0	N= 73	Median = 4.27	X^2 = 41.200*
4:	1	4	5	3	5	4	6	7	11	11	5	4	7	N= 73	Median = 8.64	X^2 = 20.800
5:	10	8	4	9	9	8	10	6	4	3	1	1	0	N= 73	Median = 5.11	X^2 = 32.800
6:	3	6	8	10	8	9	9	6	8	1	2	2	1	N= 73	Median = 5.67	X^2 = 28.000
7:	5	4	4	9	10	5	11	9	6	2	1	3	4	N= 73	Median = 6.40	X^2 = 25.200
8:	3	5	4	6	5	5	5	4	7	9	6	8	6	N= 73	Median = 8.38	X^2 = 7.600
9:	9	8	9	2	3	3	5	5	4	6	8	7	4	N= 73	Median = 7.00	X^2 = 14.800
10:	3	4	7	4	4	9	4	9	10	7	5	3	4	N= 73	Median = 7.67	X^2 = 15.600
11:	4	1	4	1	1	3	6	3	2	10	12	17	9	N= 73	Median = 10.62	X^2 = 60.400*
12:	2	3	2	0	2	5	0	5	2	6	13	7	26	N= 73	Median = 11.23	X^2 = 120.000*
13:	12	6	5	4	2	2	4	2	2	4	12	12	6	N= 73	Median = 8.25	X^2 = 37.600*

df = 12 a=0.001
$X^2_{critical}$ > 32.909
* denotes X^2 significance

Table 17. Frequency Data for Question 21 - All Respondents

Knowledge Area	Rankings <- High												Low ->			
1:	8	3	9	5	6	6	4	2	6	8	2	3	0	N= 62	Median = 5.50	X^2 = 17.800
2:	3	7	3	6	6	4	2	9	5	4	3	5	5	N= 62	Median = 7.50	X^2 = 9.000
3:	6	9	7	10	8	7	3	4	3	2	3	0	0	N= 62	Median = 4.40	X^2 = 26.200
4:	1	4	4	3	3	4	6	6	7	11	5	2	6	N= 62	Median = 8.50	X^2 = 15.800
5:	7	7	3	7	9	8	9	5	4	2	1	0	0	N= 62	Median = 5.28	X^2 = 26.600
6:	3	4	6	7	8	9	8	5	7	0	2	2	1	N= 62	Median = 5.83	X^2 = 21.400
7:	5	4	2	9	8	4	11	7	4	1	1	2	4	N= 62	Median = 6.25	X^2 = 23.800
8:	3	4	4	6	5	4	5	3	6	8	5	5	4	N= 62	Median = 7.50	X^2 = 4.600
9:	8	8	9	2	2	2	4	5	4	4	5	7	2	N= 62	Median = 6.50	X^2 = 15.400
10:	2	3	7	3	2	7	3	8	10	7	4	3	3	N= 62	Median = 8.00	X^2 = 17.000
11:	2	1	4	1	1	2	4	2	2	9	10	15	9	N= 62	Median = 10.80	X^2 = 48.600
12:	2	2	2	0	2	4	0	5	2	4	10	7	22	N= 62	Median = 11.30	X^2 = 83.000
13:	12	6	2	3	2	1	3	1	2	2	11	11	6	N= 62	Median = 9.00	X^2 = 39.800

Table 18. Frequency Data for Question 21 - Male Respondents

Knowledge Area	Rankings <- High												Low ->			
1:	0	1	2	2	2	0	2	2	0	0	0	0	0	N= 11	Median = 4.75	X^2 = 47.200
2:	1	1	0	1	1	1	1	0	3	0	0	1	1	N= 11	Median = 7.00	X^2 = 46.400
3:	3	3	0	1	1	2	1	0	0	0	0	0	0	N= 11	Median = 2.33	X^2 = 48.000
4:	0	0	1	0	2	0	0	1	4	0	0	2	1	N= 11	Median = 8.88	X^2 = 48.400
5:	3	1	1	2	0	0	1	1	0	1	0	1	0	N= 11	Median = 3.75	X^2 = 46.800
6:	0	2	2	3	0	0	1	1	1	1	0	0	0	N= 11	Median = 4.00	X^2 = 47.200
7:	0	0	2	0	2	1	0	2	2	1	0	1	0	N= 11	Median = 7.75	X^2 = 46.800
8:	0	1	0	0	0	1	0	1	1	1	1	3	2	N= 11	Median = 11.00	X^2 = 46.800
9:	1	0	0	0	1	1	1	0	0	2	3	0	2	N= 11	Median = 10.25	X^2 = 47.200
10:	1	1	0	1	2	2	1	1	0	0	1	0	1	N= 11	Median = 5.75	X^2 = 46.000
11:	2	0	0	0	0	1	2	1	0	1	2	2	0	N= 11	Median = 8.00	X^2 = 46.800
12:	0	1	0	0	0	1	0	0	0	2	3	0	4	N= 11	Median = 11.00	X^2 = 49.200
13:	0	0	3	1	0	1	1	1	0	2	1	1	0	N= 11	Median = 7.00	X^2 = 46.800

Table 19. Frequency Data for Question 21 - Female Respondents

Knowledge Area	Rankings <- High											Low ->				
1:	2	0	3	1	0	1	2	1	0	3	1	1	0	N= 15	Median = 6.75	X^2 = 41.200
2:	0	1	2	1	2	1	1	3	1	0	1	1	1	N= 15	Median = 7.00	X^2 = 40.000
3:	3	3	1	2	0	3	0	2	1	0	0	0	0	N= 15	Median = 3.75	X^2 = 42.400
4:	0	1	1	1	2	0	1	0	3	2	2	1	1	N= 15	Median = 9.00	X^2 = 40.400
5:	1	1	1	4	0	0	3	3	1	1	0	0	0	N= 15	Median = 6.67	X^2 = 42.800
6:	1	1	2	1	4	1	1	1	2	0	0	1	0	N= 15	Median = 5.12	X^2 = 41.200
7:	1	0	1	1	1	2	2	2	1	0	0	1	3	N= 15	Median = 7.25	X^2 = 40.400
8:	0	1	1	2	3	1	1	1	3	1	0	1	0	N= 15	Median = 6.00	X^2 = 40.800
9:	3	3	1	0	1	1	1	0	1	3	1	0	0	N= 15	Median = 5.00	X^2 = 41.600
10:	0	1	1	1	0	1	1	1	2	2	1	1	3	N= 15	Median = 9.25	X^2 = 40.000
11:	0	1	0	0	0	1	1	0	0	3	3	5	1	N= 15	Median = 11.00	X^2 = 44.400
12:	0	1	1	0	2	2	0	0	0	0	4	2	3	N= 15	Median = 10.88	X^2 = 42.800
13:	4	1	0	1	0	1	1	1	0	0	2	1	3	N= 15	Median = 7.00	X^2 = 42.000

Table 20. Frequency Data for Question 21 - Military Respondents

Knowledge Area	Rankings <- High												Low ->			
1:	11	4	11	9	7	1	11	3	1	12	0	3	0	N= 73	Median = 4.71	X^2 = 53.600*
2:	4	11	5	6	2	8	4	5	6	4	6	7	5	N= 73	Median = 6.62	X^2 = 12.800
3:	8	10	15	9	7	7	3	5	4	1	1	3	0	N= 73	Median = 3.89	X^2 = 44.800*
4:	1	3	3	7	2	6	6	5	11	11	6	3	9	N= 73	Median = 8.82	X^2 = 26.400
5:	9	9	2	8	12	5	8	10	5	2	1	2	0	N= 73	Median = 5.21	X^2 = 38.400*
6:	4	6	6	8	16	7	7	1	11	2	3	2	0	N= 73	Median = 5.28	X^2 = 48.000*
7:	5	4	5	9	10	4	9	10	6	3	3	2	3	N= 73	Median = 6.38	X^2 = 21.200
8:	6	6	3	6	4	7	6	4	9	7	4	7	4	N= 73	Median = 7.25	X^2 = 8.000
9:	6	6	9	5	3	8	4	8	4	5	7	4	4	N= 73	Median = 6.44	X^2 = 9.600
10:	3	7	5	3	6	7	3	11	6	11	3	3	5	N= 73	Median = 7.73	X^2 = 20.400
11:	3	0	6	0	0	5	7	3	4	6	15	15	9	N= 73	Median = 10.67	X^2 = 61.200*
12:	3	2	1	1	1	3	2	4	2	6	16	8	24	N= 73	Median = 11.22	X^2 = 115.200*
13:	10	5	2	2	3	5	3	4	4	3	8	14	10	N= 73	Median = 9.12	X^2 = 34.400*

df = 12 a=0.001
$X^2_{critical}$ > 32.909
* denotes X^2 significance

Table 21. Frequency Data for Question 26 - All Respondents

Knowledge Area	Rankings <- High												Low ->			
1:	10	3	9	5	5	1	10	3	1	12	0	3	0	N= 62	Median = 5.30	X^2 = 41.800
2:	3	11	3	6	2	7	2	4	6	4	5	5	4	N= 62	Median = 6.36	X^2 = 14.200
3:	6	6	15	7	6	7	2	5	4	1	1	2	0	N= 62	Median = 4.07	X^2 = 37.400
4:	1	2	2	7	2	6	4	5	8	10	5	3	7	N= 62	Median = 8.75	X^2 = 18.200
5:	7	7	1	6	12	4	8	8	5	2	1	1	0	N= 62	Median = 5.33	X^2 = 31.800
6:	3	5	3	6	15	7	6	1	10	1	3	2	0	N= 62	Median = 5.43	X^2 = 41.800
7:	5	4	4	9	7	4	9	8	4	3	1	1	3	N= 62	Median = 6.00	X^2 = 17.800
8:	5	6	3	6	4	5	5	4	9	5	3	4	3	N= 62	Median = 6.90	X^2 = 6.600
9:	5	6	9	5	2	6	4	8	2	3	6	3	3	N= 62	Median = 6.17	X^2 = 11.800
10:	3	5	5	3	4	6	2	8	5	11	3	3	4	N= 62	Median = 7.88	X^2 = 14.600
11:	1	0	6	0	0	4	6	3	2	4	13	14	9	N= 62	Median = 10.88	X^2 = 53.800
12:	3	2	1	1	1	2	2	3	2	4	13	8	20	N= 62	Median = 11.27	X^2 = 78.200
13:	10	5	1	1	2	3	2	2	4	2	8	13	9	N= 62	Median = 10.00	X^2 = 37.400

Table 22. Frequency Data for Question 26 - Male Respondents

Knowledge Area	Rankings <- High											Low ->				
1:	1	1	2	4	2	0	1	0	0	0	0	0	0	N= 11	Median = 3.88	X^2 = 48.400
2:	1	0	2	0	0	1	2	1	0	0	1	2	1	N= 11	Median = 7.25	X^2 = 46.400
3:	2	4	0	2	1	0	1	0	0	0	0	1	0	N= 11	Median = 2.38	X^2 = 48.400
4:	0	1	1	0	0	0	2	0	3	1	1	0	2	N= 11	Median = 9.00	X^2 = 47.200
5:	2	2	1	2	0	1	0	2	0	0	0	1	0	N= 11	Median = 3.75	X^2 = 46.800
6:	1	1	3	2	1	0	1	0	1	1	0	0	0	N= 11	Median = 3.75	X^2 = 46.800
7:	0	0	1	0	3	0	0	2	2	0	2	1	0	N= 11	Median = 8.25	X^2 = 47.600
8:	1	0	0	0	0	2	1	0	0	2	1	3	1	N= 11	Median = 10.25	X^2 = 47.200
9:	1	0	0	0	1	2	0	0	2	2	1	1	1	N= 11	Median = 9.25	X^2 = 46.400
10:	0	2	0	0	2	1	1	3	1	0	0	0	1	N= 11	Median = 7.00	X^2 = 47.200
11:	2	0	0	0	0	1	1	0	2	2	2	1	0	N= 11	Median = 9.25	X^2 = 46.800
12:	0	0	0	0	0	1	0	1	0	2	3	0	4	N= 11	Median = 11.00	X^2 = 49.200
13:	0	0	1	1	1	2	1	2	0	1	0	1	1	N= 11	Median = 7.00	X^2 = 46.000

Table 23. Frequency Data for Question 26 - Female Respondents

Knowledge Area	Rankings <- High											Low ->				
1:	2	0	3	0	2	0	3	0	1	3	0	1	0	N= 15	Median = 6.67	X^2 = 42.400
2:	1	2	1	1	1	2	0	2	1	1	2	0	1	N= 15	Median = 6.25	X^2 = 39.600
3:	3	1	5	1	0	0	1	3	0	0	0	1	0	N= 15	Median = 3.20	X^2 = 44.400
4:	0	1	0	4	0	1	0	0	3	3	1	1	1	N= 15	Median = 9.00	X^2 = 42.800
5:	3	2	0	1	3	0	2	2	1	1	0	0	0	N= 15	Median = 5.00	X^2 = 41.600
6:	1	2	0	0	6	1	1	1	2	0	0	1	0	N= 15	Median = 5.25	X^2 = 44.800
7:	1	0	1	3	1	2	1	0	2	2	0	0	2	N= 15	Median = 6.25	X^2 = 40.800
8:	0	1	2	2	1	3	1	2	1	1	1	0	0	N= 15	Median = 6.00	X^2 = 40.400
9:	1	3	1	2	1	1	1	1	1	2	1	0	0	N= 15	Median = 5.00	X^2 = 40.000
10:	0	1	1	1	0	2	0	1	1	1	1	2	4	N= 15	Median = 10.00	X^2 = 41.200
11:	0	0	0	0	0	2	1	1	0	1	3	5	2	N= 15	Median = 11.33	X^2 = 44.000
12:	0	1	0	0	0	1	2	1	1	0	4	2	3	N= 15	Median = 10.88	X^2 = 42.400
13:	3	1	1	0	0	0	2	1	1	0	2	2	2	N= 15	Median = 8.00	X^2 = 40.800

Table 24. Frequency Data for Question 26 - Military Respondents

Knowledge Area	Rankings	<- High						Low ->				
1:	26	13	5	5	5	6	4	9	N= 73	Median = 2.31	X^2 = 43.000*
2:	16	19	14	12	3	7	2	0	N= 73	Median = 2.61	X^2 = 39.222*
3:	2	8	16	15	9	7	12	4	N= 73	Median = 4.20	X^2 = 19.222
4:	2	4	4	9	8	11	11	24	N= 73	Median = 6.36	X^2 = 37.000*
5:	5	3	15	10	14	8	10	8	N= 73	Median = 4.75	X^2 = 13.000
6:	10	6	5	11	16	14	7	4	N= 73	Median = 4.78	X^2 = 14.778
7:	6	12	4	6	10	9	12	14	N= 73	Median = 5.35	X^2 = 9.667
8:	6	8	10	5	8	11	15	10	N= 73	Median = 5.44	X^2 = 7.667

df = 7 a=0.001
$X^2_{critical}$ > 24.322
* denotes X^2 significance

Table 25. Frequency Data for Question 22 - All Respondents

Knowledge Area	Rankings	<- High						Low ->				
1:	24	9	4	4	4	5	3	9	N= 62	Median = 2.28	X^2 = 39.111
2:	12	19	9	12	3	5	2	0	N= 62	Median = 2.50	X^2 = 33.333
3:	2	7	16	12	8	6	9	2	N= 62	Median = 4.00	X^2 = 18.889
4:	1	3	4	9	6	10	7	22	N= 62	Median = 6.30	X^2 = 34.222
5:	4	2	11	10	11	8	9	7	N= 62	Median = 4.86	X^2 = 9.778
6:	9	5	5	7	16	11	6	3	N= 62	Median = 4.81	X^2 = 14.889
7:	5	10	3	5	7	8	12	12	N= 62	Median = 5.62	X^2 = 10.222
8:	5	7	10	3	7	9	14	7	N= 62	Median = 5.36	X^2 = 10.000

Table 26. Frequency Data for Question 22 - Male Respondents

Knowledge Area	Rankings	<- High						Low ->				
1:	2	4	1	1	1	1	1	0	N= 11	Median = 2.38	X^2 = 52.778
2:	4	0	5	0	0	2	0	0	N= 11	Median = 2.80	X^2 = 55.000
3:	0	1	0	3	1	1	3	2	N= 11	Median = 6.00	X^2 = 52.778
4:	1	1	0	0	2	1	4	2	N= 11	Median = 6.62	X^2 = 53.000
5:	1	1	4	0	3	0	1	1	N= 11	Median = 3.38	X^2 = 53.222
6:	1	1	0	4	0	3	1	1	N= 11	Median = 4.38	X^2 = 53.222
7:	1	2	1	1	3	1	0	2	N= 11	Median = 4.67	X^2 = 52.333
8:	1	1	0	2	1	2	1	3	N= 11	Median = 5.75	X^2 = 52.333

Table 27. Frequency Data for Question 22 - Female Respondents

Knowledge Area	Rankings	<- High						Low ->				
1:	6	1	0	0	0	4	1	3	N= 15	Median = 5.62	X^2 = 49.000
2:	0	5	2	4	2	1	1	0	N= 15	Median = 3.62	X^2 = 47.667
3:	1	0	6	3	1	1	2	1	N= 15	Median = 3.67	X^2 = 47.889
4:	1	1	0	0	3	3	4	3	N= 15	Median = 6.33	X^2 = 47.000
5:	0	1	1	4	2	0	3	4	N= 15	Median = 5.25	X^2 = 47.222
6:	4	0	2	2	3	3	1	0	N= 15	Median = 4.25	X^2 = 46.778
7:	0	6	1	1	3	0	2	2	N= 15	Median = 4.00	X^2 = 48.111
8:	3	1	3	1	1	3	1	2	N= 15	Median = 4.00	X^2 = 45.889

Table 28. Frequency Data for Question 22 - Military Respondents

Knowledge Area	Rankings (|<- High ... Low ->|)										
1:	23	9	7	10	6	6	4	8	N= 73	Median = 3.14	X^2 = 27.222*
2:	18	20	13	10	3	6	3	0	N= 73	Median = 2.42	X^2 = 42.333*
3:	3	10	17	12	3	10	15	3	N= 73	Median = 4.04	X^2 = 24.333*
4:	3	5	4	7	8	10	12	24	N= 73	Median = 6.45	X^2 = 35.222*
5:	2	10	9	10	17	11	7	7	N= 73	Median = 4.82	X^2 = 14.111
6:	8	5	6	10	22	14	6	2	N= 73	Median = 4.84	X^2 = 31.000*
7:	9	6	5	10	6	9	13	15	N= 73	Median = 5.56	X^2 = 9.667
8:	7	8	12	4	8	7	13	14	N= 73	Median = 5.19	X^2 = 9.444

df = 7 a=0.001
$X^2_{critical}$ > 24.322
* denotes X^2 significance

Table 29. Frequency Data for Question 27 - All Respondents

Knowledge Area	Rankings (|<- High ... Low ->|)										
1:	19	8	6	8	5	5	3	8	N= 62	Median = 3.17	X^2 = 20.000
2:	14	18	9	10	3	5	3	0	N= 62	Median = 2.44	X^2 = 30.667
3:	3	9	17	9	3	8	10	3	N= 62	Median = 3.72	X^2 = 19.333
4:	2	3	4	7	6	10	10	20	N= 62	Median = 6.40	X^2 = 27.333
5:	2	7	7	10	14	9	7	6	N= 62	Median = 4.86	X^2 = 10.667
6:	8	4	6	7	18	12	5	2	N= 62	Median = 4.83	X^2 = 21.556
7:	8	6	2	9	5	7	12	13	N= 62	Median = 5.64	X^2 = 11.556
8:	6	7	11	2	8	6	12	10	N= 62	Median = 5.12	X^2 = 9.556

Table 30. Frequency Data for Question 27 - Male Respondents

Knowledge Area	Rankings (|<- High ... Low ->|)										
1:	4	1	1	2	1	1	1	0	N= 11	Median = 3.00	X^2 = 52.778
2:	4	2	4	0	0	1	0	0	N= 11	Median = 2.25	X^2 = 54.111
3:	0	1	0	3	0	2	5	0	N= 11	Median = 6.25	X^2 = 54.333
4:	1	2	0	0	2	0	2	4	N= 11	Median = 6.75	X^2 = 53.222
5:	0	3	2	0	3	2	0	1	N= 11	Median = 4.67	X^2 = 53.000
6:	0	1	0	3	4	2	1	0	N= 11	Median = 4.88	X^2 = 53.444
7:	1	0	3	1	1	2	1	2	N= 11	Median = 5.00	X^2 = 52.333
8:	1	1	1	2	0	1	1	4	N= 11	Median = 6.00	X^2 = 52.778

Table 31. Frequency Data for Question 27 - Female Respondents

Knowledge Area	Rankings (|<- High ... Low ->|)										
1:	3	2	0	2	1	3	1	3	N= 15	Median = 5.00	X^2 = 46.111
2:	2	4	2	2	2	1	2	0	N= 15	Median = 3.25	X^2 = 46.111
3:	2	2	2	1	1	4	2	1	N= 15	Median = 5.00	X^2 = 45.889
4:	1	0	2	1	2	1	4	4	N= 15	Median = 6.62	X^2 = 46.778
5:	0	2	1	3	3	0	3	3	N= 15	Median = 5.00	X^2 = 46.556
6:	3	1	2	3	3	3	0	0	N= 15	Median = 4.00	X^2 = 46.556
7:	2	4	0	3	2	0	2	2	N= 15	Median = 4.00	X^2 = 46.556
8:	2	0	6	0	1	3	1	2	N= 15	Median = 3.42	X^2 = 48.111

Table 32. Frequency Data for Question 27 - Military Respondents

Overall Rank	Median	Area
1.	4.27	3. Navigation
2.	5.11	5. Operations
3.	5.31	1. Aeronautical Charts
4.	5.67	6. Performance
5.	6.40	7. Weight & Balance
6.	7.00	9. Aircraft Systems
7.	7.33	2. Airspace
8.	7.67	10. Stall Awareness & Spins
9.	8.25	13. Decision Making
10.	8.38	8. Aerodynamics
11.	8.64	4. Weather
12.	10.62	11. FAR's
13.	11.23	12. Physiology

Question 21

Overall Rank	Median	Area
1.	3.89	3. Navigation
2.	4.71	1. Aeronautical Charts
3.	5.21	5. Operations
4.	5.28	6. Performance
5.	6.38	7. Weight & Balance
6.	6.44	9. Aircraft Systems
7.	6.62	2. Airspace
8.	7.25	8. Aerodynamics
9.	7.73	10. Stall Awareness & Spins
10.	8.82	4. Weather
11.	9.12	13. Decision Making
12.	10.67	11. FAR's
13.	11.22	12. Physiology

Question 26

Table 33. Areas by Median Rank for Questions 21 & 26 - All Respondents

Overall Rank	Median	Area
1.	4.40	3. Navigation
2.	5.28	5. Operations
3.	5.50	1. Aeronautical Charts
4.	5.83	6. Performance
5.	6.25	7. Weight & Balance
6.	6.50	9. Aircraft Systems
7.	7.50	2. Airspace
8.	7.50	8. Aerodynamics
9.	8.00	10. Stall Awareness & Spins
10.	8.50	4. Weather
11.	9.00	13. Decision Making
12.	10.80	11. FAR's
13.	11.30	12. Physiology

Question 21

Overall Rank	Median	Area
1.	4.07	3. Navigation
2.	5.30	1. Aeronautical Charts
3.	5.33	5. Operations
4.	5.43	6. Performance
5.	6.00	7. Weight & Balance
6.	6.17	9. Aircraft Systems
7.	6.36	2. Airspace
8.	6.90	8. Aerodynamics
9.	7.88	10. Stall Awareness & Spins
10.	8.75	4. Weather
11.	10.00	13. Decision Making
12.	10.88	11. FAR's
13.	11.27	12. Physiology

Question 26

Table 34. Areas by Median Rank for Questions 21 & 26 - Male Respondents

Rank	Median	Area	Rank	Median	Area
1.	2.33	3. Navigation	1.	2.38	3. Navigation
2.	3.75	5. Operations	2.	3.75	5. Operations
3.	4.00	6. Performance	3.	3.75	6. Performance
4.	4.75	1. Aeronautical Charts	4.	3.88	1. Aeronautical Charts
5.	5.75	10. Stall Awareness & Spins	5.	7.00	10. Stall Awareness & Spins
6.	7.00	2. Airspace	6.	7.00	13. Decision Making
7.	7.00	13. Decision Making	7.	7.25	2. Airspace
8.	7.75	7. Weight & Balance	8.	8.25	7. Weight & Balance
9.	8.00	11. FAR's	9.	9.00	4. Weather
10.	8.88	4. Weather	10.	9.25	9. Aircraft Systems
11.	10.25	9. Aircraft Systems	11.	9.25	11. FAR's
12.	11.00	8. Aerodynamics	12.	10.25	8. Aerodynamics
13.	11.00	12. Physiology	13.	11.00	12. Physiology
		Question 21			Question 26

Table 35. Areas by Median Rank for Questions 21 & 26 - Female Respondents

Overall Rank	Median	Area	Overall Rank	Median	Area
1.	3.75	3. Navigation	1.	3.20	3. Navigation
2.	5.00	9. Aircraft Systems	2.	5.00	5. Operations
3.	5.12	6. Performance	3.	5.00	9. Aircraft Systems
4.	6.00	8. Aerodynamics	4.	5.25	6. Performance
5.	6.67	5. Operations	5.	6.00	8. Aerodynamics
6.	6.75	1. Aeronautical Charts	6.	6.25	2. Airspace
7.	7.00	2. Airspace	7.	6.25	7. Weight & Balance
8.	7.00	13. Decision Making	8.	6.67	1. Aeronautical Charts
9.	7.25	7. Weight & Balance	9.	8.00	13. Decision Making
10.	9.00	4. Weather	10.	9.00	4. Weather
11.	9.25	10. Stall Awareness & Spins	11.	10.00	10. Stall Awareness & Spins
12.	10.88	12. Physiology	12.	10.88	12. Physiology
13.	11.00	11. FAR's	13.	11.33	11. FAR's
		Question 21			Question 26

Table 36. Areas by Median Rank for Questions 21 & 26 - Military Respondents

Overall Rank	Median	Area	Overall Rank	Median	Area
1.	2.31	1. Preflight	1.	2.42	2. Norm. & X-wind T/O & Land
2.	2.61	2. Norm. & X-wind T/O & Land	2.	3.14	1. Preflight
3.	4.20	3. Max Perf. T/O & Landings	3.	4.04	3. Max Perf. T/O & Landings
4.	4.75	5. Slow Flight & Stalls	4.	4.82	5. Slow Flight & Stalls
5.	4.78	6. Cross Country	5.	4.84	6. Cross Country
6.	5.35	7. Basic Inst. Maneuvers	6.	5.19	8. Emergency Procedures
7.	5.44	8. Emergency Procedures	7.	5.56	7. Basic Inst. Maneuvers
8.	6.36	4. Ground Ref. Maneuvers	8.	6.45	4. Ground Ref. Maneuvers
		Question 22			Question 27

Table 37. Areas by Median Rank for Questions 22 & 27 - All Respondents

Overall Rank	Median	Area	Overall Rank	Median	Area
1.	2.28	1. Preflight	1.	2.44	2. Norm. & X-wind T/O & Land
2.	2.50	2. Norm. & X-wind T/O & Land	2.	3.17	1. Preflight
3.	4.00	3. Max Perf. T/O & Landings	3.	3.72	3. Max Perf. T/O & Landings
4.	4.81	6. Cross Country	4.	4.83	6. Cross Country
5.	4.86	5. Slow Flight & Stalls	5.	4.86	5. Slow Flight & Stalls
6.	5.36	8. Emergency Procedures	6.	5.12	8. Emergency Procedures
7.	5.62	7. Basic Inst. Maneuvers	7.	5.64	7. Basic Inst. Maneuvers
8.	6.30	4. Ground Ref. Maneuvers	8.	6.40	4. Ground Ref. Maneuvers
		Question 22			Question 27

Table 38. Areas by Median Rank for Questions 22 & 27 - Male Respondents

Overall Rank	Median	Area	Overall Rank	Median	Area
1.	2.38	1. Preflight	1.	2.25	2. Norm. & X-wind T/O & Land
2.	2.80	2. Norm. & X-wind T/O & Land	2.	3.00	1. Preflight
3.	3.38	5. Slow Flight & Stalls	3.	4.67	5. Slow Flight & Stalls
4.	4.38	6. Cross Country	4.	4.88	6. Cross Country
5.	4.67	7. Basic Inst. Maneuvers	5.	5.00	7. Basic Inst. Maneuvers
6.	5.75	8. Emergency Procedures	6.	6.00	8. Emergency Procedures
7.	6.00	3. Max Perf. T/O & Landings	7.	6.25	3. Max Perf. T/O & Landings
8.	6.62	4. Ground Ref. Maneuvers	8.	6.75	4. Ground Ref. Maneuvers
		Question 22			Question 27

Table 39. Areas by Median Rank for Questions 22 & 27 - Female Respondents

Overall Rank	Median	Area	Overall Rank	Median	Area
1.	3.62	2. Norm. & X-wind T/O & Land	1.	3.25	2. Norm. & X-wind T/O & Land
2.	3.67	3. Max Perf. T/O & Landings	2.	3.42	8. Emergency Procedures
3.	4.00	7. Basic Inst. Maneuvers	3.	4.00	6. Cross Country
4.	4.00	8. Emergency Procedures	4.	4.00	7. Basic Inst. Maneuvers
5.	4.25	6. Cross Country	5.	5.00	1. Preflight
6.	5.25	5. Slow Flight & Stalls	6.	5.00	3. Max Perf. T/O & Landings
7.	5.62	1. Preflight	7.	5.00	5. Slow Flight & Stalls
8.	6.33	4. Ground Ref. Maneuvers	8.	6.62	4. Ground Ref. Maneuvers
		Question 22			Question 27

Table 40. Areas by Median Rank for Questions 22 & 27 - Military Respondents

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study saught to answer two primary questions. The primary question was to determine if certified flight instructors (CFI) thought they were both knowledgable and/or confident in all of the Knowledge and Performance Areas required by the FAA to teach private pilot students. The survey attempted to determine which areas, if any, were deficient and also determine (secondary question) if any trends might indicate that particular flying backgrounds (i.e. military training or scheduled airline experience) might produce more knowledgable and/or confident instructors with respect to other methods. This study was undertaken because no studies or surveys have directly asked these types of questions.

The results of the first question are striking. Indeed, there are several areas in which the majority of respondent CFI's report both a lack knowledge and a lack confidence when teaching. The results from the secondary question, determining whether or not training backgrounds had any affect on CFI knowledge or confidence, were mixed.

The primary hypothesis: a significant number of CFI's believe that they are not adequately prepared to teach in at least one, if not several, of the knowledge and performance areas needed to safely and effectively train private pilot students, was supported

for several areas. The secondary hypothesis: a correlation exists between the confidence a CFI has and where that CFI obtained their original flight training (e.g. military vs. civilian flight school), was not supported. The data would seem to indicate that those with military experience reported both considerably more and less knowledge and/or confidence, depending on the area, in a number of specific areas when compared to CFI's without a military background. There were also several areas in which female CFI's ranked an area significantly higher or lower than their male peers. Unfortunately, both female and military respondents represented only a small fraction of an already small total sample. Thus, any conclusions drawn from these groups are suspect until confirmed by a larger survey.

Each of the Knowledge and Performance areas have already been reviewed in depth in Chapter IV. In this chapter we will examine more closely those areas which demonstrate the greatest deviation from the theoretical flat distribution and, hence, indicate significantly high or low levels of knowledge and/or confidence among the sampled CFI's. Special attention will be given to those areas which garnered especially low levels of confidence from CFI's.

Knowledge Areas

The entire sample of 73 CFI's, as well as the three sub-groups (males, females, military), all indicated that Navigation was the subject in which they reported the most knowledge. All of the groups, except the females, gave Navigation a median rank of approximately 4.00 ($\pm$ ~ 0.7), whereas the females ranked it higher at a median rank of about 2.3. The respondent CFI's do not indicate that navigation is problem for them.

Unfortunately, Navigation was the only unambiguously favored Knowledge Area across the board. No other area was ranked nearly as high.

Aeronautical Charts showed up as mildly favored by all respondents and somewhat more favored by females but it was borderline for the males and virtually in the middle for the military. Other areas such as Operations and Performance variously show up in the favored range but they were not overwhelmingly favored. The only exceptions are provided by the 11 female respondents who ranked Operations, Performance and Aeronautical Charts below the median rank of 4.00.

By far the most striking result of the study was the large number of respondents who reported the least knowledge and confidence in the areas of Physiology and Federal Aviation Regulations. With the exception of the military group, Physiology ranked dead last within each group. The military respondents, whom it was thought would have a better grasp on the subject, were the only group to assign Physiology a median rank above 11.00, but just barely, giving it a median rank of 10.88. Only FAR's were ranked lower by the military at 11.00 for Depth and Breadth and 11.33 for Confidence. All other groups ranked Physiology between 11.00 and 11.30.

Across the board Physiology and FAR's were ranked far lower than the favored area, Navigation, was ranked high. For example, for all respondents, Navigation was only ranked 2.73 rankings above average for Depth and Breadth and 3.11 rankings above for Confidence. The same group ranked FAR's 3.62 rankings below average for Depth and Breadth and 3.67 rankings below for Confidence. Physiology fared even worse at 4.23 and 4.22 rankings below average. Males ranked Navigation 2.6 and 2.93 rankings above

average (Depth and Breadth and Confidence, respectively) whereas they ranked FAR's 3.80 and 3.88 rankings below average and Physiology 4.3 and 4.27 rankings below. Military respondents, while ranking FAR's lower than Physiology, also ranked these two areas (3.88 rankings below and 4.00 rankings below) farther away from the average than they did for the most favored area, Navigation (3.25 rankings above average). Only the smallest group, the females, ranked Navigation more favorably than they ranked Physiology unfavorably. Navigation ranked 4.67 and 4.62 rankings above average, Depth and Breadth and Confidence, respectively, and Physiology at 4.00 rankings below for both questions.

It is interesting to note that Physiology garnered more "votes" for the last ranking (thirteenth) than any other Performance Area on the Depth and Breadth question (see Figure 45) with 26 "votes." This means that 36% of the 73 respondents ranked Physiology last. Fifty two respondents ranked Physiology tenth, eleventh, twelfth or thirteenth, representing 71% of the sample. By comparison, the next most disliked area, FAR's, only received nine 9 "votes" for last place (12%) and only garnered 48 "votes" for the tenth, eleventh, twelfth or thirteenth rank, representing 66% of the sample.

By comparison, Navigation only garnered nine "votes" for first ranking on the Depth and Breadth question (representing 12% of the sample) and only 39 respondents ranked it among one of the top four rankings (53%). ***CFI's in this sample report they are neither knowledgable nor confident in their ability to teach both Federal Aviation Regulations and Physiology.***

Performance Areas

The Performance Areas provided another indication of which subjects CFI's report knowledge and confidence in teaching and in which they do not. On the Depth and Breadth question all groups ranked Preflight as the highest ranked Performance Area with Normal & Crosswind Takeoffs & Landings coming in second except for the military respondents. Curiously, respondents with military experience ranked no Performance Area in the favored range. The least favorite area was Ground Reference Maneuvers for all four groups. When combining the responses from all 73 subjects and again when looking only at the males, Ground Reference Maneuvers was the only Performance Area in the unfavored range. The females ranked Emergency Procedures just within the unfavored range along with Maximum Performance Takeoffs & Landings. The military respondents also ranked Preflight in the unfavored range.

On the Confidence question the full group and the males ranked Normal & Crosswind Takeoffs & Landings highest followed by Preflight. The females reversed this order and also marginally ranked Slow Flight & Stalls in the favored range. The military respondents marginally ranked Normal & Crosswind Takeoffs & Landings and Emergency Procedures in the favored range. In last place for all four groups was Ground Reference Maneuvers. The larger group of subjects and the males also marginally ranked Basic Instrument Maneuvers in the unfavored range. The females ranked Emergency Procedures barely inside the unfavored range and ranked Maximum Performance Takeoffs & Landings just above the last place Ground Reference Maneuvers.

For the most part the favored and unfavored Performance Areas balanced each other,

unlike those in the Knowledge Areas. The most favored subjects were about 2.0 rankings above average and the most unfavored about 2.0 below average. Two notable exceptions occurred with the military respondents. This group ranked no Performance Area in the favorable range on the Depth and Breadth question and barely rated Normal & Cross-wind Takeoffs & Landings and Emergency Procedures within the favorable range on the Confidence question.

There are clear "winners" and "losers" in the Performance Areas. Preflight and Normal & Crosswind Takeoffs & Landings were consistently ranked first or second on both the Depth and Breadth and the Confidence question. The obvious "loser" is Ground Reference Maneuvers.

Conclusions

Despite the limitations of this study, there are three areas in which CFI's report that they lack either the knowledge and/or the confidence to teach Private Pilot students. Most notable are the subjects of Physiology, Federal Aviation Regulations, and Ground Reference Maneuvers. While discussion may continue over the meaning of the various rankings in the other Knowledge and Performance Areas, the results from the three lowest ranked areas indicates a general and widespread lack of both knowledge and confidence among CFI's. Whereas Ground Reference Maneuvers was not hypothesized to be a deficient area, both Physiology and Federal Aviation Regulations were hypothesized to be ranked below average based on anecdotal information. What was not expected was the magnitude or degree to which the respondents expressed their discomfort or lack of confidence in these two critical areas (Physiology and Federal Aviation Regulations).

What is also remarkable is that the two subjects which received the lowest rankings in the Knowledge Areas (Physiology and Federal Aviation Regulations) are the two areas which have alternately the most and the fewest questions in the Private Pilot written exam question bank. Of the 711 possible Private Pilot questions in the FAA question bank 182 are devoted to Federal Aviation Regulations. At the other extreme, only 15 questions are devoted to Aeromedical Factors or Physiology (See Appendix D for all fifteen Physiology questions). Whereas it might be relatively easy to memorize all 15 Physiology questions and, thus, generate a low level of knowledge and confidence, the same cannot be said for the FAR's. But if it is possible to memorize all fifteen possible physiology questions on the written exam why does so much uncertainty exist among CFI's in this area? Evidently, CFI's understand that much more must be learned about Human Factors or Physiology than the FAA written exam would tend to indicate. It now seems just as obvious that CFI's lack knowledge and confidence in this critical area.

Recommendations

1. A more comprehensive and in-depth study is needed to either confirm or refute this study. Based on the limited evidence within this survey Physiology, Federal Aviation Regulations and Ground Reference Maneuvers are not well understood by a large number of CFI's. This must be either confirmed or refuted before any other action is undertaken based on these results. Because of the small sample size and even smaller rate of return any broad conclusions or actions based on this data are difficult to support until confirmed by the aforementioned larger study.

2. In addition to the larger study of CFI's, a parallel study of General Aviation pilots

should also be conducted to determine if similar conditions exist in the general pilot population as exists among CFI's. If CFI's who have many hundreds of flying hours report low levels of knowledge and confidence in Physiology and FAR's it would be reasonable to hypothesize that many Private, Instrument, and even Commercially rated pilots may have similarly low levels of knowledge and confidence in several areas.

2. Encourage a thorough review of CFI and Private Pilot training in the areas of Physiology, Federal Aviation Regulations and Ground Reference Maneuvers and the assumptions upon which said training is based. This is especially true because the combination of a lack of knowledge and confidence in both Physiology and Federal Aviation Regulations among CFI's is striking and portends danger for both the CFI's as well as their students.

The FAR's describe what is legal and/or what is required. Physiology, however, informs every pilot of what could possibly happen to their bodies under the various circumstances encountered in aviation. Due to the extreme variability in human performance (Cottrell, Lebovitz, Fennell, and Kohn, 1995, Morris, 1989, Elsworth, Larry, and Malmstron, 1986, Eyraud and Borowsky, 1985) various FAR's have been historically based on the average response rather than the extremes. In addition, much of the physiologically based research upon which current FAR's are based was originally conducted in the 1930's and 1940's and based on data obtained from healthy young males entering the military (DeHart). Many of these regulations have not been updated since that time and do not take into consideration the performance of older adults with less than healthy lifestyles.

Thus, it is currently legal to operate an aircraft slightly over eight hours after drinking alcoholic beverages (FAR 91.17(a)(1)) and with a blood alcohol content of slightly less than 0.04% (FAR 91.17(a)(4)) (Of course you can not legally drive yourself to the airport), provided you do not consider yourself "under the influence of alcohol" (FAR 91.17(a)(2)). Further, it is perfectly legal to conduct this same flight at an altitude of up to 14,000 feet for 29 minutes (FAR 91.211(a)(1)) at night and while smoking. This flight could be made within the letter of the law but a good understanding of physiology would clearly indicate that such a flight would push most individuals well beyond the limits of their normal functioning.

The previous example may be extreme but the possibility that a general aviation pilot, even one holding only an airplane, single engine land rating, will find themselves flying at speeds and altitudes at which a much more in depth understanding of physiology is necessary is rapidly approaching. In 1992 the National Aeronautics and Space Administration (NASA) began the Advanced General Aviation Transports Experiment (AGATE) program to attempt to revitalize the general aviation industry (Cox, 1997). Part of this plan was a grant to Williams International under the General Aviation Propulsion (GAP) plan to develop small, efficient, and inexpensive turbine engines to power small single and twin engine general aviation aircraft. These aircraft will be powered by one or two 700 pound thrust turbofan engines and are designed to be mass produced and power the next generation of general aviation aircraft which will replace aging aircraft designs like the Cessna 172/182, and many light and medium twins.

These aircraft may be coming soon and one prototype, the Williams V-Jet-II, is on

display and flying daily at the Experimental Aircraft Association fly-in in Oshkosh, Wisconsin as this is being written. This five seat prototype (with the less powerful 500 pound thrust engines) has already demonstrated a speed of 295 knots and an altitude of 30,000 feet during its early testing (Phillips, 1997, Cox). Thus, early in the next century pilots who are currently flying a Cessna 172, a Beech Bonanza or a Piper twin may find themselves in a pressurized aircraft that is capable of flight at Mach .70 or greater and at altitudes of 30,000 to 40,000 feet. The altitude and the speed capabilities of such an aircraft will certainly tax the skills of current generation private pilots and place a premium on their having a firm understanding of the limitations of their minds and bodies: in other words, physiology. Yet this is where the greatest deficiency lies among CFI's.

A deficient knowledge of Physiology coupled with a limited knowledge of the FAR's could easily place such a pilot in danger. Because this study clearly indicates that both Physiology and FAR's are the two subject areas where CFI's report the least knowledge and confidence more research is needed. This is why a much more comprehensive study needs to be conducted among a much larger sample of CFI's specifically and private pilots in general.

3. Finally, if the data and conclusions within this study are confirmed by a larger study, then perhaps it is time to perform a complete bottom-up review of Private Pilot and CFI training in light of the various new technologies entering the field, as well as the more complete understanding we now have of human factors and their continuing role in aviation accidents. These new technologies will place general aviation pilots into new environments which may easily tax their currently limited knowledge of physiology and

human factors. While operating in these environments has become routine for military and many commercial pilots, it is new to the majority of general aviation pilots. If the AGATE and GAP programs do yield a new generation of inexpensive high performance light aircraft, current training programs will not be adequate.

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APPENDIXES

APPENDIX A

COVER LETTER AND QUESTIONNAIRE

OKLAHOMA STATE UNIVERSITY

OSU

Department of Aviation and Space Education
300 Cordell North
Stillwater, Oklahoma 74078-8034
405-744-5856 or 405-744-7015
FAX 405-744-7785

9 February, 1997

Dear CFI Participant:

You have been randomly selected from the group of all CFI's in the United States to participate in a survey which I am conducting as part of my doctoral dissertation. This research is descriptive in nature and seeks to determine how knowledgable and capable certified flight instructors feel they are when teaching private pilot students. Participation in this research is purely voluntary and you are under no obligation to complete this survey or return it. If you do agree to participate, all of the information you provide will remain confidential and the data gathered will only be presented in statistical form. There are no identifying numbers on any of the questionnaires and there will be no way for me or anyone else to identify any individual respondent.

The reason I am conducting this research is because there is so little direct information on how well CFI's are doing and how adequately they feel they have been prepared to perform their duties. Typically, deficiencies in pilot training are only inferred through accident investigations. Recommendations for changes in training are then made by the NTSB and implemented by the FAA. However, the question remains: How knowledgable and well prepared do you feel you are to teach? This survey aims to begin determining the answer to that question.

This survey is made up of several parts: A background portion; a self assessment; a ranking of the the various knowledge and performance areas; and, finally, a section that solicits your opinions regarding the training of CFI's and private pilots. Please be as candid as you possibly can if you elect to complete this questionnaire. If you feel uncomfortable teaching certain subjects it is important that you note these in the questionnaire. Your honesty in doing so is the only way the true state of the instructor force can be accurately gauged. If you have any additional comments or amplifying information please feel free to include it on page seven or add additional pages yourself. If you wish to communicate with me directly without relinquishing your anonymity on the survey form please call or write to me at the numbers listed above.

Thank you for your time and cooperation,

Stanley J. Alluisi
Doctoral Student

Kenneth Wiggins
Professor and Head
Department of Aviation and Space Education

CFI Questionnaire
Directions

Thank you for taking the time to complete this questionnaire. While most of the questions are self explanatory please read these directions to avoid any confusion. If there are any significant errors on a questionnaire the data might not be useable. Please read these directions carefully and please print clearly when your write in your answers so that we may make full use of your contribution to this survey.

The questions on page two are "background questions." These questions allow the researchers to look for correlations between the various levels of experience possessed by CFI's and their assessment of their own knowledge and ability to teach. Due to the varied nature of each individual's progression from non-pilot to instructor some of these questions may not be applicable or may seem redundant. Please answer each question to the best of your ability, especially when answering questions concerning flying hours. Feel free to provide any additional information on page seven.

The next part of the questionnaire on page three asks you to assess your feelings about your own depth and breadth of knowledge as an instructor as well as your assessment of your own ability to teach private pilot students. For each of the Private Pilot Knowledge and Performance areas please indicate how broad and deep your knowledge is and how confident you feel in your ability to teach the required material to a new Private Pilot student by placing an "X" in the appropriate column. Please make sure that you only place one "X" in each of the Knowledge and Performance rows.

Note: It is possible for someone to have a better than average understanding of some particular subject matter but not feel at all confident in their ability to teach it to others.

On pages four and five you are asked to rank each subject in the Knowledge and Performance areas to indicate in which subject you feel most knowledgable and confident and in which you feel the least knowledgable and confident. Please make sure you use each subject's number only once. We suggest that you cross out each subject as you write its corresponding number in the ranking.

Also on pages four and five are seven questions requiring a "write in" answer. Please go to page seven and write the number of the question you are answering in the first column and your answer in the next column. If you need additional room please feel free to attach additional pages to the questionnaire. If possible, please print your answers. This will make it that much easier for us to read and benefit from your answers.

The remaining questions are on page six. The first three ask you to check the appropriate box and the following six questions ask you for your opinions regarding your CFI training, CFI training in general and the training of private pilots. Again, if you need additional room please feel free to attach additional pages to the questionnaire.

When you have completed the questionnaire please place any additional pages you may want to include between pages four and five and then fold the entire questionnaire in half so that the return address on the back page is exposed. Please tape the questionnaire closed (***do not staple it closed!***) and drop it in the mail. No postage is required.

Thank you for taking the time to complete this questionnaire.

Background Questions

1. **How old are you today? (Years)** ☐
2. **What is your gender? (M/F)** ☐
3. **Have you ever been a military aviator?** (i.e. Pilot, Nav, Engineer, etc.) **(Y/N)** ☐
   In which branch and position?_____
4. **How many years since you earned your private pilots license or completed initial military flight training?** ☐
5. **Total flying hours logged?** ☐

How many hours have you logged:

6. **As a private pilot before earning an instrument rating?** ☐
7. **From the time you earned your instrument rating until you became a CFI?** ☐
8. **Since earning your CFI rating?** ☐
9. **In aerobatic aircraft?** ☐

Military pilots only:

10. **How many hours do you have in high performance fighter or training aircraft?** ☐
11. **How many hours in heavy bomber or transport aircraft?** ☐
12. **How many hours do you have in helicopters?** ☐

How many hours have you flown in the:

13. **Past 30 days?** ☐
14. **Past 90 days?** ☐
15. **Past 180 days?** ☐
16. **Past year?** ☐

17. **What was the source of your initial flight training? (check one box only)**
    - Military..... ☐
    - Part 61..... ☐
    - Part 141 school:
      - Private aviation school..... ☐
      - State sponsored school..... ☐ (university/college/VoTech)
    - Accelerated course..... ☐
    - Self Study..... ☐

18. **What was the source of your initial instructor pilot or CFI training? (check one box only)**
    - Military..... ☐
      Which branch? _____
    - Private aviation school..... ☐
    - State sponsored school..... ☐ (i.e. University/College/VoTech)

19. **How many students have you recommended for private pilot checkrides?** ☐
20. **How many of the students you recommended passed their checkride on their first attempt?** ☐

Indicate the Depth & Breadth of Your Knowledge in Each Area					
Knowledge Areas	Very Little Knowledge	Some Knowledge	Average Knowledge	Good Knowledge	Excellent Knowledge
1. Aeronautical Charts					
2. Airspace					
3. Navigation					
4. Weather					
5. Operations (traffic pattern, comm. procedures, collision avoidance)					
6. Performance					
7. Weight & Balance					
8. Aerodynamics					
9. Aircraft Systems					
10. Stall Awareness & Spins					
11. Federal Aviation Regulations					
12. Physiology					
13. Decision Making					
Performance Areas					
14. Preflight					
15. Normal & Crosswind Takeoffs & Landings					
16. Maximum Performance Takeoffs & Landings					
17. Ground Reference Maneuvers					
18. Slow Flight & Stalls					
19. Cross Country (pilotage, dead reckoning, radio aids)					
20. Basic Instrument Maneuvers					
21. Emergency Procedures					

Indicate Your Confidence in Your Ability to Teach in Each Area					
Knowledge Areas	No Confidence	Little Confidence	Somewhat Confident	Confident	Very Confident
1. Aeronautical Charts					
2. Airspace					
3. Navigation					
4. Weather					
5. Operations (traffic pattern, comm. procedures, collision avoidance)					
6. Performance					
7. Weight & Balance					
8. Aerodynamics					
9. Aircraft Systems					
10. Stall Awareness & Spins					
11. Federal Aviation Regulations					
12. Physiology					
13. Decision Making					
Performance Areas					
14. Preflight					
15. Normal & Crosswind Takeoffs & Landings					
16. Maximum Performance Takeoffs & Landings					
17. Ground Reference Maneuvers					
18. Slow Flight & Stalls					
19. Cross Country (pilotage, dead reckoning, radio aids)					
20. Basic Instrument Maneuvers					
21. Emergency Procedures					

Depth and Breadth of Your Knowledge

21. Please rank each <u>knowledge</u> area showing in which area you have the greatest depth and breadth of knowledge down to the area in which you have the least knowledge. Write the number corresponding to the Knowledge area in the space provided.
(Please remember to use each Knowledge Area only once!)

1. _____ **Most Knowledge**
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____ **Least Knowledge**

Knowledge Areas
1. Aeronautical Charts
2. Airspace
3. Navigation
4. Weather
5. Operations
6. Performance
7. Weight & Balance
8. Aerodynamics
9. Aircraft Systems
10. Stall Awareness & Spins
11. Federal Aviation Regulations
12. Physiology
13. Decision Making

22. Please rank each <u>Performance</u> area showing in which area you have the greatest depth and breadth of knowledge down to the area in which you have the least knowledge. Write the number corresponding to the Performance area in the space provided.
(Please remember to use each Performance Area only once!)

1. _____ **Most Knowledge**
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____ **Least Knowledge**

Performance Areas
14. Preflight
15. Normal & Crosswind Takeoffs & Landings
16. Maximum Performance Takeoffs & Landings
17. Ground Reference Maneuvers
18. Slow Flight & Stalls
19. Cross Country
20. Basic Instrument Maneuvers
21. Emergency Procedures

For the following questions please write in your answers on pages seven.

23. For the top three <u>Knowledge</u> areas in question 21, how did you obtain this knowledge?

24. For the top three <u>Performance</u> areas in question 22, how did you obtain this knowledge?

25. For the <u>Knowledge</u> and <u>Performance</u> areas where you feel that you have the <u>least</u> breadth and depth of knowledge, where did you receive your training in these areas?

Confidence in Your Ability to Teach

26. Please rank each <u>Knowledge</u> area showing in which area you have the greatest confidence in your ability to teach down to the area in which you have the least confidence. Write the number corresponding to the Knowledge area in the space provided.
(Please remember to use each Knowledge Area only once!)

1. _____ **Most Confidence**
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____ **Least Confidence**

Knowledge Areas
1. Aeronautical Charts
2. Airspace
3. Navigation
4. Weather
5. Operations
6. Performance
7. Weight & Balance
8. Aerodynamics
9. Aircraft Systems
10. Stall Awareness & Spins
11. Federal Aviation Regulations
12. Physiology
13. Decision Making

27. Please rank each <u>Performance</u> area showing in which area you have the greatest confidence in your ability to teach down to the area in which you have the least confidence. Write the number corresponding to the Performance area in the space provided.
(Please remember to use each Performance Area only once!)

1. _____ **Most Confidence**
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____ **Least Confidence**

Performance Areas
14. Preflight
15. Normal & Crosswind Takeoffs & Landings
16. Maximum Performance Takeoffs & Landings
17. Ground Reference Maneuvers
18. Slow Flight & Stalls
19. Cross Country
20. Basic Instrument Maneuvers
21. Emergency Procedures

For the following questions please write in your answers on pages seven.

28. For the top three <u>Knowledge</u> areas in question 26, why do you feel so confident in your ability to teach the material?

29. How did you acquire this knowledge which you now feel best able to teach?

30. For the top three <u>performance</u> areas in question 27, why do you feel so confident in your ability to teach these skills?

31. How did you acquire the performance skills you now feel best able to teach?

General	
32. Where have you received the majority of the skills that you use to train Private Pilot students for their written and oral examinations? (Check one box only)	☐ Military ☐ Civilian School ☐ Self Study ☐ Accelerated Courses ☐ Seminars/Lectures ☐ Other (specify)
33. Where have you received the majority of the skills that you use to train Private Pilot students for their practical examination? (Check one box only)	☐ Military ☐ Civilian School ☐ Self Study ☐ Accelerated Courses ☐ Seminars/Lectures ☐ Other (specify)
34. Immediately after earning your CFI rating how confident did you feel about your ability to teach new Private Pilot students? (Check one box only)	☐ Very confident ☐ Confident ☐ Somewhat confident ☐ Minimally confident ☐ Not confident at all

For the following questions please write in your answers on pages seven.

35. If you answered "somewhat confident," "minimally confident" or "not confident at all" on question 34 please explain why.

36. If you were confident at the time but have since realized that you were not fully prepared, what has changed your mind?

37. Do you think the current rules concerning the training and evaluation of CFI's is adequate to produce competent and safe Private Pilots?

38. In your opinion, what area or areas of CFI training, if any, need improvement?

39. What are your recommendations for improving CFI training?

40. What are your recommendations for improving the training of new private pilot students?

Question#	COMMENT FORM

Stanley J. Alluisi
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APPENDIX B

INSTITUTIONAL REVIEW BOARD APPROVAL FORM

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 02-19-97 **IRB#: ED-97-066**

Proposal Title: CERTIFIED FLIGHT INSTRUCTORS SELF REPORTED ASSESSMENT OF THEIR DEPTH AND BREADTH OF KNOWLEDGE AND CONFIDENCE IN THEIR ABILITY TO TEACH PRIVATE PILOT STUDENTS.

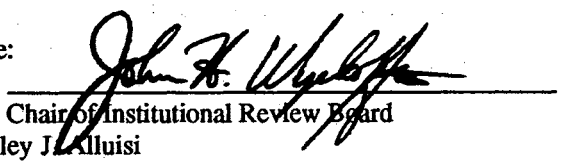
Principal Investigator(s): Steven K. Marks, Stanley J. Alluisi

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR DATA COLLECTION FOR A ONE CALENDAR YEAR PERIOD AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Disapproval are as follows:

Signature:  Date: February 20, 1997

Chair of Institutional Review Board

cc: Stanley J. Alluisi

APPENDIX C

RESPONDENT COMMENTS

ID# 1

Q23 Aviation Technical Specialist - Primary skill Avionics Systems
Q24 Private school training
Q25 Private school training
Q28 Continuous study & work and teach in these
Q29 Private school, self study, teaching and seminars
Q30 I feel I understand & know these things
Q31 Instruct one by one, self study, practice
Q35 I understand the mechanics of teaching but could not feel I always understood the student's feelings and mindset
Q37 Yes. As long as the term "adequate" is used
Q38 Interpersonal and communication skills
Q39 1. Add requirement for 10 hours aerobatic instruction. 2. Initial CFI to attend communication seminar - role play, etc.
Q40 Use of "sim" for basic procedures and com, NAV, systems

ID# 3

Q23 Experience
Q24 Experience
Q25 Self taught
Q28 Experience
Q29 Experience
Q30 Experience
Q31 Experience
Q37 Yes

ID# 4

Q23 Practical Experience
Q24 Practical Experience
Q35 I learn by experience
Q37 Yes
Q38 A little less regulation
Q39 Training by CFI's with good practical training
Q40 They should select experienced CFI's
Otther Comments: Have not flown/taught much in the past year due to illness

ID# 5

Q23 ATC controller and commuter experience
Q24 Training private pilots
Q25 Del Rio, TX
Q28 Experience
Q29 ATC controller and commuter experience
Q30 Experience
Q31 Training private pilots
Q35 It was a new challenge

Q36 All those times when I couldn't answer questions
Q37 Yes
Q38 Practice teaching scenarios
Q39 Have them trained by a CFI with at least 500 hours CFI time
Q40 Have them trained by a CFI with at least 500 hours CFI time

ID# 6

Q23 My private instructor drilled FAR's into my head, and through a lot of studying, they stuck with me
Q24 Hours of practice and studying as well as a good foundation from my private instructor
Q25 I had no training in aerodynamics other than what I read and understood on my own or asked questions about. I received Basic Instrument Training at Delta State university.
Q28 I know without a doubt that I definately know my stuff on FAR's
Q29 A good foundation form my private instructor as well as a good reinforcement from my CFI instructor. I also had a good background in flight planning and lost procedures. Aeronautical charts go along with cross country flight planning
Q30 Good foundation in preflight. A guy from the flight team taught me how to preflight (he won first place at national competition). I've done a million landings, I should be able to teach them because I'm especially critical of my own, and I am always analysing why I've had a good or bad landing.
Q31 A lot of hard work, dedication, heart, soul and practice
Q36 When you begin instructing and you have your 1st student you realize that you didn't really know that much after all. Especially when they start asking questions that you don't have the answers to.
Q37 Yes.
Q38 Teaching skills (Learning how to get your point across to others).

ID# 7

Q23 Self study.
Q24 Self study.
Q25 Self Study.
Q28 I enjoy it, thus study more.
Q29 Self taught.
Q30 I enjoy it, thus study more.
Q31 Self study.
Q37 Yes .
Q38 (CFIT) Terrain avoidance and instrument - basic.
Q39 More self study - Not as much 3 day courses.
Q40 More study less teaching of exams.

ID# 8

Q23 Schools, self taught - Roosevelt Aviation School 1941, Embry-Riddle 1941-42
Q24 Self study the way we did everything in the depression.

Q25 Flight Safety 35 years - Schools 10 years - PAMA etc.
Q28 Enclosed is a copy of some of my 34 certificates and ratings. Never failed any.
Q30 Been doing it all my life.
Q31 Self study: Never solos anyone if they hadn't done spins - deep stalls, etc. - forced landings to 100 feet, etc.
Q38 More basic maneuvers.
Q40 All training should be set back 50 years to the original CPT-WTS Army Primary Courses. Hardly any can now land cross wind - navigate with a sectional, if the GPS goes dead they are lost. We had 3 private pilots leave the runway in 20 minutes here in crosswinds.// Aircraft operations are seldom taught anymore..... Start teaching old time flying!

ID# 9
Q23 Self study.
Q24 Self study.
Q25 Self study.
Q28 Deep breadth of knowledge & good language skills .
Q29 Self study.
Q30 Good language skills.
Q31 Self study.
Q35 Apprehension about putting theory into practice.
Q37 Yes.
Q38 Teaching & learning process
Q39 None
Q40 Improve decision making training

ID# 10
Q23 Flight experience
Q24 Flight experience
Q25 Classroom
Q28 Most interesting
Q29 Experience
Q30 Experience
Q37 Yes
Q38 Back to basics
Q39 More thorough understanding of aerodynamics
Q40 Eliminate Private Examiner program - return pilot certification to FAA

ID# 11
Q23 I gained this knowledge by being an employed professional pilot (and 22 year military pilot) for all of my adult life.
Q24 SAA; Flying a helicopter for approx. 31 years daily.
Q25 All of my initial training was military; The items I have marked as least breadth and depth is due to my interest in the interest in the item and the frequency at which they occur.

Q28 These are the items I am involved in the most (and luckily the items I enjoy the most).
Q29 Constant utilization (experience).
Q30 I enjoy flying and I enjoy the "hands on" part of aviation training (as opposed to the book work part).
Q31 Experience.
Q37 At this time, I do not feel qualified to honestly answer these questions since I have not actively instructed new (private pilot) students for about ten years.

ID# 12

Q23 Decision making — flight training, business, self-study. Navigation and Weight & Balance — flight training, reading.
Q24 Flight training, self-study.
Q25 Flight training, self-study.
Q28 Knowledge of subject and ability to communicate.
Q29 Flight training, self study and business experience.
Q30 Knowledge of subject and ability to communicate.
Q31 Same as 29
Q35 Lots of knowledge but little teaching experience.
Q37 Yes.
Q38 Decision making and judgement. Awareness of pilot limitatons.

ID# 13

Q23 Military.
Q24 Military.
Q25 Military.
Q28 Great deal of experience.
Q29 Military.
Q30 Experience.
Q31 Military.
Q35 Crossover from military to civil.
Q36 N/A
Q37 Yes.
Q38 Adaptation to civil use.
Q39 Require more experience.
Q40 War.

ID# 14

Q24 Experience, training, courses, reading.
Q25 Flight training.
Q28 Most knowledge in these areas.
Q29 See above.
Q30 Most experience in these areas.
Q31 Training & experience.
Q35 I hadn't done it before.
Q36 N/A

Q37 Yes - Especially the refresher course.
Q38 None.
Q39 Some proctored update.
Q40 Use of computer simulators for some of the basic training.
Other Comments: I got my CFI & CFII for the experience and do not actually teach except for friends for biennial.

ID# 15

Q23 Self study, experience.
Q24 Experience.
Q25 Self study.
Q28 Practical experience doing them.
Q29 Doing them over and over.
Q30 Repetition of doing them.
Q31 Experience.
Q35 Like anything in life we are apprehensive until we see what our results are.
Q36 I was concerned if I taught all I could. As time passed I became more confident.
Q37 Yes.
Q38 Communication skills.
Q39 Overall, none.
Q40 More emphasis on the use of all the electronic devices available to new pilots.

ID# 16

Q23 Subscripting to engine manufacturers. Talking to experienced mechanics and flight instructors.
Q24 Researching and reading numerous material on human behavior.
Q25 The least would be navigation; this is only because of the changing equipment and instruments due to the advancent in the technological field. Training was received in structured lectures w/no "hands on" experience.
Q28 I know the material very well through attending lectures and meteorological courses.
Q29 Research; reading. College courses. Experienced pilots.
Q30 I practice what I instruct therefore I am more observent and a better instructor.
Q31 It is a combination such as experience, instructors, and research.
Q37 The rules are inadequate.
Q38 Decision making, airspace interpretation, recognizing personal limitations.
Q39 CFI's should improve on giving feedback; negative or positive with specifics and behavior. Behavior is the key to feedback and behavior will change one's attitude.
Q40 Communication and decision making.

ID# 17

Q23 Prior U.S. Air Force training.
Q24 Basic air training plus civilain instructor at good civilian training school, Baltimore, MD.
Q25 From the manuals and civilain instructor at civilain flight school.
Q28 These subjects are given both practical and classroom instruction in the Air Force.

They are common subjects to all areas whether military or private or commercial and do not change from year to year and from aircraft to aircraft.

Q29 Basic Air Force flight training and experience flying the C-130/C-5 in many countries.
Q30 Same as 28.
Q31 Same as 29.
Q35 N/A
Q36 N/A
Q37 Yes.
Q38 None.
Q39 Mix training with basic students.
Q40 Pair basic students together for their training.

ID# 18

Other Comments: I didn't fill out your questionaire because I'm no longer an active CFI - in fact my CFI expired last november & I couldn't renew them in time. Although I was "current" for 12 years & taught for the first 5 1/2 actively, full time, since I started flying for a major airline & have to commute to work I no longer had the time to keep my CFI current. I hated to let them expire, but realistically so much has changed in aviation over the last 5 yrs, if you don't REALLY teach - not just attend a course once every 2 years I don't think you can teach very affectively. Also, from a liability standpoint, I can'r afford to teach someone to fly. Good luck with your survey.

ID# 19

Q23 U.S Marine Corps, naval flight training.
Q24 Same, AOPA flight school.
Q25 Military
Q28 After 55 years of flight training.
Q29 Military & AOPA school.
Q31 Civil and military
Q36 Nothing.
Q37 Very good.
Q38 None.
Q39 None.
Q40 None. PTS covers well.

Other Comments: In my years as a military aviator and flight instructor in Part 61 and 141 schools and having much knowledge of theinfrastructure of American aviation I do not encourage new pilots to seek airline positions for reasons of my own; such as subsidizing of the airline industry by the military trained pilots, and government services offered to airlines at tax payers expense, including FAA, control personnel, navigation equipment and feel strongly that "user fees" should be employed.

ID# 20

Q23 Refreshers & self study.
Q24 SAA
Q25 SAA
Q28 Experience / seasoning / maturity.
Q29 SAA
Q30 SAA
Q31 SAA
Q37 Basically, yes.
Q38 Risk assesment / decision making: Collision avoidance.
Q39 Continued improvement in ccertificate renewal programs.
Q40 More emphasis on accident stats & the knowledge and skills pertinent to avoiding the problem areas.

ID# 21

Q23 Study & experience.
Q24 SAA
Q25 Part 141 school, from instructors.
Q28 A lot of experience with my private pilot students.
Q29 Study and mostly from teaching others.
Q30 SAA for Q 28
Q31 SAA for Q 29
Q35 N/A
Q36 N/A
Q37 Yes.
Q38 Perhaps more thought and ideas about teaching older students (40 - 70 years old).
Q39 Allowing for a wider range of "student" personalities.
Q40 I would recommend not teaching "touch and go" landings but always "full stop" and then taxi back.
Other Comments: I have had a lot of experience teaching prospective private pilots. But also with instrument and commercial I see "in my opinion" a lot of instruction which I would consider a "bad habit" or wrong and should be changed.

For Example:

1. Riding the brakes.
2. Using much more power than necessary to turn around while parking an airplane. ALSO - I feel a lot of "young" instructors are not the best because they want to "build time" and move on to a commuter or corporate job. etc.

ID# 22

Q23 Military instructor.
Q24 Military instructoe.
Q25 Local aviation tech college.
Q28 Experience.
Q29 Military instructor.
Q30 Military instructor/Test pilot.

Q31 Experience and military training.
Q36 No change.
Q37 Yes.
Q38 More on regulations.
Q39 Need two tracks of training and evaluation. One for fixed wing and one for rotary wing.
Q40 I DO NOT TRAIN NEW PILOTS.
Other Comments: NOTE: I am a military retired rotary wing pilot. I have a CFI/II as a requirement for my position for the maintenance contractor at Fort. Rucker, AL. I mainly deal with experienced maintenance test pilots with a min. of1000 hours of rotary wing time.

ID# 23

Q23 (6) Practice! Practice! Practice! & careful reading & basic interest. (10) Interest in aerobatic flight - self study. (9) I am also an A&P & a professional engineer - these things seem to "come naturally" to me. Self study.
Q24 (15) Teaching these skills in a taildragger tends to make one sharp in these areas. (14) A&P training & my my feeling that this is a very important area has influenced me to stress this area - self study. (18) Practice, etc. Self study.
Q25 My basic teaching skills were fine when I was active. Medical problems have put me out of the game for about five years. The areas that change - regulations, weather reporting systems, airspace - are difficult to retain if not active
Q28 Because I have both basic & advanced students in these areas and have excellent results.
Q29 Good instructors in these areas, personal interest, and practice, practice, practice.
Q30 Past success, personal interest& practice.
Q31 Aerobatic flight & self study.
Q35 N/A
Q36 N/A
Q37 Yes.
Q38 Additional stall, spin, aerobatic training.
Q39 Require a 2-3 hour basic aerobatic course.
Q40 1. Spend more time discussing performance during the lesson and less time looking at the Hobbs meter. 2. Increase flight instructo's pay so they can do #1.
Other Comments: 3. Foster a culture where Flight Instructing is a PROFESSION NOT a stop to building time to do something else.

ID# 24

Q37 Yes
Q38 Emergency Procedures

ID# 25

Q23 North American Institute of Aviation flight school, experience, self-study, video tapes.
Q24 NAIA flight school (especially from my "2-year" CFI at school) video tapes, experience.
Q25 NAIA flight school, some by experience.

Q28 I feel I have good knowledge in these areas. After correcting my confusion through experience & self study, I feel ready to share that knowledge with others.
Q29 Much was acquired through experience & self study.
Q30 I feel these maneuvers are very challenging & important to master and I've gotten enough experience & knowledge in these areas that I feel very confident.
Q31 Through very good initial & advanced training at NAIA flight school & through experience.
Q35 Having had no real experience in instructing students in aviation I felt like I just barely knew anything. I had nothing to compare my knowledge & skill to except my own instructors & they were excellent pilots & instructors in my eyes. I did not feel equal to them.
Q37 Yes.
Q38 Perhaps standardization of instructing techniques.
Q39 Again, perhaps the FAA could offer some type of standardization class or seminar for CFI's & address problems throughout the CFI community.
Q40 More structured/organized training programs at Part 61 schools, make all schools comply with 141 rules.

ID# 26

Q23 Decision making - experience, reading, flight training. Physiology - Flight school, U.S. Army, Ft. Rucker, AL. WX - College, reading, experience, flight school.
Q24 Preflight - through experience. Instrument - Flight school, reading. T-off/Landing - training, reading.
Q25 This training was Flt training, but was not enforced alot.
Q28 I have experienced these more, and understand it really well.
Q29 Overtime, Flt school, other pilots.
Q30 Because I fly instruments alot; From experience.
Q31 Flight school military, reading, college, self.
Q37 Yes.
Q39 Must demonstrate instrument skills - approaches, holding, on checkride fro CFI.
Q40 Establish a minimum (3-5 hrs) hours of instrument training and increase dual cross country time to 6 hrs.
Other Comments: Good luck on PH.D.

ID# 28

Q23 (Aircraft systems) primary (pre- PVT & COMM) training. (Performance) Experience over the years. (Aerodynamics) Self study.
Q24 (Slow flight, BIM, Norml T/O & land) Practice (and teaching).
Q25 Mostly self study /practice.
Q28 (Aerodynamics, Aircraft Systems) Knowledge obtained over the years. (Performance) Practice (and experience).
Q29 Experience on variety of aircraft.
Q30 (Preflight) Practice at being thorough. (GRM) Experience through use & teaching. (Slow flight) Experience on variety of aircraft.
Q31 Practice; teaching; Trial & error.

ID# 28

Q37 In general yes for private pilots.
Q38 Instrument & multi-engine.
Q39 Higher time required with actual instrument & multi-experience.
Q40 Relax solo cross country requirements. Require more instrument training.

ID# 29

Q23 Additional reading and practical experience from acquiring additional certif icates.
Q24 Practical flying experience.
Q25 Majority of training on my own. Emergency training only minimal required for ratings - rest from my own practice and study or while instructing.
Q28 Results in perfromance of my past students & myself.
Q29 Experience acquired from professional flying.
Q30 I fly these well - and past students have excelled in this area.
Q31 My practice and technical understanding of each maneuver.
Q35 I was not trained enough on poor perfromance of students only my own to pass checkride.
Q37 No! It is inadequate!
Q38 Fundamental Instructor Skills.
Q39 More total flight time as PIC. Initial certificate should be probational. Practice student teaching should be required. Initial certificate CFI's should be required to instruct a certain number of hours before permanent certificate is issued.
Q40 Review from another instructor (phase check) required before sign off.

ID# 30

Q23 Gained through experience and years flying.
Q24 Mostly through experience but lesser through reading.
Q25 Learned through previous flight instructor.
Q28 Mainly experience first hand in these areas, plus interest in these areas.
Q29 Experience in doing each of them.
Q30 Knowledge of the subject matter.
Q31 Actual experience.
Q35 lack of actual experience plus concern about premature recommendations of applicants.
Q36 N/A
Q37 Yes overall, however there area "pockets" or areas which need to be stressed regarding the training of private pilots. Not by FAA.
Q38 Professionalism! Attitude!
Q39 Should work under experienced supervisor/check pilot.
Q40 QUALITY computerized visual training aids along with competent instruction.

ID# 31

Q23 Experience and through dialog with other aviators.
Q24 As per #23.
Q25 Same as #23 & #24 with less exposure over the years. (Note - #21 - #25 - very difficult to differentiate as all must be initially known & practiced in order to train

pilots. i.e. All are top 3!)
Q28 Been doing it for years - examined every <?> years - <tragic?> record - all contribute to confidence - not to speak of basic trg.
Q29 Experience.
Q30 See #28.
Q31 See #28
Q35 N/A
Q36 N/A
Q37 Yes.
Q38 In my opinion, all areas as directed in the current FAA PTS meets the criteria required to produce highly qualified CFI's.
Q39 Continued monitoring of PTS and continued high standards set by examiners.
Q40 I have included, and would recommend, that night cross country training be included in sylabus and PTS.

ID# 32

Q23 I obtained this knowledge from my aerobatic training & aerobatic instructing, as well as during my experience as an aerobatic competitor.
Q24 Same as #23.
Q25 It's not the location or method of training that is lacking, but the fact that I don't review this information or teach it as often so I feel less knowledgable or confident regard the respective subjects.
Q28 Because of my training and experience in aerobatic flying.
Q29 Aerobatics; I have been told that I have natural ability to teach & college taught me to be patient & more effective ways to get my point accros.
Q30 gain, aerobatics.
Q31 Aerobatics & my college education.
Q35 This is the first time you are responsible for someone who knows absolutely nothing about aviation, not someone pretending to know nothing. Also, this person could kill the both of you if you don't react or teach them properly.
Q37 No!
Q38 CFI applicants need to be absolutely confident & able to fly the training aircraft to the edge of its envelope by second nature, before they can expect to teach someone else to fly.
Q39 I think at least a primary aerobatics course should be manditory, not just the "spin" endorsement that is currently required.
Q40 New CFI's should have some sort of probationary period in which they are observed by experienced CFI's before they are allowed to instruct on their own. Again, aerobatic training should be a definate requirement.
Other Comments: #33: Experience. All of the experiences I have had to deal with in my 1300+ hrs of flying. Aerobatics accelerated this learning process for me. Every hr of aerobatic flying is equivilent to four hrs of straight and level f lying as far as experience goes.

ID# 33

Q23 Experience, many hours of primary training (A&P mech) of students.
Q24 Same - experience - student for private or solo.
Q25 FAR - out of touch with changes. Little training received - as I am not inst. rated (grandfathered).
Q28 Same answer - experience.
Q29 Doing it over and over.
Q30 Ditto.
Q31 Not from books but from "been there, done that."
Q37 Yes.
Q39 The CFI refresher courses are helpful, but not near enough training for two year intervals - It would be difficult to find time to attend seminars every 6 mos, but this would be best for those of us who aren't giving instruction frequently.

ID# 34

Other Comments: CFI Army Primary - Flying Army 4th Ferry Group. Pilot Military Airlines <?>

ID# 35

Q23 US Army.
Q24 US Army.
Q25 Civilian private school.
Q28 Most experience in this area.
Q29 US Army.
Q30 Give annual check rides to fellow helicopter pilots in areas 1-5.
Q31 US Army.
Other Comments: #32: No longer teach basic flight maneuvers. #33: See 32.

ID# 36

Q23 Mostly self study & flying experience. Also seminars & work experience as a grnd. instructor in the Air Force.
Q24 This is flight training & practical experience.
Q25 Flight training. & ground school - seminars - not much training in decision making except correspondance via Jeppesen.
Q28 Easy to get this info. Prtty cut and dried.
Q29 Job as ground instructor plus various flight school training & practical experience. I like maps.
Q30 Ground training experience (see #23 answer); Like cross country & maps. Its easy to tell if you are doing good maneuvers correctly.
Q31 Practice.
Q35 If I knew why I would do something about it.
Q36 No change.
Q37 Yes. It is up to the CFI to use the training well - in a judicious manner.
Q38 No idea.
Q39 None.

Q40 None.

ID# 37

Q23 Initally I learned this starting when I obtained my private license through self study, oral quizing and practical exposure to these areas by my instructor. It has been expanded over time with increased experience.

Q24 Basically - same as above. My initial instructor stressed these areas.

Q25 Received my training from a local flight school. Those areas were never stressed and I feel my instructor was limited in his knowledge in these areas.

Q28 These are the areas I feel most knowledgable in and feel comfortable teaching.

Q29 Received the knowledge initially through self study and practical applications. Knowledge has been expanded by additional experience, and using video material, attending safety seminars.

Q30 These are the areas I have the most experience in.

Q31 By practice.

Q35 At the time I had about the minimum time required to get a CFI (250-300 hrs) of which most was in a limited local area. I felt that I knew how to do the maneuvers adequately to pass the exam, I didn't have a great deal of a variety of experiences.

Q36 N/A

Q37 Since I receive my initial CFI, the structured Practical Test Standards have been implemented which I believe has improved training. I don't believe that having the FAA do the initial flight testing of applicants has helped any in improving the "standards." A designated examiner is sufficient.

Q38 More empahsis on how to teach, as well as a better understanding of the teaching process.

Q39 See #38.

Q40 I would like to see a minimum number of hours "under the hood," perhaps 5 hours in addition to raising the night requirement to 5 hours. "Spin awareness" should be required, which the student has at least been shown a spin. As far as requiring spin recovery, I don't think that is necessary.

ID# 38

Q23 Combination of self study, my instructor, aerobatic course.

Q24 Self study, my instructor.

Q25 Instructor.

Q28 Resultant of my experience.

Q29 Resultant of my experience.

Q30 Resultant of my experience.

Q31 Resultant of my experience.

Q37 I believe the training is adequate, and the evaluation is not. A big issue with aviation has been, and will aalways be, the human element i.e. designated examiner/FAA inspector evaluations. The FAA has a good idea in controlling CFI checkrides, however the implementation is poor - FAA checkrides for CFI's are unrealistic. FAA inspectors are incapable of making good overall evaluations (big picture) of CFI applicants.

Q38 None - System works well with possible exception of the FAA. I would like to add

that all CFI applicants in my opinion, should receive basic aerobatic training.
Q40 Require spin training - Otherwise all areas are covered well.

ID# 39

Q23 Self study because of great interest in subject matter.
Q24 Same as #23.
Q25 Certificated school.
Q28 I have always been interested in instrument flying and have completed self r esearch on the subject.
Q29 Same as #28.
Q30 Same as #28.
Q31 Same as #28.
Q37 Yes.
Q38 Basic aerodynamic skills such as good crosswind landing technique and correct use of flaps.
Q39 More acrobatic trainingfor CFI's so that they are not apprehensive about teaching spins and stalls.
Q40 More navigational skills with a sectional chart and plotting and following courses and routes logs. Presently there is too great of a reliance on electronic nav aids.

ID# 40

Q35 I did not feel my checkride went very well & felt I really knew very little in all in the vast information available in aviation. I had very little experience in aviation as well. Many things can only come from experience, however.
Q37 Yes. Learning does not end with the private students CFI. It takes years of experience to learn what's necessary to be a good pilot. The CFI's job is to get them on that road. Not complete the trip with the student.
Q38 Maybe more emphasis on teaching decision making. Stall-spin recognition seems to be the biggest hurdle for a lot of students I have a chance to work with - even experienced pilots. I don't feel I learned enough on spin entry, but enough on spin recovery. If I knew more about spin entry I would feel better about letting my students get into a little more "trouble" when learning slow flight & stalls.
Q39 Better spin training. Not just doing them, but learning and understanding them as well. Put more emphasis on decision making in the go-no go decision & when to turn around.
Q40 Nothing more than applying the above.

ID# 41

Q23 USCG experience and private pilot training.
Q24 Private pilot , commercial pilot and CFI training.
Q25 Same as above.
Q28 Very familiar with subject material.
Q29 Reading, experience and teaching.
Q30 See 28.
Q31 See 29.

Q35 Met minimums for the rating, but had no teaching experience.
Q37 Yes.
Q39 Better FAA oversight of certification process to ensure standardization.

ID# 42

Q23 Service experience as a military pilot. Service as an FAA pilot examiner.
Q24 Service experience as a military pilot. Service as an FAA pilot examiner.
Q25 Self study. Civil training in seminars and non-structured learning environme nt.
Q28 Training & practice.
Q29 Military training.
Q30 Doing the maneuvers frequently & reinforcing training.
Q31 Military training and FAA standardization flights for examiner duties.
Q35 N/A
Q36 N/A
Q37 Yes, provided they are honestly enforced and minimum experienced is not compromised.
Q38 Training integrity. Teach or change instructor candidates behavior so that falsifying training or experience is not condoned, and that we do so is not acceptable behavior for an instructor. The quality of the training or experience is much more important than the number of times the event was repeated.
Q39 Have instructor candidates fly more often (more flights, more hours) with more senior instructors. Have the new instructors teach each maneuver to the older instructor enough times and be corrected enough times that mistaken ideas can be taken out of the training system. If the present rules were kept and an honest effort made to comply with the spirit of the regulation, rather than the letter of the regulation, the system would work better than it does now.
Q40 Improve the quality of the instruction. Improve the selling of flying. We aren't teaching flying P-51's, or World War II, but how to fly safely. Sometimes this is hard work and requires more effort than our learners expect.

ID# 43

Q23 Video tapes, books, experience.
Q24 study, experience.
Q25 San Diego, tapes & books, experience & study.
Q28 Study & experience.
Q29 Self study, classes, CFI, lectures.
Q30 Practice, study, CFI's.
Q31 Practice/study.
Q35 Very cautious.
Q36 No, more confident with experience & further study.
Q37 Yes, but it depends on the individual.
Q38 Need constant retraining.
Q39 Notice of changes made by FAA.
Q40 More information on short/long term memory, physical coordination, eye & hand coordination.

ID# 44

Q23 Civilian schools and self study.
Q24 Civilian schools and self study.
Q25 Civilian schools and self study.
Q35 Lack of repitition.
Q40 I regret I could not be of more help to you. I really do not have any recomm endations for improvement.
Other Comments: I have not done any instruction in 3 years. The pay was very poor and I mostly did it for fun. I would have to admit that my confidence level is very low in all areas mostly due to the fact that I have done nothing in 3 years.

ID# 45

Q23 I am an engineer by training. Maps, navigation, equipment (systems) is related to all of this. i enjoy planning, calculating, etc.
Q24 Re; No. 23; Most of this is obtained by practicing what I enjoy as a private/commercial pilot.
Q25 These are areas that one must study and study and keep studying to feel confident in these areas. Ground reference maneuvers can be practiced and able to show them, but still they must be studied, also.
Q28 Refer No. 27.
Q29 Besides college and OJT I practice these procedures to where I felt very comfortable with them.
Q30 I like cross country work. That's what an airplane is built for! Prefligh is an inspection of your A/C. You should be able to totally teach one of the most important items of flight. I enjoy achieving maximum performance from an aircraft. By enjoying something, you tend to be able to do things better.
Q31 You acquire your confidence and performance skills by working at it and practice.
Q37 Current rules seem to be adequate.
Q40 Private pilots need to have a confident level adjustment.

ID# 46

Q36 Changing rules and political environment make it less than efficient to stay abreast of the correct methods. Political correctness reduces the ability to communicate precisely.
Q37 No.
Q38 Reduce the litigeousness of public & responsibility of mentors relative to students.
Q39 Require more intnsive systems (both A/C & airspace) study and knowledge before allowing to work those areas.
Q40 Stress and require proper peformance in radio communications and airspace awareness.

ID# 47

Q23 Through my formal education B.S. in aerospace engineering.
Q24 Great primary instructor and great CFI instructor.
Q25 Great primary instructor and great CFI instructor.
Q28 Formal education.

Q29 Formal education.
Q30 Great instructors and much experience.
Q31 Great instructors and much experience.
Q35 N/A
Q36 N/A
Q37 Yes.
Q38 Need more advanced weather theory.
Q39 Need more advanced weather theory.
Q40 Change part 141 syllabus to front load more dual and delay solo. Require 3+ hours of simulated instrument.

ID# 48
Q23 Self study and practical experience.
Q24 Experience and self study.
Q25 From poorly trained inexperienced CFI's from 141 schools.
Q28 Experience gained by teaching.
Q29 Experience and self study.
Q30 Students understanding as well as commendations from examiners.
Q31 Experience and desire to teach. Not like many CFI's who are only interested in building hours.
Q35 I had less than 450 hours and did not feel confident in my skills.
Q37 141 schools do not prepare CFI's well. They usually know book information. Flying skills are marginal.
Q38 Aircraft flight experience should be increased.
Q39 Increase hours needed to get a CFI, set a total PIC and dual time.
Q40 Update the training materials.

D# 49
Q23 USAF
Q24 USAF
Q25 Part 141 school
Q28 Most flight experience in these areas.
Q29 USAF
Q30 The Air Force pilot training program Mgjt <?> prepares me for successful teaching.
Q31 From USAF UPT.
Q35 The current CFI training system is woefully inadequate, and for all future hiring I will never feel confident in ANY pilots ability that did not go through formal military flying training. Until you've done it, you can't argue that military pilots are far, far superior to any skills learned through FAA training programs.
Q36 New training.
Q37 Absolutely not!!!
Q38 Hours should be raised to over a thousand (which, by the way, I don't have) or a military pilot rating "wings."
Q39 As stated above.
Q40 Taught by more qualified instructors only.

ID# 50

Q23 Experience, engineering background.
Q24 Same as 23.
Q25 Experience, books.
Q28 Experience & engineering background.
Q29 See above.
Q30 See #28.
Q31 Same.
Q35 New ratings, new experience.
Q37 Yes.
Q38 Too complex - Simplify!
Q40 Too complex - the sport is dying!

ID# 51

Q23 By missing these items on the CFI oral exam and extensively studying them.
Q24 My flight instructor always taught these items in every lesson.
Q25 In the classroom.
Q28 By teaching this numerous times in the classroom.
Q29 By constantly teaching the material.
Q30 These are the items that I teach the most in the classroom and in the air.
Q31 By constantly teaching them and staying current to ensure I did not develop bad habits.
Q37 Yes.
Q38 Airspace is constantly changing and I feel we as CFI's need better informati on to teach students.
Q39 I think all CFI training should be in a Part 61 or 141 school. This will help to insure better quality teaching.
Q40 All students should be taught in a Part 61 or 141 school.
Other Comments: #34: It was a new experience. Greater confidence is built the more we practice a profession.

ID# 52

Q23 Navigation, Operations, performance - My core knowledge came from basic private and commercial pilot training. I have since built on the core knowledge by flying a variety of aircraft of increasing complexity into a variety of wx situations and airports.
Q24 BIM, X-Country, T/O & Landings - Again, my core knowledge came from basic training. However, in these areas I enhanced my knowledge and capabilities as an instructor through the instruction process itself.
Q25 I received my knowledge through training and again through instructing. These are areas I have always felt a little weak in, though.
Q28 I feel the most confident in teaching subjects in which I have the greatest depth of knowledge.
Q29 Through basic training, instructing, and most recently, flying as a professional pilot and using my skills on a daily basis.

Q30 These are areas I personally developed an above average skill level. I also have achieved direct results with students and that experience has enhanced my confidence.
Q31 I acquired these skills through instructing and most recently by flying as a professional pilot in a variety of flight situations.
Q35 I flet I lacked the "hands-on" experience to be a truly competent instructor.
Q36 N/A
Q37 Yes.
Q38 Spin training needs to be emphasized for all pilots. probably more single-engine training for MEI's.
Q39 Include more time fro spin training and single engine training for MEI's.
Q40 I feel that private pilots students should have spin training, more emphasis on wake-turbulence awareness, and more experience flying into tower-controlled airports.

ID# 53

Q23 Business experience, flight instructor refresher course.
Q24 Actual flight experience in tail wheel aircraft.
Q25 Basic flight training while going for ratings.
Q28 Flying experiences.
Q29 Flight time, classroom instruction & reading.
Q30 Flight experience, classroom instruction, & reading.
Q31 Experience, reading & business skills.
Q37 Yes.
Q38 Basic aerodynamic understanding.
Q39 Decision making could be expanded.
Q40 Note: The current material & private pilot training guide info is much better than existed 25 years ago.

ID# 54

Other Comments:

#32: Check airman - wrote training program.
Chief pilot
#34: 18 year old instructor - "overly confident"
Other: I may not be a very good candidate to measure CFI's from. I hold an ATP. Spent most of time training airline pilots and prefer not to teach anyone who does not hold a valid airman certificate - I feel that the liability of a student pilot is not worth the money - I have people wanting me to teach them for a private - I make them sign a contract of performance with my fee set at $45.00 per hour for both air and ground time - a minimum charge of $2000.00 paid up front.

This policy keeps the student focus on being a pilot.

I feel very strongly that a pilot that is an instructor should meet the following level;

7,000	TT
4,000	PIC
2,000	IFR

Training and teaching must be upgraded to level that make the student time valuable with a consistent level of instruction.

ID# 55

Q23 A degree in engineering is REALLY helpful in many aspects of aviation, (including "decision making." One learns to think critically and logically). In addition, I was fortunate to have a truly fine flight instructor.

Q24 I have to credit my flight instructor.

Q25 Self study.

Q28 They are "defined." There is closure.

Q29 One-on-one instruction with self study.

Q30 I feel confident in teaching these skills because I am very confident in performing them. I know what needs to happen.

Q31 Again, I have to credit my flight instructor, and I have had a lot of practice under difficult conditions.

Q36 I was well prepared but I don't think anyone can be fully prepared for the challenges of flight instruction. I had to learn to deal with different people, and to get out of the "situations" that students can put you in. You have to let the students make mistakes so he can learn, but how far do you let it go?

Q37 No.

Q38-39 1. Get serious about spin training for CFI's. I have met many CFI's who are scared of full stalls & spins and they pass this on to their students. They have never been in a full steady-state, multi-turn spin. A spin is rarely performed on a CFI checkride 2. Basic aerobatic training for all commercial and CFI applicants. to include: loops, rolls, spins, hammerhead turns, and real unusual attitude receovery. The military has been doing this from the start for all military aviators, even if they are going to fly transports. 3. (A dream) Some glider training (up to solo) for all commercial and CFI applicants.

Q40 Get rid of the "pick your own designated examiner" system! There is way too much "training to the examiner" rather than training to and testing on the PTS!

ID# 56

Q23 Item 12.I went to paramedic school prior to becoming a flight instructor, and this gave me a good foundation in physiology. Item 13. This was obtained from all aspects of my life experience. My experience working as a paramedic, flight instructor, fire captain, and personal life give me a lot of opportunity to use, and hone my decision making skills. Item 8. I obtained my aerodynamics knowledge from advanced CFI training, primarily my MEI. I also attained a lot of this knowledge through self study preparing for CFI students I have had.

Q24 Item 20. I obtained this knowledge starting with my instrument rating progressing through my CFI, and finally as a CFII. Item 21. I obtained this knowledge starting with my private pilot training progressing through all ratings obtained. In addition, as an instructor you constantly practice emergency procedures. As an MEI student and I constantly practiced emergency procedures. Item 19. This knowledge started in ground school learning how to plot a course and selecting landmarks. This knowledge continues to grow whenever I take a cross country flight.

Q25 Item 4. Initial ground school, video tape for instrument written, self study book and computer program for ATP written, articles in magazines about aviation weather,

aviation weather publications, and weather channel weather education specials. Item 17. Commercial pilot training, initial CFI training, and aerobatic training.

Q28 Item 12: because I have an excellent background in physiology from paramedic training. I go to medical continuing education where this knowledge is reviewed. With this good understanding, and in depth exposure it makes it easy to teach this information. Item 13. As a paramedic and fire captain I am forced to make critical decisions, under stressful situations every day. This experience of "being under the gun" helps me express the necessary step-by-step process of decision making to my students. Item 8. I study as much as I can about aerodynamics because it is interesting to me. Also, I have a lot of experience as a multiengine instructor and I had to teach a lot about aerodynamics related to multiengine airplanes to students.

Q29 I acquired this knowledge through numerous avenues. I use all life experience in developing my knowledge and skills to teach students to fly. I used self study, discussions with other instructors, experience, previous instructional experiences, notes from written preparation, videos, and CFI renewal courses.

Q30 Item 20. I have a lot of confidence in my instrument skills because of a good CFII when i did my training. I enjoy flying on instruments and carry over my enthusiasm in teaching instrument flying. I have a lot of actual instrument experience in various weather that carries over to my ability to teach basic instrument maneuvers. Item 21. My experience as a paramedic/fire captain, and pilot have given me the opportunity to function in actual emergency situations. Experience dealing with emergency situations, how to act during them, and the decision process during emergency situations give me the confidence and ability to teach emergency procedures. Item 19. My cross country flying experience gives me the confidence to teach cross country.

Q31 Training, practice, experience, actual use of these skills, studying.

Q35 I had difficulty passing my checkride, and it took two times. This made me less confident than I should have been.

Q36 Actually, looking back I should have been more confident in my ability when I first started as an instructor than I was.

Q37 I believe the training of CFI's today, compared to when I became a CFI is much better. I do believe with the current training and evaluation of CFI's they are prepared to produce competent private pilots.

Q38 CFI training could be improved if instructors would spend more time on instructional techniques and integrate them better with the flying CFI's do.

Q39 I have believed since my initial CFI training that as part of the training CFI students should watch another instructor on training flights. This would serve as in "internship" similar to other occupations. During this time the CFI student would observe the CFI/student relationship, and observe instructional techniques. When I was obtaining my initial CFI I asked if I could observe some training flights. This was very informative, and practical experience.

Q40 Improving training of private pilot students should include being up front with the student about the commitment they will need to make to their training.

Other Comments: Note: Regarding questions 19 and 20. Most of my instructor experience has been advanced ratings, so I have only signed off two private pilot students for checkrides.

ID# 57

Q23 1) Self study 2) self study & practice 3) aircraft ownership.
Q24 1) aircraft ownership 2) Frequent practice 3) Frequent practice.
Q25 Self study/periodicals.
Q28 1) Daily or weekly use 2) Aircraft maintenance 3) Experience - frequent.
Q29 Same as 28 plus articles and videos.
Q30 Skills/techniques used on every flight.
Q31 Same as 30 plus articles and videos.
Q35 N/A
Q36 I was prepared at the time, and continued to improve my teaching technique... Trying new approaches to lessons.
Q37 Yes.
Q38 I am comfortable with required training for CFI's. However, RECURRENT CFI training requirements only scratch the surface.
Q39 See 38
Q40 See 38

ID# 58

Q23 Practice - When I first started teaching I was scared of stalls till I went out with another instructor and practiced them.
Q24 Practice - review.
Q25 141 school.
Q28 I've been teaching for 11 years. I'm confident in all of it!
Q29 Experience.
Q30 Same as 28.
Q31 Experience.
Q35 When I started teaching I realized how much I did not know. My primary instructor was low time 300-400 hrs., so he did not have much experience. I felt I had been skipped on. My first 500 hrs of instruction given I felt like I had to relearn a lot (or learn for the first time.).
Q37 Yes. I'm glad the FAA is doing initial CFI rides and current rules I feel are adequate.
Q38 Confidence trainin with ability.
Q39 Pass a regulation stating all CFI's must go through 141 syllabus training private, instrumet and commercial. More structure at the beginning should help make better teachers. Instead of weekend warriors.
Q40 If a new or low time instructor is teaching a private pilot student, give the student two instructors. One high time with experience and the primary low time instructor. That way the low time instructor gets the experience and the student does not get skipped on. The student will be monitored and taught by a high time experienced instructor.

ID# 59

Q23 Teaching.
Q24 Teaching.
Q25 Reading.

Q28 Years of experience.
Q29 Many years of flying, enjoy teaching.
Q30 Knowledge and enjoyment.
Q31 Experience.
Q35 many years of flying & flight test work.
Q37 ?????
Q38 Stall spin training & cross wind usage.
Q39 Teach stalls and unusual position a pilot can get into.
Q40 Confidence in what an airplane can & cannot do.
Other Comments: #32: Airline flying, aerobatic competition, military test pilot.

ID# 60

Q23 Primary training (mine). Experience.
Q24 My primary training and experience.
Q25 Same as 23 & 24.
Q28 Easiest subjects, important subjects, repetition.
Q29 My primary training.
Q30 Repetition, easiest subjects, most important subjects.
Q31 My primary training and subsequent training.
Q36 I learned alot through experience that couldn't be obtained initially.
Q37 Yes.
Q38 I didn't like the requirement of lesson plans for initial training of CFI, when I almost never wrote out a lesson plan in actual teaching. The longer I teach, however, the more value I see in the pre printed lesson plans, like Jeppeson flight sylabus - It prepared CFI & student mentally for each lesson. The order of the lessons may change to suit weather conditions. For example, today's lesson may be power on stalls, but if its windy, I may opt to teach ground reference maneuvers, so the student can take advantage of the wind and see the main objective of the maneuver. Also, stalls or landings may not be appropraite for the student's present level of readiness if its a windy day. Also, I was expected to memorize the PTS for my initial CFI evaluation. Silly, isn't it? The book is easily carried along on a flight.
Q39 No comment.
Q40 Preprinted flight syllabus with procedures for each maneuver written out.

ID# 61

Q23 Experience - interest - training.
Q24 Experience - interest - training.
Q25 Same - This is bulshit (sic) to rate Hi/Lo on things that you don't feel weakness on.
Q28 Same
Q29 Same
Q30 Same
Q31 Experience - work - interest - survivability.
Q36 No.
Q37 Yes.

ID# 62

Q23 Self study& learned & A&P school.
Q24 From instructor (Flight).
Q25 Instructor (Flight).
Q28 Because of classes taken and confidence in knowledge of area of material.
Q29 A & P school and Flight Safety Int. training.
Q30 Knowledge in area covered and basicness of area.
Q31 From experience and instruction received from initial training and Flight Safety Int. training.
Q35 I felt that my knowledge in the areas being taught was enough but my lack of teaching experience was poor. It was difficult to become a good teacher with little training to be a teacher.
Q36
Q37 I think more empahsis should be placed on abnormal procedures. like radio loss, fuel problems, engine problems, electrical problems, icing and unplanned weather.
Q38 How to teach each potential CFI should be monitored during their first student. For example periodic checks on student to see if instructor is emparting knowledge needed.
Q39 As answered to 38 plus a CFI applicant should be trained by more than one instructor.
Q40 Having periodic checks by other instructors, more emphsis on abnormal procedures and when possible simulate training on abnormal procedures. Young pilots don't think it will happen to them.

ID# 63

Q23 My background with college in addition to my brother boys <?> a controller.
Q24 Repetetively doing over and over in this field.
Q25 CFI was an accellerated <?> school. I feel this hurt me.
Q28 Because of my personal knowledge.
Q29 University.
Q30 Because of their importance it is stressed & important.
Q31 Practice.
Q35 Your now to the right seat & make many mistakes on your own. Most CFI's only have around 300 hours. Not many skills at all.
Q37 No.
Q38 Recurrency should not be allowed for the weekend seminar course. Anybody can stay awake for two days but can they instruct.
Q39 Checkrides for recurrency.
Q40 Current system is good.

ID# 64

Q23 Self study.
Q24 Learned from teaching other students.
Q25 Self study.
Q28 Complete knowledge of subject matter.

Q29 Self study/practice.
Q30 Complete knowledge of subject matter.
Q31 Self study/practice.
Q35 Lack of ability to properly teach.
Q36 N/A
Q37 No.
Q38 More practical application (i.e. apprentiship, internship) prior to CFI approval.
Q39 See 38.

ID# 65

Q23 Good basic knowledge from civilian school, advanced knowledge from studies in aerospace engineering.
Q24 GOOD PRACTICE at civilian flight school on short, soft, windy runways and in congested traffic areas.
Q25 No areas considered inadequate. Preperation and training good in all areas to minimum levels. Less emphasis put on Physiology & Decision making & emergency procedures. However, coverage of these topics was adequate.
Q28 Knowledge base is very good. Skill is excellent in these areas. relaxed attitude is maintained.
Q29 Most fundementals in civilian schooling and self study while working on commercial and instrument ratings. I literally practiced teaching the ground school as I was also working on ground instructor rating. I simply read all referenced materail during training.
Q30 Good initial instruction. Good piloting skills. Confidence -> confidence.
Q31 Initial instruction and a "God given talent." From the first time I have read how to do a maneuver I could do it to desired completion standards. I have never had difficulty transitioning to different aircraft - tailwheel, glider, etc.
Q35 N/A
Q36 N/A
Q37 Yes, existing rules are adequate, provided we police ourselves and hold ourselves to our standards.
Q38 Just emphasis on professionalism and ethics.
Q39 Less emphsis on technology and more emphasis on basics.
Q40 Same as 39. Concentrate on fundamentals.

ID# 66

Q23 Military.
Q24 Civilian flight school.
Q25 Military & civilian schools.
Q28 Military experience.
Q29 Practical experience.
Q30 Practical experience.
Q31 Civilian schools.
Q35 Anxiety.
Q36 N/A

Q37 Yes.
Q38 Learning behaviors.
Q39 ?
Q40 Complete academics & pass FAA exam before flying more than 5 hours.

ID# 67

Q23 1. Military service & as a corporate pilot. 2. Prparing to teach aviation weather course. 3. Preparing to teach ATC course.
Q24 1. Military service, corporate operations, & flight instruction. 2. Experience in a variety of aircraft. 3. Experience & excellent instruction.
Q25 Primaryily self study & lack of emphasis by flight instructors.
Q28 See # 23.
Q29 Experience either as a pilot or instructor.
Q30 See #24.
Q31 See #29.
Q37 Yes.
Q38 Require more flight experience.
Q39 Honor military instructor status same as all CFI ratings. This will encourage more competent & experienced instructors to enter the field.
Q40 Make the CFI career field not just a way to build flight time. Need for dedicated instructors.
Other Comments: The FAA requirement for instructors to attend a revalidation course every two years is misguided. These courses, whether video or self study or seminar type, do little more than repeat areas on the CFI knowledge exam. New regulations should aim to require advanced knowledge beyond the basics, but on, perhaps, a four year cycle. The researcher is a weenie!

ID# 68

Q23 Most of my knowledge in these areas was obtained through self study.
Q24 Knowledge in these areas is mainly from my primary flight instruction.
Q25 These areas were not covered as much as the other areas while in ground school (at Oklahoma State) and in flight training (at SWO).
Q28 I feel confident in these areas because these are "basic" elements for instructing. These areas are stressed to students as well as in a BFR. I personally would always quiz someone on charts, airspace, and regulations during a BFR, but did not get into aerodynamics or physiology much.
Q29 Constant review and working with students and flight reviews.
Q30 Once again, confidence comes from lots of practice and lots of training in these areas.
Q31 Performance skills come from lots of practice and builds with experience.
Q35 "Fear of the unknown," once you actually start instructing you gain lots of confidence (and knowledge).
Q37 Yes!
Q38 ?
Q39 ?

Q40 From my own experience, my ground school & flight training were from 2 different sources. I would like to some more involvement of the ground school with the flight training. Also, too much emphasis on "passing" the written exam (memorizing questions) than "learning" the theory behind them. Comments:Good luck! (1987 O.S.U. Aviation Mgmt grad.)

ID# 69

Q23 Continued practice & use, initial interest was high.
Q24 Initial interest was high, was good at it.
Q25 Same places as rest of training but have not used these skills or practiced them regularly.
Q28 Same as #23.
Q29 Same as #24.
Q30 Same as #25.
Q31 Interest in them and repetition.
Q35 Confidence comes with repetition and as such, I did not have the time to teach.
Q36 N/A
Q37 Yes. The new CFI is usually highly motivated to improve and succeed.
Q38 Pay.
Q39 Giving the prospective CFI a hypothetical student with a problem & observe how he/she solves it.
Q40 Not current enough in field to comment.
Other Comments: General: Many people follow the route I did and it seems consistent and resonable, looking back. It encouraged me to know as much as possible about what I was responsible for teaching. It prompted me to continually assess my performance in personal flying. I am now an airline pilot and often find myself "coaching" fellow officers (I am a 727 captain) in systems and performance, etc. to encourage acquiring as much knowledge about aviation as possible. I do not think I would have that sense of responsibility if I had not been a CFI. Note: Although I only signed out 2 students I did have many initial students and did teach ground school (before certif. was required).

ID# 70

Q23 Instructing.
Q24 Instructing.
Q25 Previous training.
Q28 I teach it now.
Q29 Experience.
Q30 Have been teaching it at FSI for 3+ years.
Q35 Lack of experience.
Q36 More experience.
Q37 I don't feel qualified to say. I have not taught for years.
Q38 See #37.
Q39 See #37.
Q40 See #37.

Other Comments: Note: I do not teach private or commercial students at this time, only G-II/G-III initial ground and simulator & MD-11.

ID# 71

Q23 Self study.
Q24 Self study.
Q25 Self study.
Q36 The more I learn through experience, the more I realize I didn't know.
Q37 No.
Q38 All, specifically, those aspects of "teaching."
Q40 I feel very strongly that 40 hours are no where close to what should be required to cover the basics of SAFE private piloting.
Other Comments: Also, equally as important, CFI's motivated by "building hours" produce inferior students.

ID# 72

Q23 Self study.
Q24 Instruction and self study.
Q25 Self study.
Q28 Keep up with the material, continually review information.
Q29 Self study.
Q30 Understanding of material, student's ability to grasp concepts and perform lessons.
Q31 Instruction and self study.
Q35 Lack of experience; gaps in knowledge and understanding; flying skills less polished.
Q37 Not completely. Flight training is usually OK, but teaching skills are usually minimal.
Q38 People skills.
Q39 Improved study materials - particularly "Instructor's Handbook." Mentoring programs.
Q40 More emphasis on judgement skills.

ID# 73

Q25 Self study & research.
Q28 My students demonstrate mastery in each area after receiving instruction and supervised practice.
Q29 Through teaching the subject for 20 years.
Q30 Same answer as #28 above.
Q31 Combination of teaching and doing.
Q35 The PPASEL practical, written & aural exams contain too much material for any applicant to be GOOD on all pilot operations & I could not understand how all of this could be mastered in 40 hours (It can't). Moreover, at the time, I did not have a usable sylabus.
Q37 No! They are not.
Q38 CFII qualifications should require additional flight experience, pedagogical training,

and a college education.
Q39 New CFI candidates should have a student teaching experience under a mentor teacher using a structured sylabus.
Q40 The first certificate should be something like the recreational pilot certificate with reasonable limitations particularly on WX. This should then be followed by a full-up private certificate after add'l experience & training has been received.
Comments: Lastly - The profession needs a good and USEABLE sylabus - there are not many in common circulation. Good luch on your Ph&d.

ID# 74
Q23 Self study.
Q24 Civilian school.
Q25 Civilian.
Q28 Depth of knowledge coincides with confidence to teach.
Q29 Same as #23.
Q30 Same as #28.
Q31 Same as #24.
Q35 I had knowledge and SOME flying experience. I was 19 yeras old & had little TEACHING experience. I had confidence in my knowledge & flying skills, but knew I had much to learn as a CFI. I have learned far more AS a CFI than I did before I was a CFI. Being a CFI is the BEST learning experience.
Q36 N/A
Q37 Most rules are adequate. Only possible improvement - creation of opportunity to gain teaching experience prior to being CFI. i.e. Allow CFI applicants to do some student teaching with a CFI in the back seat.
Q38 Same as #38.
Q39 Same a #38.

ID# 75
Q23 Observing flights, ground school.
Q24 Practice in airplane with students (demonstrating).
Q25 Classroom, instructors.
Q28 Had an interest & wanted to learn better than others.
Q29 Practice flying and reading along with observing other students.
Q30 Same as 28 & 29.
Q31 Same as 28 & 29.
Q35 Had never done before, not sure of myself or my ability to teach.
Q36 N/A
Q37 Yes, although I don't agree with 14 day private pilot courses, instrument, commercial, etc.
Q38 The only way to improve is through experience & that requires time.
Q39 Pay the instructor better, well enough that good CFI's remain doing it.
Q40 -Have them be in ground school to prepare for written. -Have to fly at least three times/week. -Try and set up opportunity for observing other students from back seat. -require another instructor to evaluate student prior to taking checkride.

ID# 76

Q23 Self syudy, books tapes, experience, older & wiser CFI's.
Q24 Doing and studying.
Q25 Books, tapes, private school.
Q28 Self study, experience - stay on top of the latest books, theories, etc.
Q29 Self study, practice, experience.
Q30 I understand the basics well. I can tell students what mistakes to expect and how to correct for or avoid them.
Q31 Practicing, making mistakes, & learning to correct for them. Also becoming very failiar with student feelings.
Q35 Learning to "DO" and learning to teach are 2 very different things. In the begining I could perfrom, but wasn't sure I understood well enough. Also, until you have experienced several different students you can't be really sure what the common mistakes are, just what you have been told or read they are.
Q37-39 Yes, but this too depends on the person. I have met many new CFI's who were extremely good instructors right away, some who are NOT even after years of instructing. Some of the larger schools are producing good instructors who have no patience or understanding that not everyone wants to learn at the college "push" level, and not everyone will learn as quickly as they perhaps did. These students will possibly be good with some patience on the part of the CFI, or they may quit when they sense the frustration of the CFI.

ID# 77

Q23 Graduate coursework - Ohio State U.
Q24 Graduate coursework - OSU, Columbus, OH.
Q25 My strength in these areas is excellent - Realize <?> not true ???? <?>
Q28 Graduate coursework - PhD Science Ohio State
Q29 Graduate coursework - PhD Science Ohio State
Q30 Practice preparation - CFII; ATP; BGI; AGI; IGI; AeP; IA; Accident Prevention Spec.
Q36 Increase in knowledge , experience.
Q37 Reasonable.
Q38 Supervised practice teaching.
Q39 Frequent refresher seminars - flight reviews - mentors.
Q40 Couple private training & instrument competency. a) Stages of Proficiency - Level I Level II.

ID# 78

Q23 Experienced flight instructor and personal experience; Lots of sim and hood flying.
Q24 Practice, tips form other instructors.
Q25 My private training didn't emphsize systems; self taught; for emergencies my training included em procedures, of course, however, w/ the lack of emphasis on systems I felt inadequately prepared for actual systems failures to some degree.
Q28 Most experienced in these areas; re: charts - the info is there if you have any questions.
Q29 Experience & study.

Q30 Again, lots of takeoffs & landings helps one to be better able to teach: a good understanding of stalls from understanding it.
Q31 Asking questions; reading different books, experience.
Q36 After receiving CFI, I didn't immediately obtain and start teaching - 9 months later I did - time lapse hurt me.
Q37 It seems to work. Due to my own lack of #'s of students I study before each time I teach - perhaps with experience this is not necessary but I feel that I am more detail oriented in my instructor role which is better due to my lack of instrct experience.
Q38 Knowing that the person knows the material.
Q39 Encourages extensive studying of the material.
Q40 Genuine concern for the student's learning, not just concern for building your own time!

ID# 79

Q23 Military training.
Q24 Military training.
Q25 Military training.
Q28 Have taught it many times.
Q29 Military training.
Q30 Don't use them much.
Q31 Military training.
Q35 It is just different than training military pilots.
Q37 Yes.

ID# 80

Q23 Operational working for two different airlines//air taxi.
Q24 Same as #23.
Q25 Same as #23.
Q28 Experience & daily/routine use.
Q29 Practical - Employment with 2 airlines//air taxi.
Q30 Background knowledge.
Q31 Repetition.
Q36 Realize now after 30 years experience how little I really knew from a practical /this works approach.
Q37 Yes.
Q38 Training is much better now.
Other Comments: #33: Airline pilot/commercial pilot - real world experiences.

ID# 81

Q23 Read FAR's endlessly. Weight & balance was from classroom and previous math knowledge. I like maps so I looked at them a lot and studied the symbology.
Q24 Preflight was learned from a very thorough 1st flight instructor who happened to have a 99% recall rate from memory. Slow flight & stalls from classroom theory & lots of practice in the aircraft. Emergency procedures was from classroom & manuals.
Q25 I received training in these areas in my initial course work & flight training.

Q28 Corresponding to my answers to Quest 21 & 23; I felt confident because of a commanding knowledge in these areas.
Q29 Same as Q23.
Q30 I felt confident because I understood these areas and could perform them very well.
Q31 Through study and practice.
Q35 I was a new pilot with little experience and even though I had taken a CFI course I was not really a teacher.
Q36 As I gained experience as a CFI I found out how much I didn't know.
Q37 Not really. Especially in a 141 training facility you can go right from 0 time to CFI in a short time and not have much practical, real world experience. It is probably unrealistic, but I feel some experience before becoming a CFI would be useful.
Q38 I found my observation time as a student very valuable and I think it would be beneficial if a new CFI had to accumulate some (?) time observing an experienced CFI before they were allowed to instruct on their own.
Q39 As I stated in Q38 I believe some sort of apprenticeship would benefit all new CFI's. Also, if part of your training could be in instructing new students (like dental & beautician schools use humans to practice) with an experienced instructor to guide you.
Q40 I am not in favor of recreational pilots and I believe the minimums for a private pilot certificate candidate should be higher. In reality it is an exception for a student to go for the private check ride with less than 60 hours total!
Other Comments: Also, aside from the Part 141 and college aviation programs, it seems that very few people FAIL their checkride. At least in my area this was true. I used to think I could send my grandmother and she would pass.

APPENDIX D

FAA PHYSIOLOGY QUESTIONS

3844. Which statement best defines hypoxia?

A- A state of oxygen deficiency in the body.
B- An abnormal increase in the volume of air breathed.
C- A condition of gas bubble formation around the joints or muscles.

3845. Rapid or extra deep breathing while using oxygen can cause a condition known as

A- hyperventilation.
B- aerosinusitis.
C- aerotitis.

3846. Which would most likely result in hyperventilation?

A- Emotional tension, anxiety, or fear.
B- The excessive consumption of alcohol.
C- An extremely slow rate of breathing and insufficient oxygen.

3847. A pilot should be able to overcome the symptoms or avoid future occurrences of hyperventilation by

A- closely monitoring the flight instruments to control the airplane.
B- slowing the breathing rate, breathing into a bag, or talking aloud.
C- increasing the breathing rate in order to increase lung ventilation.

3852. Pilots are more subject to spatial disorientation if

A- they ignore the sensations of muscles and inner ear.
B - body signals are used to interpret flight attitude.
C- eyes are moved often in the process of cross-checking the flight instruments.

3853. If a pilot experiences spatial disorientation during flight in a restricted visibility condition, the best way to overcome the effect is to

A- rely upon the aircraft instrument indications.
B- concentrate on yaw, pftch, and roll sensations.
C- consciously slow the breathing rate until symptoms clear and then resume normal breathing rate.

3850. The danger of spatial disorientation during flight in poor visual conditions may be reduced by

A- shifting the eyes quickly between the exterior visual field and the instrument panel.
B- having faith in the instruments rather than taking a chance on the sensory organs.
C- leaning the body in the opposite direction of the motion of the aircraft.

3851. A state of temporary confusion resulting from misleading information being sent to the brain by various sensory organs is defined as

A- spatial disorientation.
B- hyperventilation.
C- hypoxia.

3835. Which technique should a pilot use to scan for traffic to the right and left during straight-and-level flight?

A- Systematically focus on different segments of the sky for short intervals.
B- Concentrate on relative movement detected in the peripheral vision area.
C- Continuous sweeping of the windshield from right to left.

3833. What effect does haze have on the ability to see traffic or terrain features during flight?

A- Haze causes the eyes to focus at infinity.
B- The eyes tend to overwork in haze and do not detect relative movement easily.
C - All traffic or terrain features appear to be farther away than their actual distance.

3849. What preparation should a pilot make to adapt the eyes for night flying?

A- Wear sunglasses after sunset until ready for flight.
B- Avoid red lights at least 30 minutes before the flight.
C- Avoid bright white lights at least 30 minutes before the flight.

3712. What is the most effective way to use the eyes during night flight?

A- Look only at far away, dim lights.
B- Scan slowly to permit offcenter viewing.
C- Concentrate directly on each object for a few seconds.

3713. The best method to use when looking for other traffic at night is to

A- look to the side of the object and scan slowly.
B- scan the visual field very rapidly.
C- look to the side of the object and scan rapidly.

3832. Large accumulations of carbon monoxide in the human body result in

A- tightness across the forehead.
B- loss of muscular power.
C- an increased sense of well-being.

3848. Susceptibility to carbon monoxide poisoning increases as

A- altitude increases.
B- altitude decreases.
C- air pressure increases.

APPENDIX E

EXCERPTS FROM T-37 JOINT SPECIALIZE

UNDERGRADUATE PILOT TRAINING

19 AF SYLLABUS P-V4A-A/J (T-37)

SYLLABUS OF INSTRUCTION

T-37 JOINT SPECIALIZED

UNDERGRADUATE PILOT TRAINING

APRIL 1995

19th AIR FORCE

DESIGNED FOR 19 AF COURSE USE

COURSE DESCRIPTION

1. **Course Title** — T-37 Joint Specialized Undergraduate Pilot Training

2. **Course Number** — P-V4A-A/J.

3. **Purpose** — To prepare graduates of this phase for the advanced phase of training and for future responsibilities as military officers and leaders. This training includes

   a. flying training to teach the principles and techniques used in operating high speed jet aircraft.

   b. ground training to supplement and reinforce flying training.

   c. officer development training to strengthen the graduates' leadership skills, officer qualities, and understanding of the role of the military pilot as an officer and supervisor.

4. **Duration** — 19 days preflight plus 90 flying training days (26 calendar weeks).

5. **Implementation Instructions** — Implementation instructions will be directed by separate letter or message.

6. **Status Upon Graduation** — Graduates of this phase have met the established course training standard, and are awarded a Certificate of Training (AF Form 1256) in accordance with paragraph 1.18.1, AFCAT 36-2223.

7. **Training Subjects**

   a. *Flying/Simulator Training.* No time has been identified for briefing, debriefing, or Cockpit Familiarization Trainer (CFT)/Simulator setup.

RECOMMENDED SORTIES/APPROXIMATE HOURS
(D-DUAL, S-SOLO)

(1) Primary

	CFT	T50	T-37
Basic	3/1.5 (D)	3/3.9 (D)	
Contact		3/3.9 (D)	26/34.1(D)
			5/5.3 (S)
Instruments		14/18.2 (D)	8/11.2 (D)
Navigation		1/1.3 (D)	5/7.2 (D)
Formation			6/8.2 (D)
TOTAL	**3/1.5**	**21/27.3**	**50/66.0**

(2) Intermediate (USAF)

Contact			3/3.9 (D)
			1/1.3 (S)
Low-Level			4/4.8 (D)
VFR Navigation			1/1.2 (D)
Formation			7/9.2 (D)
			2/2.6 (S)
TOTAL			**18/23.0**

(2) Intermediate (USN/USMC/USCG)

Low-Level Navigation			6/7.2 (D)
Intermediate Airways Navigation			6/8.4 (D)
Instruments			6/7.4 (D)
TOTAL			**18/23.0**

Figure 1 — Recommended Sorties/Approximate Hours

2

b. *Ground Training* *Hours*

(l) Academic Training

Introduction to CAI (IC)	1.0
Aerospace Physiology/Human Factors (AP)	51.5
T-37 Systems (AB)	23.0
Flying Fundamentals (AF)	15.5
T-37 Introduction to Aerodynamics (AC)	11.5
T-37 Instruments Part I (IM)	11.0
T-37 Instruments Part II (AI)	14.5
T-37 Academics for Navigation (AN)	17.0
Aviation Weather (WX)	18.0
T-37 Mission Planning (AX)	18.0
Aircraft Mishap Prevention (MP)	3.0
(2) Individual Ground Training Units (T-37 Phase)	33.0

c. *Officer Development*

(l) Orientation and Processing (OP)	19.0
(2) Officer Development	7.0
(3) Physical Training (PT)	88.0
Total Ground Training	331.0
d. *Course Total Approximate Hours*	448.8

ACADEMIC TRAINING

Instructor Requirements — Instructor pilots or contract instructors will instruct all academic units marked with an asterisk (*). Wing Safety Officers are responsible for teaching the Aircraft Mishap Prevention course.

ACADEMIC TRAINING LESSONS

INTRODUCTION TO CAI
(1 HOUR)

Lesson Number	*Medium*	*Title*	*Hours*	*Master Syllabus Prerequisite(s)*
IC0001	CAI	INTRODUCTION TO CAI	1.0	B0101

AEROSPACE PHYSIOLOGY (NOTE 1)
(51.5 Hours)

Lesson Number	*Medium*	*Title*	*Hours*	*Master Syllabus Prerequisite(s)*
AP0114	—	AP BLOCK I/DOCUMENTATION ONLY (NOTE 2, 6)	23.0 (5)	
AP0118	—	AP BLOCK II/DOCUMENTATION ONLY (NOTE 3, 6)	4.0 (1)	
AP0121	—	AP BLOCK III/DOCUMENTATION ONLY (NOTE 4, 6)	10.5 (1)	
AP0126	—	AP BLOCK IV/DOCUMENTATION ONLY (NOTE 5)	4.5	
AP0127	CR	COURSE REVIEW	1.0	AP0121 AP0126
AP0190	CR	EXAMINATION AND CRITIQUE	2.0	AP0127
AP0128	CR	AIRSICKNESS MANAGEMENT PROGRAM	0.5	
AP0129	CR	HUMAN FACTORS AND ACCELERATION	1.0	AP0190
AP0130	CR	COCKPIT/CREW RESOURCE MANAGEMENT II	4.0	
AP0290	CR	EXAMINATION AND CRITIQUE (CRM)	1.0	AP0130

NOTE 1 — Selected portions of this course are taught by enlisted instructors. Specific guidance is provided by AFI 11-403, *Air Force Aerospace Physiological Training Program* and by AETC Instructor guide P-V4A-A-AP-IG/ S-V8N-C-CAP-IG. Additional time is authorized in designated instructional units, as indicated in parentheses in the "Hours" column. This time must be allocated when scheduling large classes and should also be used to complete individual practice.

NOTE 2 — AP0101 through AP0104 and AP0111 must be completed prior to AP0112 and AP0113. Complete AP0101 through AP0113 prior to first T-37 sortie and update TRIM by annotating AP0114 as complete. The examination and critique may be administered without student(s) completing the chamber flight(s). However, chamber flight(s) deficiency must be documented and the student's flight commander must be notified.

NOTE 3 — AP0115 and AP0116 must be completed prior to AP0117. Complete AP0117 prior to graduation from Phase II. Make every effort to accomplish this training in Phase I. Update TRIM by annotating AP0118 as complete.

NOTE 4 — Complete AP0115, AP0116, AP0119 and AP0120 prior to first T-37 sortie. Update TRIM by annotating AP0121 as complete.

Lesson Number	*Medium*	*Title*	*Hours*	*Master Syllabus Prerequisite(s)*	

NOTE 5 — Complete AP0122 through AP0125 prior to first T-37 sortie. Update TRIM by annotating AP0126 as complete.

NOTE 6 — Hours listed per lesson are those required for one student to complete the required training. Additional time must be allocated when scheduling an entire class.

*T-37 SYSTEMS (23 HOURS)

AB0201	CR/MM	COURSE/INSTRUCTOR INTRODUCTION	0.5	IC0001	
AB0202	CR/MM	MAINTENANCE/PHASE DOCK VISIT (PART I)	1.0	AB0201	
AB0203	CAI	AIRCRAFT LIMITATIONS	0.5	AB0201	
AB0204	CAI	FLIGHT INSTRUMENTS (PART 1)	1.0	AB0203	
AB0205	CAI	FLIGHT INSTRUMENTS (PART 2)	1.0	AB0204	
AB0206	CAI	COMMUNICATION AND NAVIGATION SYSTEMS (PART I)	1.0	AB0205	
AB0207	CAI	COMMUNICATION AND NAVIGATION SYSTEMS (PART 2)	1.0	AB0206	
AB0208	CR/MM	INTERIM SUMMARY	1.0	AB0202	AB0207
AB0209	CR/MM	CANOPY/EJECTION SYSTEM	1.0	AB0208	
AB0210	CAI	ELECTRICAL SYSTEM (PART 1)	1.0	AB0209	
AB0211	CR/MM	ELECTRICAL SYSTEM (PART 2)	1.0	AB0210	
AB0212	CAI	J69-T-25 ENGINE (PART 1)	1.0	AB0209	
AB0213	CR/MM	J69-T-25 ENGINE (PART 2)	2.0	AB0212	
AB0214	CAI	FUEL SYSTEM (PART 1)	1.0	AB0209	
AB0215	CR/MM	FUEL SYSTEM (PART 2)	1.0	AB0214	
AB0216	CAI	HYDRAULIC SYSTEM (PART 1)	1.0	AB0211	AB0213
AB0217	CR/MM	HYDRAULIC SYSTEM (PART 2)	2.0	AB0216	
AB0218	CAI	AIR CONDITIONING, VENTILATION AND DEFROST SYSTEM	1.0	AB0211	AB0213
AB0219	CR/MM	MAINTENANCE/PHASE DOCK VISIT (PART 2)	1.0	AB0215 AB0218	AB0217
AB0220	CR/MM	COURSE REVIEW	1.0	AB0219	
AB0222	CAI	PRACTICE REVIEW EXAM (OPTIONAL)			
AB0290	CR	EXAMINATION AND CRITIQUE	2.0	AB0220	

*FLYING FUNDAMENTALS (15.5 HOURS)

AF0301	CR	COURSE INTRODUCTION	0.5	AB0290	
AF0302	CAI	TAKEOFF AND LANDING PERFORMANCE (PART I)	0.5	AF0301	
AF0303	CAI	TAKEOFF AND LANDING PERFORMANCE (PART 2)	0.5	AF0302	
AF0304	CAI	TAKEOFF AND LANDING DATA COMPUTATIONS (PART I)	1.0	AF0303	
AF0305	CAI	TAKEOFF AND LANDING DATA COMPUTATIONS (PART 2)	1.0	AF0304	
AF0306	CR	TAKEOFF AND LANDING DATA SUMMARY	1.0	AF0305	
AF0307	CR	AFTO FORM 781	1.5	AF0301	
AF0308	CAI	AERONAUTICAL CHARTS (PART 1)	1.0	AF0305	
AF0309	CAI	AERONAUTICAL CHARTS (PART 2)	1.0	AF0308	
AF0310	CAI	AIRSPACE	1.0	AF0309	

Lesson Number	*Medium*	*Title*	*Hours*	*Master Syllabus Prerequisite(s)*
AF0311	CAI	INSTRUMENTATION	1.0	AF0310
AF0312	CR	LOCAL AREA ORIENTATION/DISCUSSION	1.0	AF0311
AF0313	CR	REVIEW	2.0	AF0306 AF0307 AF0312
AF0390	CR	EXAMINATION AND CRITIQUE	2.5	AF0313
		***T-37 INTRODUCTION TO AERODYNAMICS (11.5 HOURS)**		
AC0401	CR	INTRODUCTION	0.5	AF0390
AC0402	CAI	BASIC DEFINITIONS AND THE PRODUCTION OF LIFT	1.0	AC0401
AC0403	CR	STALLS	1.0	AC0402
AC0404	CR	DRAG	1.0	AC0403
AC0405	CAI	TURNING PERFORMANCE	1.0	AC0404
AC0406	CR	T-37 SPINS	2.0	AC0405
AC0407	CAI	WAKE TURBULENCE	1.0	AC0404
AC0408	CAI	WIND SHEAR	1.0	AC0404
AC0409	CR	REVIEW	1.0	AC0406 AC0407 AC0408
AC0490	CR	EXAMINATION AND CRITIQUE	2.0	AC0409
		***T-37 INSTRUMENTS (PART 1) (11 HOURS)**		
IM0501	CR	INTRODUCTION	1.0	AC0490
IM0502	CAI	VOR MANEUVERS (PART 1)	1.0	IM0501
IM0503	CAI	VOR MANEUVERS (PART 2)	1.0	IM0502
IM0504	CR	SUMMARY	1.0	IM0503
IM0505	CR	VOR/DME MANEUVERS	1.5	IM0502
IM0506	CAI	HOLDING(PART 1)	1.0	IM0504
IM0507	CAI	HOLDING (PART 2)	0.5	IM0505 IM0506
IM0508	CR/CAI	REVIEW	2.0	IM0507
IM0590	CR	EXAMINATION AND CRITIQUE	2.0	IM0508
		***T-37 INSTRUMENTS (PART 2) (14.5 HOURS)**		
AI0601	CR	HIGH ALTITUDE APPROACHES	2.0	IM0590
AI0602	CR	LOW ALTITUDE APPROACHES	2.5	AI0601
AI0603	CR	FINAL APPROACH (NONPRECISION, NONRADAR)	2.0	AI0602
AI0604	CR	SUMMARY	1.0	AI0603
AI0605	CR	RADAR PATTERNS AND ILS/ LOCALIZER APPROACHES	1.0	AI0604
AI0606	CR	RADAR FINAL APPROACHES	1.0	AI0605
AI0607	CR	LANDING/MISSED APPROACH	1.0	AI0606
AI0608	CR	REVIEW	2	AI0607
AI0690	CR	EXAMINATION AND CRITIQUE	2	AI0608
		***T-37 NAVIGATION (17 HOURS)**		
AN0701	CR	INTRODUCTION	1.0	AI0690
AN0702	CAI	FLIP PUBLICATIONS (PART 1)	1.5	AN0701
AN0703	CAI	FLIP PUBLICATIONS (PART 2)	1.0	AN0702
AN0704	CAI	FLIP PUBLICATIONS (PART 3)	0.5	AN0703
AN0705	CAI	AFI 11-206 (CHAPTER 1 THROUGH 4)	1.0	AN0704
AN0706	CAI	AFI 11-206 (CHAPTER 5 THROUGH 6)	0.5	AN0705

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Lesson Number	*Medium*	*Title*	*Hours*	*Master Syllabus Prerequisite(s)*	
AN0707	CAI	AFI 11-206 (CHAPTER 7 THROUGH 8)	1.0	AN0706	
AN0708	CR	AFI 11-206 CHAPTER 8	1.0	AN0707	
AN0709	CR	SUMMARY	1.0	AN0708	
AN0710	CAI	AIR NAVIGATION COMPUTER (PART 1)	1.0	AN0707	
AN0711	CR	AIR NAVIGATION COMPUTER (PART 2)	0.5	AN0710	
AN0712	CAI	PERFORMANCE DATA CHARTS (PART I)	1.0	AN0710	
AN0713	CAI	PERFORMANCE DATA CHARTS (PART 2)	1.0	AN0711	AN0712
AN0714	CAI	PERFORMANCE DATA CHARTS (PART 3)	1.0	AN0713	
AN0715	CR	COURSE REVIEW	1.0	AN0709	AN0714
AN0716	CAI	OPTIONAL ICE-T REVIEW		AN0711	
AN0717	CAI	OPTIONAL REVIEW TEST		AN0714	
AN0790	CR	EXAMINATION AND CRITIQUE	3.0	AN0715	
		***AVIATION WEATHER (18 HOURS)**			
WX0801	CR	INTRODUCTION	0.5		
WX0802	CAI	BASIC AVIATION WEATHER (PART 1)	2.0	WX0801	
WX0803	CAI	BASIC AVIATION WEATHER (PART 2)	2.0	WX0802	
WX0804	CAI	BASIC AVIATION WEATHER (PART3)	1.0	WX0803	
WX0805	CR	AVIATION WEATHER HAZARDS (PART I)	2.5	WX0804	
WX0806	CR	AVIATION WEATHER HAZARDS (PART 2)	2.0	WX0805	
WX0807	CAI	WEATHER SERVICES (PART 1)	2.0	WX0806	
WX0808	CAI	WEATHER SERVICES (PART 2)	1.5	WX0807	
WX0809	CR	WEATHER SERVICES (PART 3)	1.5	WX0808	
WX0810	CR	REVIEW	1.0	WX0809	
WX0890	CR	EXAMINATION AND CRITIQUE	2.0	WX0810	
		***T-37 MISSION PLANNING (18 HOURS)**			
AX0901	CR	INTRODUCTION TO MISSION PLANNING	0.5	AN0790	
AX0902	CR	IFR MISSION PLANNING (PART 1)	3.0	AX0901	
AX0903	CR	IFR MISSION PLANNING (PART 2)	4.0	AX0902	
AX0904	CR	IFR PILOT PROCEDURES	2.0	AX0903	
AX0905	CR	VFR MISSION PLANNING (PART 1)	2.0	AX0901	
AX0906	CR	VFR MISSION PLANNING (PART 2)	2.0	AX0905	
AX0907	CR	VFR PILOT PROCEDURES	1.0	AX0906	
AX0908	CR	REVIEW	1.0	AX0904	AX0907
AX0990	CR	EXAMINATION AND CRITIQUE	2.5	AX0908	
		AIRCRAFT MISHAP PREVENTION (3 HOURS)			
MP4101	CR	HUMAN FACTORS	1.0		
MP4102	CR	AIR DISCIPLINE AND JUDGMENT	1.0	MP4101	
MP4103	CR	THE PILOT AND FLIGHT SAFETY	1.0	MP4102	

VITA

Stanley J. Alluisi

Candidate for the Degree of

Doctor of Education

Thesis: A SURVEY OF CERTIFIED FLIGHT INSTRUCTORS: SELF REPORTED ASSESMENTS OF DEPTH AND BREADTH OF KNOWLEDGE AND CONFIDENCE TO TEACH PRIVATE PILOT STUDENTS

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Specialization: Aviation and Space Education

Biographical:

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Professional Experience: United States Air Force Officer, 1981 - 1992. United States Air Force Weapons Director and Instructor Weapons Director, E-3A Airborne Warning and Control Systems (AWACS), Tinker Air Force Base, Midwest City, Oklahoma, 1981 - 1984; Navigator and Instructor Navigator, E-3A Airborne Warning and Control Systems (AWACS), Tinker Air Force Base, Midwest City, Oklahoma, 1985 - 1990; Chief of Navigator Training, Saudi Arabian Airborne Warning and Control Systems Technical Assistance Field Team, Riyadh Air Base, Riyadh, Kingdom of Saudi Arabia, 1990 - 1992

Professional Memberships: Phi Delta Kappa, Association of Old Crows, United States Naval Institute.