

COLLEGIATE AVIATION PROGRAMS AND THEIR
UNDER REPRESENTATION OF FEMALE
STUDENTS: A NATIONAL STUDY OF
THE PERCEPTIONS OF FEMALE
STUDENT PILOTS

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CHAPTER I

INTRODUCTION

Historically, the aviation industry has been dominated by males. While the percentage of female pilots has continually risen over time, they do not constitute a significant representation within the industry. The percentage of active professional pilot certificates held by women compared to men has only increased 0.45% over the last ten years (Federal Aviation Administration, 2008 Table 1 & Table 2). Despite governmental and industry policies which encourage females to join the aviation industry, women only constitute approximately 6% of FAA licensed pilots (Women in Aviation International, 2000). Furthermore, the number of female commercial pilots with an airline transport rating in the United States has remained at 3% during the past decade (1996-2006) (Women in Aviation International, 2006).

While females constitute a small percentage of the commercial pilot force, they comprise a large resource pool for the commercial aviation industry (Turney, Karp, Bishop, et al., 2002). Therefore, the commercial aviation industry can significantly increase the number of females seeking professional pilot careers if this trend of under representation can be reversed. In addition, an increase in females seeking flight careers could increase the talent pool for the industry.

The under representation of female pilots is an important issue that the aviation industry needs to research and study. A starting point for research on the under representation of female pilots can be collegiate flight programs where future pilots are typically introduced to the aviation industry. Because collegiate flight programs are a common starting place for the introduction of pilots to the aviation industry, this environment is a logical place to begin exploring the under representation of women pilots in the aviation industry. Because the collegiate flight program is the beginning of the journey for many pilot careers, any lessons that may be learned regarding the under representation of women in collegiate flight programs can be applied to solving the same issues throughout the industry. If collegiate flight programs have the capability to improve enrollment and retention rates of female flight students, this can have a ripple effect throughout the industry and will help increase the involvement of women pilots throughout the aviation industry.

Statement of the Problem

As the representation of female pilots in the aviation industry remains relatively low, the likelihood of negative perceptions toward female flight careers may exist within the aviation industry. In male dominated fields of employment, sex-stereotyping often exists, creating barriers for women which often operate in ways that limit their employment and advancement possibilities (Foster 2003). As female pilots continue to face negative perceptions within the aviation industry, they may continue to be reluctant to pursue related careers within the aviation

community. This has the potential to create repetitive cycles leading to continued limited representation of female pilots in the aviation industry. This is a serious problem that needs to be researched in order for the aviation industry, including collegiate flight programs, to understand and reverse the cycle of under representation of female pilots within the aviation industry.

Purpose of the Study

Current literature has not explored female pilot perceptions regarding the circumstances responsible for the under representation of females in collegiate flight programs. In order to identify the barriers and other possible issues that propagate the under representation of females in collegiate flight programs, this research initiative will focus on female flight students' personal perceptions of their collegiate aviation programs.

The total number of women professional pilots has remained somewhat stagnant, rising from 12,246 pilots in 2002 and increasing by only 61 pilots, to 12,307 in 2006. Women have remained underutilized and underrepresented as professional pilots in the United States air carrier industry (Bovier, 2000).

Soliciting the perceptions of female flight students regarding existing barriers and other issues that contribute to their under representation in collegiate flight programs could provide insights for addressing the problem. As a result, the collegiate flight programs could implement changes to counteract these identified barriers or biases and encourage increased representation of females within their flight programs; and ultimately, industry-wide.

Research Questions

In order to achieve the purpose of this study the following research questions were formulated to guide this study:

- Do female flight students believe the under representation of females should be a concern for their collegiate aviation program?
- Do female flight students believe negative remarks and or biases due to gender exist in their collegiate aviation program? If so, do these gender barriers and biases affect female retention within their collegiate aviation program?
- Do female flight students believe academic incentives (scholarships and internships) specific to females are adequate within their collegiate aviation program?
- Do female flight students believe their collegiate aviation program employs a sufficient number of female professionals (faculty, flight school personnel, CFI's)?

Significance of the Study

If the trend of under representation of females in collegiate flight programs remains unchanged, women will continue to account for a diminished role within the aviation industry. Furthermore, if this trend of under representation continues, women could be even more reluctant to pursue pilot careers within the aviation industry. However, if this trend can be reversed, the potential increase of college-aged females trained for the aviation industry could result in significant growth of untapped resources and increase the overall quality of individuals employed within the industry.

The findings of this research study have the potential to benefit the aviation industry as well as the female flight students who participated in the study. The information gained by this research initiative can be used as a

springboard to facilitate further discussion and provide the collegiate aviation community an avenue to address areas of concern related to the under representation of female aviation students in their flight programs. The aviation industry could benefit as well, as they become more knowledgeable of the issues and concerns facing female flight students and their collegiate flight programs.

Definition of Terms

This section provides a definition of terms that have been used throughout this study.

A&P: Airframe and Power plant, license required by the Federal Aviation Administration to maintain and repair commercial aircraft. The “A” stands for airframe and the “P” stands for powerplant.

ATP: Airline Transport Pilot, one who is licensed to be the pilot in command for an airline, corporate flight department, or charter operator. ATP licenses are usually required for insurance reasons for those responsible for the safety and well being of those aboard the aircraft.

Aviation Industry: Any business or commercial activity that is directly related to or involves aviation.

Chief Flight Instructor: A Certified Flight Instructor who is superior to all other flight instructors and is responsible for the management and leadership of the employed flight instructors.

CFI: Certified Flight Instructor, one who is licensed to instruct flight training to a student pilot.

Collegiate Flight Program: Aviation flight programs located within four-year public and private universities and or two-year public and private colleges offering comprehensive aviation curricula, and awarding either associate or bachelor degrees in aviation disciplines.

Collegiate Director / Manager: Administrator responsible for oversight of the flight operations and flight department of a collegiate flight program.

Commercial Aviation: The operation of aircraft for financial gain by transporting goods or passengers for a fee.

Commercial Pilots: Individuals operating aircraft for financial gain by transporting goods or passengers for a fee.

CPT: Civil Pilot Training, a training program that existed from 1938-1944 sponsored by the United States government to increase the number of civilian pilots for military preparedness.

FAA: Federal Aviation Administration, governmental division within the Department of Transportation that is responsible for the regulation and implementation of safety for the civil and commercial aviation industry.

FAR: Federal Aviation Regulation, rules authored by the Federal Aviation Administration (FAA) that govern all aviation activities that take place within the United States.

Female Flight Student: A woman enrolled and actively participating in flight training at a collegiate flight program.

Professional Pilot: A pilot who holds a current Commercial or Airline Transport Pilot certificate from the Federal Aviation Administration.

UAA: University Aviation Association, a professional association and unifying voice for promoting and furthering aviation education as a collegiate academic discipline within the United States.

WAI: Women in Aviation International, a nonprofit organization founded in 1994, dedicated to the encouragement and advancement of women in all aviation career fields and interests.

WASP: Women's Airforce Service Pilots, program that used female pilots to perform peaceful military flight duties in place of male pilots that were engaged in the war effort during World War II.

Assumptions of the Study

This research was limited to female flight students that were receiving flight training at collegiate flight programs. This research study did not survey female students receiving flight training from non collegiate training resources such as non degree awarding or military flight training programs.

This research study assumed that the managers and directors of the collegiate flight programs would only administer the research instrument to undergraduate female aviation students that were currently enrolled in flight training, and not enrolled in other aviation degrees such as aviation management, maintenance, safety, security, avionics, etc.

The research study assumed that the participating female flight students would answer the research instrument honestly without any influence, actual or perceived. In addition, this research study assumed that the female flight

students would answer the research instrument honestly without feeling pressured to present their flight program in a positive manner.

Limitations of the Study

Limitations were based on the voluntary participation of the managers and directors of each collegiate flight program asked to participate in this study. Due to the laborious responsibility of administering the research instrument to every female flight student enrolled in their flight program, the managers and directors could decide not to participate in the study.

The logistics and convenience of gathering all female flight students in one meeting time and place to administer the research instrument may have imposed limitations on this study. It is likely that results were not received from some female flight students that were unable or unwilling to attend the meeting.

This study may also have a limitation due to the reluctance of the respondents to accurately detail any type of bias or barriers that may exist while in the presence of the flight program manager or director. Since the research instrument was administered to the female flight student by the manager or director of the flight program, there may be pressure, actual or perceived, on the flight student to portray their flight program in a more positive light than the actual conditions.

If biases or barriers did exist the female flight student could also feel pressure, actual or perceived, from other students (male or female) enrolled in the flight program. The respondent may have felt pressure to not acknowledge

any negativity, bias, or barriers in fear that additional or increased biases or barriers might be a result of “complaining” of these issues. Respondents may have the tendency to feel accountable to other female students if additional biases or barriers are created.

Similar pressure may also have been felt or perceived by respondents from students or staff enrolled or employed at the flight program. These students or staff may fear that acknowledgment of any biases or barriers may result in disciplinary actions. Therefore female flight students may have felt pressured not to acknowledge the existence of negative biases or barriers that could result in any type of disciplinary action.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to provide a review of the relevant literature related to the under-representation of female flight students enrolled in collegiate flight programs and the aviation industry. Topics covered within this chapter include: Historic Role of Women in Aviation, Professional Organizations Promoting Women in Aviation, Female Gender Biases in Aviation, Female Representation in Professional Aviation, Pilot Shortage, Collegiate Flight Programs, Collegiate Flight Programs Professional Relationships, and Collegiate Aviation Scholarships.

Historic Role of Women in Aviation

Women who have chosen aviation as an interest or career historically have been risk takers in both their careers and their lives. Throughout history many aspiring female pilots have been turned away from the hanger doors, while many others have found their efforts sabotaged by male pilots who felt compelled to guard their turf. Sand was dumped in gas tanks of aircraft piloted by females, brake lines were severed, and other dangerous tricks were played in an effort to keep women from conquering the sky (Welch 1998). Despite these deterrents, many brave women broke these barriers to achieve their dreams of flight. Often

the personal determination and passion to conquer the sky is what helped to motivate female flyers. Jerry Cobb, the first woman to qualify for space travel, summarized her passion for flight with the following statement: “For everything there are beginnings and endings, tops and bottoms, sides or limits. Only two things can we conceive of as infinite: God and the sky. I find one in the other” (Cobb, & Rieker, 1963).

As with all historical timelines, the role women first played in the progression of aviation is marked by numerous firsts. The first woman to design and build an aircraft was E. Lillian Todd. Her 1906 design would become known as the Aeroplane. Todd was never granted permission to pilot her new craft, so she could only display the Aeroplane at aero shows for several years. The Aeroplane would eventually complete a successful test flight, piloted by a man, at the Garden City Aviation Field in 1910 (Model Aeroplanes, 2006).

In 1910, Blanche Scott would be the first female to pilot an aircraft (Lebow, 2002). After receiving instruction from the famed aviator and aircraft builder Glen Curtiss, Scott achieved solo flight on September 2, 1910 (Blanche Stuart Scott, 2000). Also in 1910, Raymonde de Laroche would be the first woman in the world to receive a pilot’s license (Raymonde de Laroche, n.d.). After setting numerous speed and altitude records, Laroche died in an aircraft crash in 1919. In response to a comment that flying was a dangerous occupation for women she replied, “Most of us spread the hazards of a lifetime over a number of years. Others pack them into minutes or hours. In any case, what is to happen, will

happen...It may be that I tempt fate too often, but it is to the air that I have dedicated myself and I will fly always without the slightest fear” (Welch, 1998).

In 1911, Harriet Quimby became the first woman in the United States, and thirty-seventh person in the world to earn a pilot license (Simons, & Withington, 2004). Quimby was one of only two females to receive her pilot’s license in 1911. The following year, Quimby would attend air meets and compete in cross-country races. In 1912, she would be the first woman to cross the English Channel, completing the flight in 59 minutes piloting her Bleriot monoplane (Koontz, 2007).

Katherine Stinson invested \$500 to earn the fourth United States pilot license to be awarded to a female in 1912 (Cadogan, 1993). Stinson would eventually be awarded the first airmail route in Canada connecting Calgary to Edmonton, earning her the title of the first female airmail pilot (Katherine Stinson, 2000). When asked if she was afraid when flying Stinson responded, “Fear, as I understand it, is simply due to lack of confidence or lack of knowledge – which is the same thing” (Welch, 1998).

African American woman Bessie Colman, facing both race and gender discrimination, found the door locked at flight schools disallowing her to pursue her dream of flight in the United States. She decided to study the French language so she could travel to Paris where she could receive pilot training. After completing her pilot training and returning to the United States in 1921, she became the world’s first African American licensed pilot (History of Women Pilots, 2007).

Among the most famous fliers, Amelia Earhart used her influence to promote aviation and spread aviation propaganda to the general public (Millbrooke, 2006). Born in 1897, she was an aviation pioneer, author, and aviation record holder (Bilstein, 1994). Earhart is credited as being the first woman to fly solo across the Atlantic Ocean in May 1932. Her flight departed from Newfoundland lasting nearly 15 hours until she landed in rural Ireland (Long & Long, 1999). Tragically, in her record attempting around the world flight in 1937, she would be lost at sea, presumably as a result of fuel starvation after completing more than three-quarters of the scheduled world flight (Millbrooke, 2006).

In 1934, Central Airlines broke the historic precedent of hiring only male pilots and hired the first female pilot, Helen Richey. Richey became the first woman to pilot a commercial airliner on a regular scheduled route. She made her first flight as a pilot on December 31, 1934, piloting a Ford Tri-Motor from Washington to Detroit (Holden, 2001). In 1935, to Richey's disappointment, the male pilots union rejected her application for union membership. Because she was a woman, Central Airlines would not allow her to fly in bad weather. After 10 months she resigned, saying she was not going to be restricted to being a fair-weather pilot. Richey only flew approximately a dozen round trips. Unable to find a flying job, Richey became depressed. On January 7, 1947, she made headlines for the last time when she was found dead of an apparent suicide. It seems there were too many veteran male pilots and no one wanted a female pilot, or so she thought (Holden, 2001).

Jacqueline Cochran lived a storied life with numerous contributions and advancements to the field of aviation and for the advancement of female participation in aviation. Cochran began her flying endeavors in 1932 as a means to reach more clients geographically for her cosmetics business. She would go on to organize and lead the Women Airforce Service Pilots (WASP) during World War II, earn the coveted Harmon Trophy for the most outstanding woman pilot of the year in 1937, and accomplish more than 250 speed, altitude and distance records (Welch, 1998). In 1953, Jacqueline Cochran became the first female pilot to break the sound barrier aboard her F-86 Saberjet (Rich, 2007). Cochran, with her trainer Chuck Yeager flying along her side, averaged 652 mph over Rogers Dry Lake, California (Long, 2007).

Geraldine Mock became the first woman to fly around the world from March 19 to April 17, 1964 (Holden, & Griffith, 1993). Mock, aboard her Cessna 180 named Spirit of Columbus, completed the task Amelia Earhart had attempted 27 years previously (Haynsworth, & Toomey, 1998). Mock's 23,000 mile, 29 day trip, offered the opportunity to visit local dignitaries along the route promoting her venture. Much of the trip was funded through the daily editorials Mock submitted detailing her adventures. The flight awarded Mock numerous aviation records including: first woman to fly both the Pacific and Atlantic, first woman to fly the Pacific in both directions, and the first woman to fly the Pacific in a single engine plane (Welch, 1998).

Emily Warner in 1973 became the first female to be employed as an Air Transport Pilot by an airline operating jet powered aircraft (Douglas, 2004).

Warner would go on to become the first female captain for a scheduled United States air carrier in 1976, piloting for Frontier Airlines. Warner's 1973 pilot's uniform is now displayed at the Smithsonian National Air and Space Museum (Wise, & Witvliet, 2000).

Professional Organizations Promoting Women in Aviation

In addition to these numerous contributions and achievements by individual female aviators, there has also been a great deal of contribution to the ability and success of women in aviation from several notable groups including: the Ninety Nines, Women Airforce Service Pilots, and Women in Aviation International.

The Ninety Nines is a non-profit international organization of over 5,500 licensed women pilots from 35 countries. Founded on November 2, 1929, the 99 charter members wanted to assemble American female pilots for mutual support and advancement of aviation (Who are the Ninety Nines, 2007). Each year, local Ninety Nine chapters sponsor several hundred educational programs, including aerospace workshops for teachers, airport tours for school children, fear-of-flying clinics for airline passengers, and flight instructor revalidation seminars. The Ninety Nines also co-sponsor more than 75% of the FAA pilot safety programs in the United States. Additionally, Ninety Nines members have worked with the National Intercollegiate Flying Association's student flying competitions since 1948 as judges, runners, and teachers, as well as with funding contributions.

More recently, the Ninety Nines became sponsors for the Girl Scouts of America offering a merit badge for aviation (The Ninety Nines, 2006).

While encountering discrimination, the extraordinary women of the Women Airforce Service Pilots (WASP) explored new opportunities and opened new doors for women in military aviation and space exploration by exchanging their traditional roles to become civilian air pilots for the United States military during World War II (Cornelsen, 2005). From the onset, male pilots often resented women's presence in a traditionally male military setting. Many WASP pilots experienced incidents of bias from men who refused to acknowledge their ability, but as the need for male combat pilots became more urgent, the opportunities for female aviators to travel new paths in military aviation greatly increased (Elderkin, 2001).

Female WASP pilots ferried aircraft from factories to military bases, flew transport flights, towed aerial targets for practice exercises, tested aircraft in flight, and provided flight instruction to student pilots, male and female (Millbrooke, 2006). The WASP program is credited with introducing an extraordinary number of females into aviation, and for being an inspiration to future women pilots (Thaden, 2004). Unfortunately, it was not until 1977 that the United States Congress passed legislation that granted veteran status to the women who had served in the WASP program during World War II (Douglas, 2004).

While the WASP program was the largest and most popular of its kind, there were other United States women military flying organizations that

performed similar services as the WASP. These included: Women's Army Auxiliary Corps (WAAC), Women's Army Corps (WAC), Women's Appointed for Volunteer Emergency Services (WAVES), Women's Flying Training Detachment (WFTD), and the Women's Auxiliary Ferry Squadron (WAFS) (Bilstein, 1994).

Women In Aviation, International (WAI) began in 1990 and was formally established in 1994 as a nonprofit organization dedicated to the encouragement and advancement of women in all aviation career fields and interests. WAI membership of over 15,000 includes; astronauts, corporate pilots, maintenance technicians, air traffic controllers, business owners, professional organizations, educators, journalists, flight attendants, high school and university students, air show performers, airport managers and many others.

Current WAI membership is comprised of 73% Individual (Professionals/Enthusiasts), 21% Student (High School/University/College), 4% International (Overseas Residents), and 2% Corporate (Organizations/Corporations) (About WAI, 2007). WAI offers many member benefits that include: Aviation for Women publication, annual and regional conferences, government and industry representation, education outreach programs, and scholarship assistance for various aviation fields (About WAI, 2007).

WAI indicates that scholarship awards are a major part of what Women in Aviation International is all about. Over the past 10 years WAI has awarded more than \$4.5 million to its members, including females in collegiate flight programs,

to help them get ahead and advance into the aviation and aerospace careers they have always dreamed about (Education, 2007).

Female Gender Biases in Aviation

As indicated earlier in this chapter, the role of women in aviation can be traced back to the very beginning of flight. Seemingly as long, female aviators have also had to defy social prejudices and biases in their aviation pursuits and accomplishments. The famed female flyer Amelia Earhart once said “Men do not believe us capable, because we are women, seldom are we trusted to do an efficient job” (Moolman, 1981). This gender bias against female aviators is echoed and confirmed by the famed Charles Lindbergh. While visiting the Soviet Union in 1938, Lindbergh observed the Soviet female combat pilot program Night Witches and had the following remark: “I don’t see how it can work very well. After all, there is a God made difference between men and women that even the Soviet Union can’t eradicate” (Moolman, 1981).

When the airplane was invented, the societal makeup was male dominated. This masculine gender gap continued through the beginnings of commercial aviation in the 1920s up until the present decade. While the masculine influence of society has changed considerably since the invention of the airplane; isolation, sexism, and harassment are still being experienced by female pilots (Wells, 1998).

In the early years of aviation, like all pilots, female pilots risked their lives each time they flew these early fragile aircraft. Often when men would die in

aviation accidents it was thought to be bad luck, but in the case of female flyer Harriet Quimby's death in 1912, the sentiment of the general public was quite different, concluding that Quimby's fatal accident proved that women could not fly (Yount, 1995). As these biases continued, aircraft companies in the 1930s exploited women pilots to their advantage. Aircraft companies hired women pilots as demonstrators, hoping their customers would believe that if a woman could fly their plane, anyone could (Chambers, 1984).

It was not until the inception of the Women's Airforce Service Program, and many others like it, that the involvement of women greatly increased when these organizations placed female pilots in the cockpit due to male pilot shortages during World War II. This increasing need for women pilots due to the shortage of available male pilots, helped to greatly increase the exposure and acceptance of the female pilots (Rich, 2007). Up until this point, the most prominent jobs occupied by women in the aviation industry were comprised of flight attendants, ticket agents, reservation clerks, and other service personnel (Roberts, 1994).

The prolonged success of the WASP program proved that women could operate combat aircraft safely and successfully; and it further showed that women were as capable as men in the rigorous responsibilities of piloting a multitude of complex combat aircraft. In addition, it proved that while piloting every United States aircraft during World War II; the WASP female pilots had as few or fewer accidents or incidents as their male counterparts (Douglas, 2004).

While female representation within the aviation field has increased throughout history, female pilots are still under-represented. The profession of airline pilot is among the most sex-stereotyped male dominated occupation. Airline pilot is comparable to the female dominated, sex-stereotyped occupations of secretary and hairdresser (Miller & Hayward, 2006). Due to the imbalance of female to male professional pilots and the gender stereotypes of pilots, the occupation of professional pilot carries overwhelming masculine perceptions (Bateman, 1987).

This masculine culture creates an environment where discrimination and gender bias is common; and where women in aviation careers face longer lasting discrimination than women in more gender neutral careers. Airline representatives often take the view that female pilots had been accepted easily and quickly by traditional male chauvinist airlines (Davey & Davidson, 2000).

There is evidence that as the number of female pilots increase in the United States air carrier industry, so does the resentment from competing male pilots. Some male pilots believe that hiring practices at some airlines have bred resentment among some of their male counterparts as they believe women are sometimes accepted with less experience than competing males; which seems unfair to male pilots who may be passed over for employment for someone with less experience (Smith, 2005).

To overcome these oppositions, women pilots have to develop an extraordinary degree of persistence and self-confidence (Yount, 1995). Some female pilots have adapted to this masculine culture by laughing off sexist jokes

or socializing with the boys and feeling as if they have to perform far beyond that of males (Davey & Davidson, 2000). As stated by famed German pilot Hana Reitsch, “culture puts barriers in the paths of women who endeavor to succeed. When one excels in a repressive culture it is remarkable” (Piszkiwicz, 1997).

Female Representation in Professional Aviation

Women have remained underrepresented and underutilized as professional pilots in the United States air carrier industry. The most current data on active airmen certificates was obtained from the Federal Aviation Administration Civil Airmen Statistics website. In 2006, there were a total of 259,363 professional pilots in the United States. Of these 259,363 active pilots, only 12,307 were female, equaling a female pilot representation of only 4.7% (Federal Aviation Administration, 2008 Table 1 & Table 2).

While this percentage represents an increase from 4.5% in 2002, the total number of female professional pilots has only increased a total of 61 female pilots from 12,246 in 2002 to 12,307 in 2006 (Federal Aviation Administration, 2008 Table 1 & Table 2). This indicates that the number of active female professional pilots has remained fairly consistent since 2002, while the number of male professional pilots have dropped significantly over the period from 270,628 in 2002, to 259,363 in 2006 (Federal Aviation Administration, 2008 Table 1). This decreasing number of pilots can be attributed to two factors. First, the decrease is due to the high number of Vietnam War Era trained pilots that are retiring from the industry. The second reason is due to the high costs that are associated with

required flight training. It costs aspiring pilots approximately \$100,000 to complete the required training at collegiate flight programs, which is the primary cause for the current aviation staffing shortages that are beginning to be experienced by the United States airlines (Rodgers, 2008).

Women make up only 2% of all United States airline captains and constitute approximately 6% of commercial copilots and flight engineers jobs in the United States. Since the introduction and involvement of women in the United States air carrier industry is an increasing and fairly recent phenomenon, most female pilots in the United States aviation industry hold little seniority compared to their male colleagues. And due to the overall lack of seniority in the industry, women more often fly commuter hops and cargo trips than transcontinental or international flights (Rodojcic-kane, 1999).

Most United States airlines will publicly acknowledge they seek female and minority pilots; however, few will release the actual number of female pilots that are currently employed. But many airlines publicly promote their bridge collegiate programs for hiring pilots. While many airlines have implemented these collegiate aviation bridge programs, others have dedicated the focus of their bridge programs to seek the employment of female and minority pilots.

Delta Airlines and Western Michigan University are actively attempting to alleviate the shortage of female and minority pilots by initiating a bridge program that actively recruits female and minority pilots. With the support of \$1.65 million from Delta Airlines, Western Michigan University started to train as many as 40 women and minority pilots. Once pilot training is completed these new pilots were

given priority employment considerations from Delta Connection carrier Comair (Armstrong, 2001).

In 2008, JetBlue Airways created the Aviation University Gateway, a career-planning and mentoring program designed to identify and recruit talented men and women into the professional pilot ranks. Through academic training and regional airline experience, the JetBlue Aviation University Gateway creates a career path for aspiring pilots beginning early in an aviator's college career and culminating in the possibility of a final interview at a major airline. JetBlue has partnered with collegiate aviation programs at Embry-Riddle Aeronautical University and the University of North Dakota to fill the Aviation University Gateway's pipeline with candidates for potential professional pilots (JetBlue Airways, 2008).

The continued growth of the air transportation industry combined with large numbers of anticipated retirements of airline pilots in the foreseeable future is causing professional pilot shortages throughout the industry (Bovier, 2000). As air transportation increases in popularity with the high projected number of pilot retirements expected in the next few years, there will be a need for an increasing number of pilots (Hedden, 2000). The reason for this concentration of retirements expected in the next few years has to do with the timing of training for the current professional pilot force. A large percentage of the current pilots were trained in the United States military during the Vietnam War era (Mark, 1999).

In order to meet the future pilot replacement demands of the air carrier industry an increased number of pilots must be introduced into the industry over

the next few years. Women can contribute a significant role in this pilot shortage. While women constitute 40% of the total United States workforce, they only contribute less than 5% of all the professional pilot positions in the United States air carrier industry (Bovier, 2000). A significant increase in female professional pilots would help to solve the increasing demand of pilots and the increasing number of pilots retiring.

Pilot Shortage

The United States air carrier industry is currently dealing with an increasing issue of pilot shortage. This industry wide shortage of pilots will have far reaching effects throughout the industry that will remain an issue for the conceivable future. According to the latest figures, there are approximately 1.2 million pilots worldwide, most of whom hold a private or commercial license. Only 14% hold the professional Airline Transport Pilots license (Associated Press, 2008). The shortage of pilots is putting less experienced pilots at the controls of passenger aircraft, forcing airlines to cancel flights and recall older pilots that have been retired (McCartney, 2007).

Currently, less than 30% of pilots hired by the airlines come from the military; which historically has yielded the most highly qualified candidates. Furthermore, fewer students are transferring to the airlines from collegiate flight programs due to extremely high tuition and associated flight costs (Michels, 2008). To further complicate this problem, the days of a 747 captain working 12 days per month receiving \$350,000 per year are forever gone. But there is still a

potential for a salary of approximately \$150,000, if the pilot is willing to stay with the same airline for 15 to 20 years (Philips, 2006).

Today, there is a tremendous shortage of pilots on the lower levels of the United States air carriers operating regional jets, as most notably indicated by the hiring criteria. Most regional airlines have lowered their experience level requirements for newly employed pilots, while some are struggling to find employed pilots that have enough hours to serve as Captains (McCartney, 2007). Not long ago, major carriers like American Airlines were requiring minimum flight experience of 1,500 hours, with an additional 500 hours of multi-engine experience. American has now lowered these requirements to 1,000 flight hours and 100 hours of multi-engine experience. But in reality recent college graduates are accepting pilot jobs that are often much lower than these stated minimums (Philips, 2006). Many aviation experts fear that lowering the minimum required amount of flight experience will create an unsafe environment where pilots with little actual experience may be required to react to emergencies.

In 2007, the Federal Aviation Administration altered the mandatory pilot retirement requirement of age 60. Pilots are now allowed to continue employment as air carrier pilots until the age of 65. Commercial airline pilots have argued for years that the mandatory retirement at age 60 forced physically and mentally capable pilots out of the cockpit. But many aviation industry experts believe the real reason for the additional five years is to give airlines an additional five years to retain their most senior pilots (McCartney, 2007).

The two methods of retaining or introducing additional pilots (lowering minimum flight time requirements and extending the mandatory retirement age) will help to alleviate the growing pilot shortage; but there are also associated risks that must be considered with these two changes. There are several studies that have demonstrated a U-shaped curve as it relates to pilot accident rates. Data has shown that accident rates tend to be higher for less-experienced pilots and for older pilots as well. This presents a potential hazardous environment within the United States air carrier industry (Craver, 2007).

Collegiate Flight Programs

Traditionally, there have only been two ways to become a commercial airline pilot. Individuals may join the military where they will receive military flight training and experience. And once their military obligations have passed, they can enjoy a career in the air carrier industry as an experienced pilot. Other aspiring pilots choose to attend civilian flight schools, proprietary or collegiate, where they earn their initial flight certificates and licenses, often progressing to employment as a certified flight instructor (CFI). Once the CFI rating has been achieved, the pilot can build flight time instructing students and develop the proficiency required to meet the minimum hiring standards of commercial airlines (Traditional ways to become a pilot, 2005).

Historically, airlines have relied on a steady stream of pilots from the military (Thomas, 2008). But as a result of shrinking pools of military pilots, airlines are now looking for alternative ways to obtain pilots. The most common

resource for airlines to acquire new pilots is now through collegiate flight training programs (Armstrong, 2001).

As collegiate flight programs have become more popular employment resources for the airlines, they are now offering more new pilot hires to the airlines than the historically popular military trained pilots. Non-military flight training comprises 63% of total trained pilots hired by the United States major, national, regional, and commuter airlines (Poynor, 2001). While the general public at large may regard general aviation flight training as a recreational activity, general aviation flight training is a critical component of America's aviation infrastructure and serves as a significant training ground for the airlines (Armstrong, 2001). For financial assistance, the airlines have claimed to be the backbone of the United States economy, and of vital importance to the health of the United States economy. If airlines are the backbone to the United States economy, then general aviation flight training is the lifeblood to the airlines. Without general aviation (collegiate) flight training, the airlines and all other commercial aviation will run dry of pilots in relatively short order (Poynor, 2001).

Since regular commercial air passenger service began in the 1920s, formal aviation education within the United States has also existed. During pre-World War II years, pilot training centers opened up on almost every college campus in the nation to improve the country's readiness for war. Established in 1939 to help the United States prepare for the possibility of war, the Civil Pilot Training (CPT) Program established training programs of military pilots at virtually every campus in the nation. These initial collegiate training centers

became the foundation for approximately 1,255 aviation degree programs and non-degree flight schools certified by the Federal Aviation Administration to provide pilot flight training (Flight Careers, 2000).

The first collegiate aviators were often discouraged and confused by these new programs because of the disparity among them. To introduce some continuity, in 1976 the University Aviation Association (UAA) created and published College Aviation Accreditation Guidelines, which established standards for curricula, courses, and credits. This helped prospective students to compare different collegiate training programs using a uniform set of standards (Kiteley, 2007).

In 1982, the FAA further formalized collegiate aviation when it sponsored Airway Science. This introduced peer review, evaluation, and recognition of programs through a UAA committee of educators and industry representatives. Initially four-year programs were available for in management, flight, maintenance, avionics, or computer science. Later in 1992, two-year programs in flight, maintenance, and avionics were added to the Airway Science standards (Kiteley, 2007).

As indicated by Flight Training's College Directory, more than 200 United States institutions currently offer undergraduate academic degrees in aviation-related majors. Of these 200 institutions, 93 offer bachelor's degrees, and 112 offer associate (two-year) degrees (Kiteley, 2007). According to the Flight School and Pilot Training Directory by Best Aviation (2007), there are a total of 80 collegiate flight programs in the United States.

Collegiate flight programs in the United States can be separated into three different categories depending on Federal Aviation Regulations (FARs) that govern them. There are FAR Part 61 flight schools, FAR Part 141 flight schools, and dual certificate schools that operate under both FAR Part 61 and 141 (Flight School, 2004).

Part 141 flight schools provide a more structured training program than Part 61 flight schools, with a standardized training syllabus that is approved by the FAA (FAR Part 141, 2003). This ensures that all necessary skills are taught in a specific order through lesson plans. In accordance with continual audit and rules set by the FAA, students are required to complete a specific number of hours of formal ground instruction in a classroom or one on one with a certificated flight instructor. Finally, flight students must pass the FAA Knowledge and Practical Tests, as also required by Part 61 regulations (Silverhawk, 2006).

In order to maintain their Part 141 certification, flight schools must obtain approval from the FAA and adhere to the following FAA regulations: an approved flight training syllabus for each course, instructor standardization, stage checks and exams given by the Chief Flight Instructor or his/her assistants, and regular FAA inspections of school facilities, aircraft, simulators and training devices. Detailed records for each student's progress are also kept, in which periodic inspections are conducted by the FAA (Learn to Fly, 2007).

FAR Part 61 flight schools offer a more flexible, or less structured, training program than FAR Part flight 141 schools. Under Part 61 the training syllabus is not subject to FAA approval. This allows Part 61 flight school instructors to alter

or change the sequence of lesson plans to meet the specific needs of their students (Flight School, 2004).

In addition to less stringent training sequences, Part 61 flight schools do not require students to complete a formal ground school. Students at Part 61 flight schools have several options to complete ground school training. Students may attend a ground school course, home-study program, or hire an instructor to review and teach any materials they are having problems understanding. All students, Part 61 or 141, must pass the FAA Knowledge and Practical Tests for the particular certificate or rating. The regulations governing a flight school under FAR Part 61 are less strict than schools operating under FAR Part 141, and therefore, require additional minimum flight hours in order to obtain a flight certificate or rating (Learn to Fly, 2007).

FAA certified flight schools in the United States fall under two additional categories, degree awarding or non-degree awarding. Non-degree programs are certified by the FAA and only offer instruction in flight and ground school theory. Many of these non-degree programs implement accelerated methods for flight and ground school training so pilots receive training in a minimal amount of time. These accelerated programs typically are at a much higher cost to the student than the cost to obtain the same certification from degree awarding programs. Accelerated programs are highly utilized by international students, who have been enrolled and financed by international airlines that will employ the student upon graduation from the program (Flight Careers, 2000).

There are two types of degree awarding flight schools, two-year programs and four-year programs. Four-year aviation programs typically award a Bachelor of Science (B.S.) degree, while two-year programs typically award an Associates of Science (A.S.) degree. Degree programs in aviation are generally based at institutions with regional or national accreditation (White, 2007). The most significant difference between an associate and bachelor's program is the general studies component and the breadth of aviation courses that are required. Associate programs have advantages such as smaller campuses and classes, and typically have lower tuition.

The majority of four-year collegiate flight programs lead to a Bachelor of Science degree. These programs are typically 120-130 semester-hour programs and require, on average, around four years to complete. Typically, four year collegiate flight programs also described as professional flight, professional pilot or flight education majors, prepare students for entry-level positions as a flight instructor, air carrier first or second officer, air-taxi pilot, or corporate pilot. These programs lead to commercial pilot certificates with instrument ratings and often include a multi-engine rating and/or flight instructor certificate (Guide to College, 2005).

Education has become increasingly important for pilots in the United States, where over 95% of pilots hired by major airlines today have at least a four-year Bachelor of Science degree (Phillips, 2003). While very few airlines require a college degree for employment, an applicant's chances to be hired are far better if they have a four-year college degree (Spangler, n.d.). Students

pursuing a career in the cockpit should never forget that a failed medical can terminate a flying career without notice. This is an additional reason that pilots should acquire more knowledge than just how to pilot an aircraft. If the student does not have a degree, their aviation career options can be very limited. But if they also have been educated in an aviation related management, engineering, or technology career field, they have career alternatives that will enable them to survive professionally and maintain their aviation employment connection (Spangler, 2007).

This has made the collegiate flight schools much more popular and common for aspiring pilots to receive their training (Aviation College Decision, 2008). Furthermore, a college degree demonstrates that the aspiring pilot is focused and committed enough to complete a rigorous track of study; and good grades usually indicate a positive work ethic. These collegiate qualities that are demonstrated and earned by flight students are highly valued by commercial airlines in the United States (Phillips, 2003).

Collegiate Flight Program Professional Relationships

As students near graduation, many collegiate flight programs have various programs that will help the student make the transition from school to the professional environment. Colleges or universities will often have numerous internship or employment bridge programs where students can get direct exposure and experience in the industry towards the end of their graduation. The efficiency and effectiveness of these professional assistance programs can add a

significant amount of value to graduating students, or prospective students searching for a collegiate aviation program to attend (Aviation College Decision, 2008).

Building these relationships between academia and the industry requires an exceptional amount of work from the program faculty, especially from smaller, less known schools. The importance of these professional relationships has been recognized and indicated as a priority for many schools that have established professional relationships. This is echoed by the theme and focus of the 2008 National Training Aircraft Symposium; Managing College Flight Training to Preserve Pilot Supply. Furthermore, one entire day of the three day symposium was themed Developing and Preserving the Pilot Supply Pipeline: A Dialog between Institutions and Employers (Focus of NTAS, 2008).

Internships

Academic internship opportunities give students the opportunity to work in professional environments gaining invaluable knowledge, experience, and relationships. In addition, students may often be given preferential treatment for full time employment once their internship period has expired. Many collegiate aviation programs have established relationships with organizations in the aviation industry to offer students a wide array of internship opportunities. These opportunities are most always directly related to the focus of the degree major that is offered (Phillips, 2008).

Bridge programs

Often when collegiate flight students complete their requirements to earn their degree, they have accumulated between 250 and 350 hours of flight experience. At this point the student has all the required licenses and ratings that are required by the Federal Aviation Administration to begin their professional flight career. However, most commuter or regional airlines, the typical first employment opportunity for new pilots, require many more hours for consideration of employment. While the minimum number of hours that are typically required fluctuates, current literature indicates that the average minimum hour requirement is approximately 1,200 hours. Comair requires 600 hours, Sky West and American Eagle require 1,000 hours, and Republic Airlines require 1,500 hours. The major carriers, such as Southwest and Continental, require a minimum of 2,500 hours of flight experience (Phillips, 2007). Often this gap of flight experience from completion of the collegiate flight degree up to the amount that is required for employment consideration from the lower tier regional or commuter airlines is completed by the student serving as a certified flight instructor until they gain enough hours to be considered for airline employment.

Bridge programs, professional relationships between academia and airlines, is one way that collegiate flight programs are helping students fill this gap of flight experience hours. Bridge programs establish a relationship between collegiate flight programs and one or more airlines. These bridge programs give flight students the opportunity to serve as interns within the airlines. If students prove effective during their internships and adhere to the prescribed flight curriculum, they are often given interviews for employment. As the name implies,

a bridge program is designed to bridge the gap between the general aviation experience in light single engine and multi-engine aircraft and larger more complex aircraft operated by airlines (Phillips, 2007). Some of the largest collegiate flight programs in the United States have extensive commitments to continue and expand their industry bridge programs. These include Embry-Riddle Aeronautical University, University of North Dakota, and Middle Tennessee State University (Phillips, 2003).

Collegiate Aviation Scholarships

Students pursuing collegiate flight degrees pay significantly higher costs than other college students for their education. Students majoring in flight are responsible for additional flight costs above and beyond typical tuition and associated fees charged to all college undergraduate students. Flight students are also required to pay for flight equipment (headset, charts, etc.), check rides, FAA exams, and additional books and test preparation guides. Depending on the aircraft and associated flight costs, collegiate flight students can easily spend \$300 per instruction hour (Thalman, 2007).

In addition to all regular academic expenses incurred while pursuing a college or university degree (tuition, books, institutional fees), flight students can expect to spend an additional \$50 to \$60,000 on flight costs alone by the end of their flight training (NewMyer, 2006). Therefore, costs for students to complete a four-year flight education can easily range from \$120,000 to \$180,000,

depending on the institution, equipment used, and whether the student is paying in-state or out of state tuition (Michels, 2008).

To compound this problem, there is the stereotype that graduates of pilot programs will be compensated shortly after graduation due to high salaries after graduation. But this stereotype is outdated and flawed. Pilot salaries within the aviation industry had decreased significantly over the past 10 years, to where the average starting pilot salary for an aviation flight major is \$23,819 per year (Thalman, 2007).

Approximately two-thirds of all aviation students receive some form of financial aid. Sources include federal and state grant scholarship and loan programs, collegiate institution-supported grants, tuition waivers, scholarships and student work programs, department scholarships, and alumni association scholarships for children of alumni from specific institutions or for specific majors (Kiteley, 2007).

Nationally, there are more than \$1 million in collegiate aviation scholarships available, in addition to campus-based financial aid and scholarships. The University Aviation Association's Collegiate Aviation Scholarship Listing offered the best resource summarizing available compilation of publicly available information related to collegiate aviation scholarships. The UAA indicates that while this list is extensive, it does not represent all scholarship availabilities. Table #1 details a complete breakdown of the number, type, and amount of the scholarships listed in the Collegiate Aviation Scholarship listing.

TABLE #1

COLLEGIATE AVIATION SCHOLARSHIPS

Description	Number of Awards	Total Value
Airport Related	15	\$25,000
Air Traffic Control/ Airways	14	\$11,400
Aviation in General (including Aviation Management)	114	\$222,000
Avionics/ Aircraft Electronics	15	\$21,500
Flight	56	\$370,450
Mechanic (A&P)	20	\$59,075
Special Groups:		
Freshman	68	\$113,000
Geographic	26	\$44,600
Graduate School	7	\$19,500
International	4	\$32,500
Military	240	\$153,750
Minority	53	\$63,000
Women	131	\$57,100
Other	<u>14</u>	<u>\$23,100</u>
Totals:	777	\$1,214,975

University Aviation Association. (2006). Collegiate Aviation Scholarship Listing (8th ed.). Auburn, AL: University Aviation Association.

CHAPTER III

METHODOLOGY

This chapter explains the methodology used to guide this research study and includes the following areas of emphasis: Objective of the Study, Selection and Description of the Research Population, Description of the Research Instrument, Pretest Survey, Procedure for Collecting Data, and Statistical Procedures.

Objective of the Study

Guided by descriptive methodology, this research study uses a research instrument authored by the researcher. The instrument was administered nationally to four-year public and private universities and two-year public and private colleges offering comprehensive aviation flight curricula and awarding either associate or bachelor degrees in aviation disciplines. Exploratory in nature, this study is designed to elicit information and perceptions related to the under representation of female flight students in collegiate aviation programs in the United States and act as a springboard for further related research.

The objective of the instrument is to answer the following research questions:

1. Do female flight students believe the under representation of females should be a concern for their collegiate aviation program?

2. Do female flight students believe negative remarks and or biases due to gender exist in their collegiate aviation program? If so, do these gender barriers and biases affect female retention within their collegiate aviation program?
3. Do female flight students believe academic incentives (scholarships and internships) specific to females are adequate within their collegiate aviation program?
4. Do female flight students believe their collegiate aviation program employs a sufficient number of female professionals (Faculty, Flight School Personnel, Certified Flight Instructors)?

Descriptive statistics will be used to develop and interpret the research data. Descriptive research determines and reports the way things are, involving the collection of numerical data to answer questions about the current status of the subject of the study (Gay, 2006). Descriptive research involves assessing the preferences, attitudes, practices, concerns, or interests of a group; mainly collected through a questionnaire survey, interview, or observation (Gay, 2006).

Selection of Sample and Description of the Research Population

The sample for this study was drawn from female aviation students participating in 60 collegiate flight training programs identified on a 2006 UAA membership list. The collegiate flight programs, solicited for this study, were members of the University Aviation Association. Members of the University Aviation Association constitute a diverse representation of two-year and four-year collegiate flight programs geographically distributed across the United States. Sixty collegiate flight programs were identified as participants and were obtained from a 2006 University Aviation Association membership list. As mentioned, the

participating flight programs were from four-year public and private universities and two-year public and private colleges offering comprehensive aviation curricula; awarding either associate or bachelor degrees in aviation disciplines.

The female flight students participating in this study had their identities protected by using the following methods: (1) the research questionnaire did not ask for the student's name, (2) the data given by each individual female student could not be linked back to the student, (3) the data submitted by the student was anonymously coded and electronically sent to an Excel spreadsheet, and (4) the spreadsheet was then electronically entered by the researcher into a statistical software program, Statistical Package for the Social Sciences (SPSS), for analysis. The participants were notified in the introduction area of the research questionnaire that their information would be kept confidential and their responses would be anonymously coded for statistical analysis.

Description of the Research Instrument

The research instrument for this study, *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots* (Appendix A) was created by the researcher to quantitatively and qualitatively explore the perceptions of female flight students, and obtain personal data as well as data related to their flight program. The instrument will collect demographic data characterizing each female flight student and evaluate the student's perceptions regarding: financial opportunities or barriers to flight costs; career or professional opportunities; recruitment,

involvement, and retention of female flight students; the prevalence of gender barriers, biases, or favoritism against female flight students; and the existence of female faculty, flight school personnel, and certified flight instructors.

Advantages of research questionnaires are that they can be mailed or given to large numbers of people at the same time. The main way in which information is collected is through asking questions. Question formats can include multiple choice questions, true-false, or a checklist. Open format questions can also be used to allow respondents to answer in their own words (Cohen, Lawrence, & Morrison, 2000). The research instrument created for this study was a structured questionnaire consisting of two parts: demographic information (yes/no and multiple choice questions) and Likert-scale interpretive questions. The first part of the instrument requested information related to the female flight student completing the survey, as well as the collegiate flight program. The second part offered Likert-scale questions with ordinal measurement pattern options ranging from: (1) Strongly Agree, (2) Agree, (3) Disagree, to (4) Strongly Disagree. These questions were intended to gain insight into the perceptions of the female flight students related to their collegiate flight program experiences. The final section of the research instrument offers participants the opportunity to provide any personal comments they feel will be appropriate to this study.

Pretest Survey

In survey research it is difficult to develop questionnaires that produce maximum information with minimum burden to the respondents. Given this, the

researcher should pretest the questionnaire with several knowledgeable individuals to ensure the questionnaire produces the desired results (Mertens, 2004). To ensure the highest level of quality, a pretest of the research instrument was given to eight professionals, representing eight different institutions within the field of collegiate aviation. These eight professionals were chosen due to their academic involvement within collegiate aviation programs. These aviation professionals examined the research instrument to measure its focus related to the research topic and reviewed its clarity of instructions. A pretest of the questionnaire can eliminate items that respondents could not answer, redundancies in questions, confusing items, and items that do not correlate to the purpose of the study (McMillan, 2007). The final design of the research instrument was modified by the researcher based on responses from this pretest group.

Procedure for Collecting Data

Inconsistent numbers of four-year public and private universities and two-year public and private colleges offering comprehensive aviation curricula within the United States were discovered by the researcher. Several discrepancies existed between various sources claiming a complete list of all United States collegiate flight programs. The total number of collegiate flight programs varied from 80 to 94 depending on the source (Best Aviation, 2007; Federal Aviation Administration, 2006; Woman Pilot, 2002). Due to the difficulty of determining an accurate list of flight programs, the researcher decided to solicit two-year and

four-year collegiate flight programs that were institutional members of the University Aviation Association in 2006.

The University Aviation Association (UAA) acts as a voice for collegiate aviation education to its members, the industry, government and the general public. The UAA is a nonprofit organization that plays a pivotal role in the advancement of degree-granting aviation programs that represent all segments of the aviation industry (University Aviation Association, n.d.). Sixty potential participants were identified by a 2006 UAA membership list that was obtained from the UAA.

An e-mail (Appendix B) was sent to the managers/ directors of the sixty collegiate flight programs requesting their participation in the survey. This email explained the educational importance of the study and included instructions of how to administer the research instrument.

To participate, each flight program manager/ director was asked to reply to the email and send the researcher their complete mailing address and the approximate number of female aviation students currently enrolled in their collegiate flight program. In return, the researcher mailed a packet of research instruments printed in color on 8 ½ inch by 11 inch white paper to each flight program manager/ director via First Class Mail.

Included with each instrument was a cover letter (Appendix C) that explained the significance and importance of the study, and that each female flight student's responses would remain confidential and would be anonymously

coded for statistical analysis. Also enclosed with each instrument was a standard envelope to be used for the completed instrument.

The managers/ directors were asked to assemble their female flight students together to administer the research questionnaire. Upon completing the survey each female flight student was asked to place it in the provided envelope, seal it, and give it to their manager/ director. Lastly, the manager/ director would place all sealed envelopes containing surveys in the provided pre-paid postage envelope and mail it back to the researcher.

Initial emails were sent to the managers/ directors of the sixty collegiate flight schools in March of 2007. The spring semester allowed incoming freshmen to have two semesters of flight so that their responses would be more valid and meaningful. After approximately 1 ½ weeks, a second email was sent to each flight school that had not responded to the first email. After an additional 1 ½ weeks, a third and final request was sent to each manager/ director who had not responded. All of the 30 returned instrument packets were received by the researcher by the end of May 2007.

Statistical Procedures

The perceptions of the female collegiate flight students were examined and explained through descriptive statistics. Descriptive research is commonly used to identify the cause of something that is happening in order to gather information related to the object of study (Creswell, 2004). The major advantage of descriptive statistics is that they permit researchers to describe the information contained in many scores with just a few indices, such as the mean. The mean is

the average of a set of numbers, or the sum of the scores divided by the number of scores (Slavin, 2007).

Using central tendencies, such as the mean, for statistical analysis can effectively explain and evaluate research data (Best & Kahn, 2005). The researcher applied descriptive statistics to the data retrieved from the research instrument. Once the research instruments were collected the researcher anonymously coded the data into a Microsoft Excel Spreadsheet. This data was then analyzed by the statistical analysis software program Statistical Package for the Social Sciences (SPSS). The results and interpretation of this statistical analysis of data will be discussed in Chapter IV.

CHAPTER IV

FINDINGS

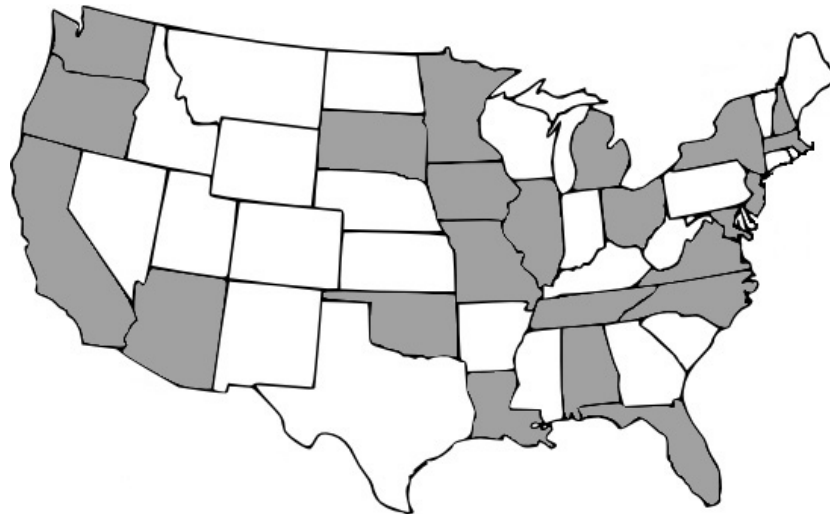
This chapter presents the data obtained from participating female collegiate flight students who completed the research instrument. The data is presented based on three parts of the instrument. First, the responses of participants to questions pertaining to the *Characteristics of Yourself and Your Collegiate Flight Program* describe demographics of the participating female flight students, and provide institutional information about the participating collegiate flight programs. Second, responses to questions pertaining to *Perceptions of Your Collegiate Flight Program* revealed the perceptions of the female flight students based on a Likert-type scale. And third, *Personal Comments* written by respondents in the comment box of the research instrument were analyzed.

Reporting and Response Rate

The researcher requested participation from 60 different collegiate flight programs. Thirty programs chose to participate in the study resulting in an overall response rate of 50%. From these 30 participating flight schools, 262 female flight students completed the research instrument, *“Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the*

Perceptions of Female Student Pilots". The 30 participating schools represented an even geographic distribution within the United States. Participating collegiate flight programs were located in the following States: Alabama, Arizona, California, Florida, Iowa, Illinois, Louisiana, Massachusetts, Maryland, Michigan, Minnesota, Missouri, North Carolina, New Hampshire, New Jersey, New York, Ohio, Oklahoma, Oregon, South Dakota, Tennessee, Virginia, and Washington (Figure 1).

FIGURE 1.
GEOGRAPHIC DISTRIBUTION OF PARTICIPATING COLLEGIATE
FLIGHT PROGRAMS



Note: shaded states represent states of participating institutions.

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

Both four-year public and private universities and two-year public and private colleges offering comprehensive aviation curricula were solicited for participation in this study. Of the 30 collegiate flight programs that participated in the study, there were eighteen four-year public and private institutions (60%) and twelve two-year public and private institutions (40%).

Demographic and Institutional Information

Each participating female flight student was asked to identify their academic classification. Table 2, *Academic Classification of Female Flight Students*, indicates that of the 262 respondents to the survey, 25% are freshman, 27% are sophomores, 21% are juniors, and 27% are seniors.

TABLE 2.

ACADEMIC CLASSIFICATION OF FEMALE FLIGHT STUDENTS

Academic Classification	Number of Respondents	Percentage of Respondents
Freshman	65	25%
Sophomore	70	27%
Junior	56	21%
Senior	71	27%

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

Factors that influenced the female flight student to major in collegiate aviation are indicated in Table 3, *Female Flight Student Influences to Major in*

Aviation Flight. Some respondents chose more than one factor; therefore, there were 266 total responses. Of the 266 responses, influences to pursue flight training were: 50% no one (childhood dream), 20% parent(s), 20% other, 6% friend(s), 3% sibling, and 1% high school counselor. Those who chose the option of other had the opportunity to fill in a blank to describe the influence. Included in the choices for other were: grandparents, uncles, commercial flight experience, air shows, Air Force ROTC, Cessna introduction flights, Space Camp, and Women in Aviation.

TABLE 3.

FEMALE FLIGHT STUDENT INFLUENCES TO MAJOR IN AVIATION FLIGHT

Influence	Responses	Percentage of Responses
Parent(s)	52	20%
Sibling	8	3%
Friend(s)	15	6%
High School Counselor	1	1%
No One, Childhood Dream	136	50%
Other	54	20%

Note: The total number of responses was 266. This number is higher than the total number of received instruments due to some respondents choosing more than one influence.

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots.* Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

Question three asked if one of the responding female flight student's parents are employed in the aviation industry. Forty-four (17%) female flight

students indicated yes, and 211 (83%) indicated no. The number of responses, for this question was 255, which is lower than the total number of 262 respondents. Seven respondents did not answer this survey question. Results are indicated by Table 4, *Representation of Female Flight Students' Parents Involved in the Aviation Industry*.

TABLE 4.

REPRESENTATION OF FEMALE FLIGHT STUDENTS' PARENTS INVOLVED IN THE AVIATION INDUSTRY

Parents Employed	Responses	Percentage of Responses
Yes	44	17%
No	211	83%

Note: The total number of responses was 255. This number is lower than the total number of received instruments due to some respondents not answering the question.

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

The researcher identified the primary financial sources for funding flight costs in question four. Table 5, *Female Flight Student' Financial Sources for Flight Costs*, presents the financial sources for funding the respondent's flight costs.

TABLE 5.
FEMALE FLIGHT STUDENTS' FINANCIAL SOURCES FOR
FLIGHT COSTS

Financial Source	Responses	Percentage of Responses
Parent(s)	118	33%
School Loans	121	34%
Scholarships	63	18%
Myself	32	9%
Other	21	6%

Note: The total number of responses was 355. This number is higher than the total number of received instruments due to the majority of respondents choosing more than one source.

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

The majority of the female flight students indicated multiple financial sources as a result, there were 355 total responses. Among the five survey choices, respondents indicated that their primary financial sources for flight costs were; 33% parent(s), 34% school loans, 18% scholarships, 9% myself, and 6% other. The female students who chose the other option were asked to identify the funding source. Included in the choices were: retirement, spouse, Air Force ROTC, and Veterans grant.

Question five asked female students to estimate the total number of full-time students, male and female, in their collegiate flight program. Table 6, *Full-Time Flight Students (Male & Female) Enrolled in Collegiate Flight Program*, indicate there were 257 responses, as five respondents did not answer this question.

TABLE 6.

FULL-TIME FLIGHT STUDENTS (MALE & FEMALE) ENROLLED IN COLLEGIATE FLIGHT PROGRAM

Full-Time Students Enrolled	Responses	Percentage of Responses
1-50	44	17%
51-100	61	24%
101-150	56	22%
151-200	60	23%
Over 200	36	14%

Note: The total number of responses was 257. This number is lower than the total number of received instruments due to five respondents not answering the question.

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

Full time student enrollments were separated into five sub groups: 1-50; 51-100; 101-150; 151-200; and over 200. Fifty-one to one-hundred received the majority, (24%), and over 200 receiving the least, (14%). A combination of 51-100, 101-150, and 151-200 represented more than two-thirds (69%) of respondents flight schools.

Table 7, *Percentage of Female Full-Time Flight Students Enrolled*, indicates the female flight student's estimation of the percentage of female full-time flight students enrolled in their collegiate flight program.

TABLE 7.

PERCENTAGE OF FEMALE FULL-TIME FLIGHT STUDENTS ENROLLED

Percentage Full-Time Female Students Enrolled	Responses	Percentage of Responses
0-10%	181	70%
11-25%	76	28%
26-50%	1	1%
Over 50%	1	1%

Note: The total number of responses was 259. This number is lower than the total number of received instruments due to three respondents not answering the question.

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

When compared to the estimation of total number (male and female) of full-time flight students, female flight students comprise a very small percentage of overall flight students. Respondents indicated that an overwhelming 98% of reporting flight schools had a combined percentage of 0-25% of enrolled full-time female flight students. The range of 0-10% received the 181 responses (70%), while 11-25% comprised 76 responses (28%) of all responses. Respondents indicated their collegiate flight programs consisted of 1% female flight students for both ranges of 26-50% and over 50%, with one response for each range.

The female flight students' current flight certificate or rating is presented in Table 8, *Current Pursuant Flight Certificate/ Rating*. A total of 279 responses were received, as many students were currently pursuing multiple flight certificates or ratings. The three most common flight certificate or ratings

indicated were Private Pilot (24%), Commercial (25%), and Instrument (24%). Those who choose the option of other had the opportunity to fill in a blank to identify the current flight certificate or rating. All respondents that chose other, indicated Airline Transport Pilot (ATP).

TABLE 8.
CURRENT PURSUANT FLIGHT CERTIFICATE/ RATING

Flight Certificate/ Rating	Responses	Percentage of Responses
Private Pilot	66	24%
Commercial	69	25%
Instrument	67	24%
Multi-Engine	27	10%
Multi-Engine (Instrument)	10	3%
Certified Flight Instructor	27	10%
Certified Flight Instructor (Instrument)	7	2%
Other	6	2%

Note: The total number of responses was 279. This number is higher than the total number of received instruments due to some respondents choosing more than one certificate/ rating.

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

To understand the influence of female mentorship at each collegiate flight program, the survey asked flight students to identify the number of employed female flight instructors, and female flight administrators (Director, Manager, Chief Flight Instructor). In addition to the influence of female mentors,

consideration was also given to the training female flight students received by a female flight instructor.

Table 9, *Representation of Female Certified Flight Instructors Employed at Female Flight Students Collegiate Flight School*, indicates the respondent's approximation of employed female flight instructors. Fifty-seven percent of respondents indicated their flight school employed 1-5 female flight instructors. Eighteen percent of respondents indicated that there was no female flight instructors employed at their flight school. The remaining three options 6-10, 11-20, and over 20 received a combined 25% of responses. When combined, 184 (75%) of the respondents estimated 0-5 female flight instructors were employed in their collegiate flight program.

TABLE 9.
REPRESENTATION OF FEMALE CERTIFIED FLIGHT INSTRUCTORS
EMPLOYED AT FEMALE FLIGHT STUDENTS COLLEGIATE FLIGHT
PROGRAM

Number of Female Flight Instructors Employed	Responses	Percentage of Responses
0	46	18%
1-5	148	57%
6-10	46	18%
11-20	14	5%
Over 20	7	2%

Note: The total number of responses was 261. This number is lower than the total number of received instruments due to one respondent not answering the question.

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

To gain additional insight on how much one-on-one influence related to flight training female student pilots had received from other female flight instructors, question nine asked female students to indicate if they have had at least one female flight instructor training them during their tenure at their current collegiate flight program.

TABLE 10.
FEMALE STUDENTS TRAINING RECEIVED BY FEMALE CERTIFIED FLIGHT INSTRUCTORS

Instruction Received by Female Flight Instructors	Responses	Percentage of Responses
Yes	135	53%
No	122	47%

Note: The total number of responses was 257. This number is lower than the total number of received instruments due to five respondents not answering the question.

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

Table 10, *Female Students Flight Training Received by Female Certified Flight Instructors* responses indicated that 135 female flight students (53%) had received instruction from a female flight instructor. While the remaining 122 respondents (47%) had not received any flight instruction from a female flight instructor.

The final indication of female mentor influence is drawn from question ten, inquiring if the administrator (Director, Manager, Chief Flight Instructor) of the

collegiate flight school is female. As indicated by Table 11, *Representation of Female Management at Collegiate Flight Schools*, a very low percentage of flight programs have a female flight administrator. Twenty respondents (8%), indicated their collegiate flight program did have a female administrator, while 240 respondents (92%) did not have a female administrating their collegiate flight school.

TABLE 11.

REPRESENTATION OF FEMALE ADMINISTRATION AT COLLEGIATE FLIGHT SCHOOLS

Female Administrator	Responses	Percentage of Responses
Yes	20	8%
No	240	92%

Note: The total number of responses was 260. This number is lower than the total number of received instruments due to two respondents not answering the question.

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

Respondents Perceptions of their Collegiate Flight Program

The second part of the research instrument, *Perceptions of Your Collegiate Flight Program*, focused on the perceptions of each female flight student. The students indicated their perception by addressing statements based on a four-point Likert-scale. For statistical purposes the four-point Likert-scale

was assigned numerical values: (1) “Strongly Agree”, (2) Agree, (3) Disagree, and (4) Strongly Disagree.

Table 12, *Female Flight Students Perception of Institutional Financial and Professional Barriers and Opportunities*, presents data obtained from three Likert-type statements involving the respondent's perceptions of: (1) the availability of aviation pilot careers, (2) the availability of scholarships to assist with flight costs, and (3) the availability of career or professional opportunities.

TABLE 12.

FEMALE FLIGHT STUDENTS PERCEPTION OF INSTITUTIONAL FINANCIAL AND PROFESSIONAL BARRIERS AND OPPORTUNITIES

Likert-Type Statements	SA	A	D	SD
The current cost of flight training at my collegiate flight school has an affect on the ability of female flight students to pursue an aviation career (pilot) at my educational institution.	14 5%	72 28%	124 48%	50 19%
My aviation department/institution offers sufficient aviation scholarships to assist female students with their flight costs.	37 14%	117 45%	87 34%	18 7%
My aviation department provides sufficient aviation internships to assist female flight students with career/professional opportunities.	35 14%	146 57%	67 26%	10 3%

Note: Some total response values may be smaller than total number of received instruments as some respondents left questions blank.

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

Responding to the Likert-type statement; *The current cost of flight training at my collegiate flight school has an effect on the ability of female flight student to*

pursue an aviation career (pilot) at my educational institution, 33% of the female students either agreed or strongly agreed with the statement. Approximately two-thirds (67%) either disagreed or strongly disagreed that institutional flight cost affected their ability to pursue an aviation career.

Almost six out of ten of the female flight students (59%) agreed or strongly agreed to the statement: *My aviation department/institution offers sufficient aviation scholarships to assist female students with their flight costs*. The remaining 41% of students either disagreed or strongly disagreed that their collegiate flight program offers sufficient scholarships to aid with flight costs. In agreement with the 41% of respondents disagreeing or strongly disagreeing that there are sufficient scholarships for female flight students, one respondent indicated, “One major concern of mine is the inadequate number of scholarships offered or made available to female students.”

Nearly three-quarters, 71%, strongly agreed or agreed with the statement: *My aviation department provides sufficient aviation internships to assist female flight students with career/professional opportunities*. The minority of respondents, 29%, indicated that they felt there should be more opportunities for internships or career opportunities offered through their flight school.

Likert-type statements that examine the female flight student perceptions of the effort of their flight school to recruit and retain female flight students within the program of their collegiate flight school are presented in Table 13, *Female Flight Students Perception of Institutional Recruitment and Retainment of Female Flight Students*.

TABLE 13.

FEMALE FLIGHT STUDENTS PERCEPTION OF INSTITUTIONAL RECRUITMENT AND RETAINMENT OF FEMALE STUDENTS

Likert-Type Statements	SA	A	D	SD
The under represented number of female flight students should be a primary concern of the aviation department at my institution.	59 23%	83 32%	105 40%	13 5%
My aviation department/institution does an excellent job of recruiting female students to my collegiate flight program.	20 8%	126 48%	100 39%	14 5%
My aviation department/institution makes efforts to attract more young females (junior high and high school) to careers in aviation through educational opportunities and public outreach.	17 7%	121 47%	102 39%	18 7%
There are a sufficient number of professional females (faculty, flight school personnel, CFIs) in my collegiate flight program.	16 6%	113 43%	107 41%	25 10%

Note: Some total response values may be smaller than total number of received instruments as some respondents left questions blank.

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

Approximately one-half of the female respondents (55%) strongly agreed or agreed, compared with 45% that disagreed or strongly disagreed with the statement: *The under represented number of female flight students should be a primary concern of the aviation department at my institution.*

Similar percentages were indicated when the students were asked their perceptions of the following statement: *My aviation department/institution does an excellent job of recruiting female students to my collegiate flight program.*

Fifty-six percent strongly agreed or agreed, while 44% either disagreed or strongly disagreed.

Over half of respondents (54%) either strongly agreed or agreed with the statement: *My aviation department/institution makes efforts to attract more young females (junior high and high school) to careers in aviation through educational opportunities and public outreach.* The remaining 46% of respondents either disagreed or strongly disagreed with the statement. As 54% agreed or strongly agreed that their aviation department adequately recruits young females to their collegiate flight program, one female student stated “My aviation department/institution does not make efforts to attract more young females (junior high & high school) to careers in aviation through educational opportunities and public outreach.”

Approximately half of the respondents (51%) indicated they disagree or strongly disagree, opposed to 49% that either strongly agree or agree with the statement: *There are a sufficient number of professional females (faculty, flight school personnel, CFIs) in my collegiate flight program.* In agreement with the 51% of respondents that there is not a sufficient number of professional females, one respondent indicated: “I believe that female pilots are under more pressure and feel as if we have to exceed our ability to ‘prove’ we are just as able as male pilots. I would like to see more women pilots at my flight school as well as CFI’s.”

Table 14, *Female Flight Students Perception of Gender Barriers, Biases, or Favoritism Against Female Flight Students*, this question examined the perceptions of the female flight student related to the following experiences: (1) favoritism male flight students may have received for internships, scholarships, or flight instructor positions; (2) rude or offensive remarks as a female flight student;

(3), gender biases at their collegiate flight school, and (4) the primary reason female flight students discontinue flight training is due to gender barriers or biases.

TABLE 14.

FEMALE FLIGHT STUDENTS PERCEPTION OF GENDER BARRIERS, BIASES, OR FAVORITISM AGAINST FEMALE FLIGHT STUDENTS

Likert-Type Statements	SA	A	D	SD
Favoritism towards male flight students (internships, scholarships, CFI positions) exists in my collegiate flight program.	5 2%	34 13%	143 55%	80 30%
Negative (rude and offensive) comments regarding female flight students are frequent at my collegiate flight school.	5 2%	33 13%	114 43%	110 42%
Gender “barriers” exist in my collegiate flight program.	6 2%	53 20%	110 42%	93 36%
The primary reason female flight students quit collegiate flight programs is because of gender barriers and biases.	7 3%	23 9%	134 51%	98 37%

Depperschmidt, Chad, L. (2008). *Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

The majority of female flight students (85%) indicated they either disagree or strongly disagree with the statement: *Favoritism towards male flight students (internships, scholarships, CFI positions) exists in my collegiate flight program.*

The remaining respondents (15%) either strongly agreed or agreed that favoritism towards male flight students does exist in their flight program.

Eighty-five percent of female flight students disagreed or strongly disagreed, opposed to 15% of female students who either strongly agreed or agreed with the statement that *negative (rude and offensive) comments regarding female flight students are frequent at my collegiate flight school*. While the majority of respondents indicated that negative or rude comments are not frequent, some female flight students expressed otherwise on the comment area of the instrument. One respondent indicated, "There is a tremendous amount of insults to females that go on at my school in a continuous way", while another expressed her experiences by stating, "Female students have a hard time because of the ways male students talk. I get offended almost daily but keep going because I want to be in the organizations and on the flight team, but if the guys would clean up their language I think more females would join and stick with it. I know females that don't get involved because of how the guys treated her and talked around her." Another female flight student indicated, "I have encountered many students that discredit my achievements, such as my ability to pass check rides. Comments such as 'just wear a low cut shirt and you'll pass your check ride' or 'you just passed because you're a girl' are very common."

Seventy-eight percent of female flight students either disagreed or strongly disagreed, as compared to 22% who strongly agreed or agreed with the statement: *Gender "barriers" exist in my collegiate flight program*. While the majority of respondents did not perceive that gender barriers existed, of all the comments left by respondents the most frequent topic was the existence of gender barriers. The female respondents often had very strong and similar

feelings about this issue when writing their comments. One female student indicated, "At the flight center and on campus I feel that women have to work twice as hard to receive the same amount of recognition as males. I feel like I have to work and study to get ahead of the males so that I have 'evidence' of myself not being considered a 'joke' in the eyes of the management and staff. I've seen cases when I had a legitimate concern about why I was continually being put on standby for an aircraft and instructor, and when they were voiced I was pretty much laughed at and told to go away. When a male asked the same thing, things were changed for him. I had to climb the management ladder to get anything done. It finally worked, but took much longer." Another respondent stated, "A lot of us girls feel that we need to work twice as hard as the men to get the same recognition. For most of the men, are fine but it's the few that are biased and prejudiced that ruin it for others." This sentiment is continued by another female student that indicated, "My professors try to be very supportive; other males are for the majority awful towards me, they always assume we are management majors and a huge joke. Rarely taken seriously or respected." There is also evidence that this gender barrier exists outside of the collegiate flight program. As one respondent wrote, "It does bother me when someone asks me what my major is and when I tell them they're always in shock."

The majority of female flight students (88%) disagreed or strongly disagreed with the statement: *The primary reason female flight students quit collegiate flight programs is because of gender barriers and biases.* As the majority of respondents disagreed or strongly disagreed that gender barriers are

the primary reasons that female flight students quit, one respondent's opinion indicated that gender barriers may not be the primary cause or reason for female students dropping out. Her comment was, "Based on my own experience, it seems that much of the reason that many women quit aviation is a lack of confidence. They are comparable to men in skills and general knowledge, but they tend to be less confident in their abilities. Males often jump right into things like solo cross countries whereas females tend to be more worried about the consequences like not finding the airport, getting lost, or violating FAR's."

CHAPTER V

CONCLUSIONS

Introduction

This research study was designed to explore the circumstances that contribute to the under representation of females in collegiate flight programs. In an attempt to identify the barriers or other issues that may contribute, this research study focused on the personal perceptions and demographic data of female collegiate flight students and their collegiate flight programs. Also included in this research study was a comprehensive review of the literature that included the historic role of women in aviation, professional organizations promoting women in aviation, female gender biases in aviation, female representation in professional aviation, pilot shortage, collegiate flight programs, collegiate flight programs professional relationships, and collegiate aviation scholarships.

Demographic data was also collected from each female flight student that responded to the research instrument. Demographic data collected on the female flight students and their collegiate flight program included: student academic classification, current flight certificate or rating being pursued, financial sources for flight costs, percentage of female flight students, and the existence of female certified flight instructors, or administrative positions within the flight department.

The perceptions of female collegiate flight students were collected by soliciting data related to five topics from the female flight students: (1) financial opportunities or barriers to flight costs; (2) career or professional opportunities; (3) recruitment, involvement, and retention of female flight students; (4) the prevalence of gender barriers, biases, or favoritism against female flight students; and (5) the existence of female faculty, flight school personnel, and certified flight instructors. Comment boxes were included in the research instrument that allowed respondents to add any other additional information they wanted to add to the research instrument.

Sixty collegiate flight programs were identified as potential participants based on a 2006 University Aviation Association membership list. These 60 collegiate flight programs were solicited to participate in the study by having their female flight students complete the study's research instrument. Thirty collegiate flight programs chose to participate, constituting a response rate of 50%. Female flight students from the participating collegiate aviation programs submitted a total of 262 completed research instruments.

Summary

Female flight student's demographic data and perceptions, as indicated on the completed research instruments, have been summarized and applied to the research questions.

The demographic data from the research instrument detailed an even distribution of academic classification of the female flight student respondents.

When detailing their academic classification, respondents indicated that 25% were freshman, 27% were sophomore, 21% were junior, and 27% were senior level students.

The majority of female flight students, when asked to indicate what influenced them to major in aviation flight, indicated: childhood dream (50%), parents (20%), or other (20%). Other indications that influenced the respondents included: friends (6%), sibling (3%), or school counselor (1%). While a significant number of respondents indicated that their parents were the reason for majoring in aviation flight, when asked if their parents were employed in the aviation industry, more than three-quarters (83%) indicated they were not.

Female flight students represented a wide range of experience when indicating which level of flight certificate or rating they were pursuing at their school. The three most common certificates or ratings were private pilot (24%), commercial (25%), and instrument (24%). Other certificates or ratings the female students were pursuing included multi-engine (10%), certified flight instructor (10%), multi-engine instrument (3%), certified flight instructor instrument (3%), and other (2%).

Female flight students demographic data and perceptions received from this study were used to summarize the following research questions:

1. Do female flight students believe the under representation of females should be a concern for their collegiate aviation program?
2. Do female flight students believe negative remarks and or biases due to gender exist in their collegiate aviation program? If so, do these gender

barriers and biases affect female retention within their collegiate aviation program?

3. Do female flight students believe academic incentives (scholarships and internships) specific to females are adequate within their collegiate aviation program?
4. Do female flight students believe their collegiate aviation program employs a sufficient number of female professionals (faculty, flight school personnel, CFI's)?

Research Question 1: Do female flight students believe the under representation of females should be a concern for their collegiate aviation program?

Based on the analysis of data, as indicated in chapter four, this research study found that the majority of female flight students believed that the under representation of female flight students should be a primary concern for their collegiate aviation program.

The demographic data indicated that female flight students enrolled at their collegiate flight programs comprised only a small percent of overall students. One-hundred and eighty-one respondents (70%) indicated that between 0-10% of enrolled students at their flight program were female, while 76 (28%) indicated that 11-25% of enrolled students were female. Therefore 98% of female flight students at collegiate aviation programs that participated in this research study indicated that female students comprise no more than 25% of all students.

Fifty-five percent of female flight students indicated that they agreed or strongly agreed with the statement, *the under represented number of female flight students should be a primary concern of the aviation department at my institution*. Twenty-three percent of respondent's indicated that they strongly agree, while 32% agreed that the under representation of female flight students should be a primary concern for their flight program.

Female flight students indicated they believed their aviation department makes efforts to attract more young females (through junior high and high school) to careers in aviation through educational opportunities and outreach. When responding to the following statement, *my aviation department/ institution makes efforts to attract more young females (junior high and high school) to careers in aviation through educational opportunities and public outreach*, 54% of respondents strongly agreed or agreed with the statement.

Female flight students, when responding to a statement regarding the effectiveness of their collegiate flight program to recruit female students, the majority believed their flight program does an effective job. Fifty-six percent of female students indicated they either agree or strongly agree with the statement, *my aviation department/ institution does an excellent job of recruiting females to my collegiate flight program*.

Research Question 2: Do female flight students believe negative remarks and or biases due to gender exist in their collegiate aviation program? If so, do these gender barriers and biases affect female retention within their collegiate aviation program?

The data generated from the research instrument indicates that the majority of female flight students do not believe that negative remarks or biases due to gender exist within their collegiate flight program. Likewise, the majority of respondents also do not believe that gender barriers have a negative affect on the retention of female flight students within their collegiate aviation program. Responses to the research instrument indicated that 203 (78%) of female flight students disagreed or strongly disagreed that gender barriers exist in their collegiate flight program.

When responding to the likert-type statement, *negative (rude and offensive) comments regarding female flight students are frequent at my collegiate flight school*, 224 (85%) female flight students disagreed or strongly disagreed.

The majority of respondents indicated that they disagreed with the likert-type statement; *favoritism towards male flight students (internships, scholarships, CFI positions) exists in my collegiate flight program*. Two-hundred and twenty-three (85%) female flight students disagreed or strongly disagreed that male flight students received preference over females for internships, scholarships, or CFI positions that are offered through their collegiate aviation program.

The majority of female students disagreed with the likert-type statement, *the primary reason female flight students quit collegiate flight programs is because of gender barriers and biases*. Two-hundred and thirty-two (88%) respondents either disagreed or strongly disagreed that gender barriers and biases are the primary reason that female flight students decide to quit collegiate flight programs.

Research Question 3: Do female flight students believe academic incentives (scholarships and internships) specific to females are adequate within their collegiate aviation program?

The research data indicates that female flight students do believe that both scholarships and internships specifically offered for female flight students are adequately available from their collegiate flight programs. When indicating the financial sources for flight costs, the demographic data indicates that the two largest sources for female flight students are parents, and school loans. One-hundred and twenty-one respondents (34%) indicated school loans, while 118 (33%) respondents indicated parents as their financial source for flight costs. Other financial sources for flight costs included: scholarships (18%), myself or personal funds (9%), and other (21%).

With regard to the availability of scholarships, 144 respondents (59%) either agreed or strongly agreed that their aviation department or institution offers

sufficient aviation scholarships to assist female flight students with the expenses associated with flight training.

When asked about the number of available internships, female flight students indicated they believed internships were adequately available. When responding to the likert-type statement, *my aviation department provides sufficient aviation internships to assist female flight students with career/professional opportunities*, 181 respondents (71%) either agreed or strongly agreed.

The majority of female flight students indicated that the cost of flight training does not have an effect on them pursuing flight education. When responding to the likert-type statement, *the current cost of flight training at my collegiate flight school has an affect on the ability of female flight students to pursue an aviation career (pilot) at my educational institution*, 174 respondents (67%), either disagreed or strongly disagreed.

Research Question 4: Do female flight students believe their collegiate aviation program employs a sufficient number of female professionals (faculty, flight school personnel, CFI's)?

Female flight students were asked if there is a sufficient number of professional females (faculty, flight school personnel, CFI's) in their collegiate flight program. In their responses, 132 female flight students (51%) either

disagreed or strongly disagreed, while 129 (49%) either agreed or strongly agreed that there are a sufficient amount of female flight professionals within their collegiate flight program.

However; the demographic data reflects that 20 respondents (8%) indicated that the administrator of their collegiate flight program is female. When asked how many female certified flight instructors are employed at their collegiate flight program, 194 female students (75%) indicated there was 0-5 female CFI's currently employed. Respondents indicated that while there were few female CFI's, many of them received flight training from a female CFI. One-hundred and thirty-five respondents (53%) indicated that they have received flight instruction from a female CFI.

Conclusions

As detailed in the literature, women constitute a small percentage of commercial and ATP pilots within the aviation industry. Historically, this percentage of women pilots in the aviation industry has risen over time; however, women are still under represented in the aviation industry. Women currently only make up about 2% of all airline captains in the United States (Guide to College, 2005). This research study on the under representation of female students within collegiate aviation programs sought to understand the existence of barriers or biases that may contribute to this under representation. By understanding the perceptions of female flight students, this research study attempted to identify barriers or biases that may exist within the collegiate environment. With a better

understanding of what barriers or biases contribute to the under representation of female flight students, actions can be implemented and applied to encourage more women to seek professional careers as commercial pilots.

Based on the data collected from the research instrument, the under representation of female flight students at collegiate aviation programs should be a concern for collegiate flight programs. Fifty-five percent of responding female flight students believed that female under representation should be a primary concern for their collegiate flight program. The data indicates that the majority of female flight students consider the under representation of female students at their collegiate flight program important. Since 55% of respondents agreed that the under representation of female students should be a concern, collegiate flight programs should recognize this under representation and make efforts to attract more female students.

Fifty-six percent of respondents indicated that they believe their collegiate flight program does an excellent job of recruiting female flight students to their program. Furthermore, 54% of respondents indicated that they believe that their collegiate flight program makes efforts through educational opportunities and outreach to attract junior high and high school females to collegiate aviation. While the data indicates that collegiate flight programs overall do a good job of recruiting female flight students and administering educational and outreach programs; the total number of female flight students remains significantly small. Overall, collegiate flight programs should make additional efforts to attract young females to the pilot career.

Often female students are able to attract young females to the aviation flight field by utilizing outside resources. One female flight student indicated that a group of female students from her collegiate flight program recently opened a local chapter of Women in Aviation International. Through this affiliation, several female flight students visit local high schools and junior high schools to introduce females to the aviation industry. Another respondent commented, "I am the outreach chairwomen of my college's Women in Aviation Chapter. We visit local schools to encourage girls to become pilots and generally we get responses that they weren't even aware it was possible for a girl to be a pilot". This type of educational outreach can be very beneficial in educating young students to the opportunity and possibility of careers in aviation.

While there is evidence of awareness and action to alleviate the under representation of female flight students; the low number of enrolled female flight students, as indicated by the demographic data, is a very low percentage. Seventy percent of females participating in this study stated a 0-10% representation of female flight students in their flight program. Additionally, 28% of female students indicated a representation of only 11-25% enrolled female flight students. But perhaps, the under representation of female flight students at the collegiate level may be affected by other factors than biases or barriers. One female flight student respondent commented, "I have found that the industry is male dominated not because of biases or barriers, but rather because it's just the "norm". I have never been discouraged or looked down upon based on my gender. If anything, I have been encouraged and people are genuinely interested

in how to attract more females into the industry.” Another respondent indicated that workload and commitment may be factors in the under representation of female flight students. She commented, “I’m not entirely sure why an aviation career doesn’t attract more females. Perhaps it is because of the strain of completing the flight practicum in addition to a classroom workload. Also because there are so many males in the industry, it seems intimidating for women to compete for jobs, even positions in the flight program. It is extremely high pressure and requires commitment.”

As indicated in chapter four, the research data indicates the majority of female flight students do not believe that negative remarks or biases due to gender exist at their collegiate flight program. Respondents indicated that overall their collegiate flight program environments were respectful and supportive of female flight students. One female flight student commented, “As a whole, my collegiate flight program, I think, is accepting of female flight students”. Another respondent commented, “Overall flight training at my college is fair and equal between male and female students; after all, the airplane does not care what gender you are.”

The literature indicated that the high cost of flight training can be a significant barrier to completing flight training at collegiate aviation programs. Often a degree in aviation flight can be among the most expensive, if not the most expensive, four year degrees that are offered by the institution (Aviation College Decision, 2008). To assist students in overcoming significant financial burdens, there are many scholarship opportunities available to flight students.

The numbers of scholarships that are specifically offered for female flight students are generally adequate and available through many different resources. As stated in chapter four, the majority of responding female flight students (59%) believe that their collegiate aviation program offers a sufficient amount of aviation scholarships to assist female flight students with their flight costs. The literature also indicated many other independent sources where female flight students can obtain scholarships outside their collegiate aviation programs.

As indicated in chapter four, the number of professional females that are employed at collegiate aviation programs is insufficient. Fifty-one percent of respondents indicated that they disagreed or strongly disagreed that there are a sufficient number of female professionals (faculty, flight school personnel, CFI's) at their collegiate flight program. Furthermore, 75% of respondents indicated that there are 0-5 female certified flight instructors employed at their collegiate aviation program. Additional female professionals employed at collegiate aviation programs could offer female flight students support, encouragement, and mentorship in the male-dominated collegiate aviation environment.

Comments from female flight students also indicated the need for an increase in additional female professionals employed at their collegiate flight programs. One respondent commented, "I think that identifying female pilots in the aviation industry plays a big role in motivating other females to pursue a career in the aviation field. More female professors and instructors would also definitely help."

In support, another female flight student commented, “I find our flight schools problem is trying to recruit females to fly here. We are unique because our director and chief pilot are both female. We should be using it as an opportunity to go out into the local community and spread aviation to young girls.”

Recommendations

Based on the findings and conclusions of this study the following recommendations have been formulated.

Recommendation 1

Collegiate flight programs should create and administer mentorship relationships with their female flight students. Female flight students should be paired with female professionals (faculty, CFI's) or other senior level female flight students. These relationships can help encourage and inspire incoming female flight students. Incoming female flight students can use and rely on the experiences and advice of their mentors to help give them the best collegiate flight experience possible. These mentorship programs can help female flight students endure any types of gender barriers or biases that may exist, giving them the best opportunity to complete flight training and become professional pilots in the aviation industry.

Recommendation 2

Collegiate aviation programs need to make concerted efforts to employ and retain more female faculty, and female administration. While 49% of female flight students agreed or strongly agreed that there are sufficient numbers of professional females in their flight program, only 8% indicated that the administrator (director, manager, chief flight instructor) is female. These roles within the collegiate aviation environment are inspiring to female flight students. But when few or no women hold these positions, it can be also viewed by female flight students as the inability or unwillingness of the aviation industry to be accepting or inviting to women. These female leadership roles can be a great resource and inspiration to female flight students, and collegiate aviation programs need to continue to promote and retain these positions.

Recommendation 3

Seventy-five percent of female flight students indicated that their flight program employed 0-5 female certified flight instructors. Due to this low representation of female CFI's, collegiate aviation programs need to make proactive efforts to employ, promote, and retain additional female Certified Flight Instructors. With the current status of the aviation industry and pilot shortages, collegiate flight programs are finding it difficult to retain CFI's for long periods, because CFI's are being offered employment from regional and commuter airlines. In an effort to employ and retain more career flight instructors, collegiate flight programs can offer incentives or increased salaries for flight instructors who

are willing to instruct as a career, and not to simply build flight hours. These flight instructors are not instructing simply to gain hours to earn airline employment eligibility, but are instructing due to their passion for flight education. Female flight students, especially those with very little flying experience, are often more comfortable with a female flight instructor. It should not be required or even encouraged that female flight students only receive flight instruction from female CFI's, but in a male dominated environment, many female flight students feel more comfortable training with a female CFI.

Recommendation 4

Collegiate aviation programs should attempt to keep connections and relationships with their previous female alumni. These female alumni will be able to offer a wide breadth of employment experiences. Their experiences would be invaluable when shared with current female flight students. Arrangements could be made for scheduled events or functions where the flight program would host alumni to come to campus to share their experiences and advice to the current flight students. This could be a very informative and inspiring event for the flight students. This could also create a repetitive cycle that when graduates become employed in professional environments, they will remember being inspired or encouraged by past alumni. In turn, they would be encouraged to offer their services, experience, and advice to future flight students.

Recommendation 5

Collegiate flight programs should involve and encourage current female flight students to participate in educational outreach programs that promote aviation careers to females. Promoting aviation careers to younger female students in junior high or high school can help motivate and inspire female flight students. These activities can also help form camaraderie among the female flight students and help create support structures to benefit female flight students.

Further Research

1. Further research studies are needed to determine if female barriers or biases exist in the United States commercial airline industry. Research should be conducted that would gather the experiences and perceptions of female pilots in the first five to ten years of professional employment. Research results from the professional aviation environment could then be used to compare the collegiate aviation environment. It would be beneficial to understand if there is a correlation between the existence of barriers and biases at the collegiate flight training environment and the professional environment.

2. A further study is recommended to explore the causes or purposes that lead to female flight students dropping out of collegiate flight programs as a flight major, and pursuing other aviation majors or college majors. This research study should seek to answer the following questions: Are barriers or biases toward females contributing factors? Do female flight students find the financial burden

of flight training too large to continue training? Are there other reasons that have not been identified that may lead to female flight students dropping out of flight training? Additional reasons that lead to female students choosing majors other than professional flight could offer a more complete analysis of the existence of female barriers or biases within collegiate flight programs.

3. Additional studies are needed to explore female perceptions of flight at the high school level. These studies should explore what young girls' perceptions of pilot careers are? Do they perceive them as a male dominant career? Do they perceive cultural pressure not to pursue a career as a pilot? And do these perceptions inhibit them from considering or pursuing future pilot career goals or interests?

4. A study should be conducted to determine the perception of male flight students within collegiate aviation programs regarding female flight students. This study should seek to answer the following questions. Do male flight students contribute or create negative barriers or biases against female flight students? Do male flight students stereotype female flight students? Do male flight students believe the professional pilot career should be masculine, and if so, do they create barriers or biases that may discourage female flight student from pursuing professional pilot career interests?

5. Additional research is needed that will explore the perceptions of female flight students at non-degree awarding flight training programs. This study should attempt to seek the same information from female flight students that was sought in this study. Do barriers or biases against female flight students exist at non-

degree awarding flight training programs, and how does this correlate to the existence of barriers and biases towards female flight students at collegiate flight programs?

6. Qualitative research should be conducted to study the perceptions of female flight students at collegiate flight programs. This type of research could implement individual interview sessions. Personal interviews could offer significant and meaningful data about the individual experiences and perceptions of female flight students. This research could offer a comprehensive and complete explanation regarding any barriers or biases that may exist.

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APPENDICES

APPENDIX A
RESEARCH INSTRUMENT

Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots

Directions: Your information will be kept confidential and the responses will be anonymously coded. Please provide all requested information.

I. Characteristics of Yourself and Your Collegiate Flight Program

What is your academic classification?

- Freshman
- Sophomore
- Junior
- Senior

Who influenced you to major in “aviation flight” in college?

- Parent(s)
- High School Counselor
- Sibling
- No one, childhood dream
- Friend(s)
- Other _____

Is one of your parent(s) employed in the Aviation industry?

- yes
- no

How do you “primarily” pay for your flight costs?

- Parent (s)
- Myself
- School Loans
- Other _____
- Scholarships

How many full-time students (male and female) are currently enrolled in the collegiate flight program?

- 1-50
- 51-100
- 101-150
- 151 - 200
- over 200

What percent of full-time students enrolled in the flight program are female?

- 0-10%
- 11-25%
- 26-50%
- over 50%

What flight certificate/rating are you currently pursuing?

- Private Pilot
- Multi-Engine (Instrument)
- Commercial
- Certified Flight Instructor
- Instrument
- Certified Flight Instructor (Instrument)
- Multi-Engine
- Other _____

How many female certified flight instructors (CFI) are employed in your flight program?

- 0
- 1-5
- 6-10
- 11-20
- over 20

During your tenure in the flight program, have you had at least one female CFI training you?

- yes
- no

The “person in charge” (Department Head, Director, Manager, Chief Flight Instructor, etc) at my collegiate flight school is female.

- yes
- no

II. Perceptions of Your Collegiate Flight Program

Please indicate your perceptions using the following scale:

SA = Strongly Agree, A = Agree, D = Disagree, and SD = Strongly Disagree

The current cost of flight training at my collegiate flight school has an effect on the ability of female flight student to pursue an aviation career (pilot) at my educational institution?	SA	A	D	SD
My aviation department/institution offers sufficient aviation scholarships to assist female students with their flight costs.	SA	A	D	SD
My aviation department provides sufficient aviation internships to assist female flight students with career/professional opportunities.	SA	A	D	SD
The under represented number of female flight students should be a primary concern of the aviation department at my institution.	SA	A	D	SD
My aviation department/institution does an excellent job of recruiting females students to my collegiate flight program.	SA	A	D	SD
There are a sufficient number of professional females (faculty, flight school personnel, CFIs) in my collegiate flight program.	SA	A	D	SD
My aviation department/institution makes efforts to attract more young females (junior high and high school) to careers in aviation through educational opportunities and public outreach.	SA	A	D	SD
Favoritism towards male flight students (internships, scholarships, CFI positions) exists in my collegiate flight program.	SA	A	D	SD
Negative (rude and offensive) comments regarding female flight students are frequent at my collegiate flight school.	SA	A	D	SD
Gender “barriers” exist in my collegiate flight program.	SA	A	D	SD
The primary reason female flight students quit collegiate flight programs is because of gender barriers and biases.	SA	A	D	SD

III. Comments Please add any additional comments in the space provided below.

APPENDIX B

SOLICITATION E-MAIL REQUESTING PARTICIPATION

Dear Collegiate Flight Center Administrator:

Dr. Timm J. Bliss & Mr. Chad L. Depperschmidt, Oklahoma State University are conducting a research study on the under representation of female aviation students in collegiate flight programs.

Historically, the aviation industry (including collegiate aviation programs) has been a male-dominated field. While women constitute only a small percentage of the professional pilot force (commercial, corporate), they comprise a large resource pool from which the aviation community can draw. In order to retain the best students in academic aviation programs, collegiate flight programs need to proceed proactively in addressing emerging areas of concern for the under representation of female aviation students in collegiate flight programs.

This research study is designed to examine female collegiate aviation students' perceptions of their collegiate flight programs. The participants for this research study will consist of female collegiate aviation students enrolled in an academic collegiate flight program at 4-year public and private universities and 2-year public and private colleges in the United States offering comprehensive aviation curriculums in flight training. **The participants will complete a brief two-page survey (attached for your review).**

The final research report written by the researchers will be presented at professional aviation and educational conferences (Women in Aviation and University Aviation Association) and published in peer-reviewed aviation and educational journals.

The researchers would greatly appreciate your participation in this study. To participate, please:

- ✓ Reply to this email and send us your complete mailing address and the approximate number of female aviation students currently enrolled in your collegiate flight program. In return, we will send you the surveys to be completed by your female flight students.
- ✓ Arrange a meeting time (preferably within two weeks of receiving the surveys) to gather your female students so they can complete the surveys.
- ✓ After the students have completed their survey and sealed them in the attached envelope, please place them in the return envelope and mail them back to the researchers.

If you have questions, please do not hesitate to call one of us. Timm Bliss (405.744.8146) or Chad Depperschmidt (405.744.3982).

APPENDIX C
RESEARCH INSTRUMENT COVER LETTER

Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots



Historically, the aviation industry (including collegiate aviation programs) has been a male-dominated field. While women constitute only a small percentage of the professional pilot force (commercial, corporate), they comprise a large resource pool from which the aviation community can draw. In order to retain the best students in academic aviation programs, collegiate flight programs need to proceed proactively in addressing emerging areas of concern for the under representation of female aviation students in collegiate flight programs.

This research study is designed to examine female collegiate aviation students' perceptions of their collegiate flight programs. The participants for this research study will consist of female collegiate aviation students enrolled in an academic collegiate flight program at 4-year public and private universities and 2-year public and private colleges in the United States offering comprehensive aviation curriculums in flight training.

The researchers, *Dr. Timm J. Bliss & Mr. Chad L. Depperschmidt, Oklahoma State University* strongly believe the information obtained in this research initiative can be a springboard to facilitate discussion and offer a way for the nation's collegiate aviation community to proceed proactively in addressing emerging areas of concern for the under representation of female aviation students in collegiate flight programs.

Your participation in this research study is **strictly voluntary**. Your response to each survey question will remain confidential and will be anonymously coded for statistical analysis. It will be understood by the researchers if you complete this survey and submit your responses back to the researchers, you have agreed and given your consent to participate in this study.

The researchers of this research study personally *thank you* for your feedback and support of this research. The final research report will be presented at professional aviation and educational conferences (Women in Aviation and University Aviation Association) and published in peer-reviewed aviation and educational journals.

If you have questions regarding this study, please contact Chad Depperschmidt at 405.744.7190 or chad.depperschmidt@okstate.edu or Dr. Sue Jacobs, Chair – Institutional Review Board, Oklahoma State University at 405.744.1676.

APPENDIX D

INSTITUTIONAL REVIEW BOARD APPROVAL FORM

Oklahoma State University Institutional Review Board

Date: Wednesday, March 29, 2006
IRB Application No ED06115
Proposal Title: Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots
Reviewed and Processed as: Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 3/28/2007

Principal Investigator(s)

Chad L. Depperschmidt
309 Willard
Stillwater, OK 74078

Timm Bliss
317 Willard Hall
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 415 Whitehurst (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,



Sue C. Jacobs, Chair
Institutional Review Board

Oklahoma State University Institutional Review Board

Date: Friday, March 09, 2007 Protocol Expires: 3/8/2008
IRB Application No: ED06115
Proposal Title: Collegiate Aviation Programs and Their Under Representation of Female Students: A National Study of the Perceptions of Female Student Pilots
Reviewed and Processed as: Exempt
Continuation

Status Recommended by Reviewer(s): **Approved**

Principal Investigator(s) :

Chad L. Depperschmidt 309 Willard Stillwater, OK 74078	Timm Bliss 317 Willard Hall Stillwater, OK 74078
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Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office **MUST** be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

- The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

Signature :



Sue C. Jacobs, Chair, Institutional Review Board

Friday, March 09, 2007

Date

VITA

Chad L. Depperschmidt

Candidate for the Degree of

Doctor of Education

Thesis: COLLEGIATE AVIATION PROGRAMS AND THEIR UNDER
REPRESENTATION OF FEMALE STUDENTS: A NATIONAL STUDY OF THE
PERCEPTIONS OF FEMALE STUDENT PILOTS

Major Field: Applied Educational Studies

Biographical:

Personal Data: Born in Ponca City, Oklahoma, 1978, the son of Garry and Nellie Depperschmidt.

Education: Graduated from Ponca City Senior High School 1997; received Bachelor of Science Degree in Aviation Sciences from Oklahoma State University, May 2004; received Master of Science Degree in Natural and Applied Sciences with an emphasis in Aviation Management from Oklahoma State University, July 2005; completed the requirements for Doctor of Education, Applied Educational Studies with an emphasis in Aviation and Space Education, from Oklahoma State University, July 2008.

Professional Experience: Lecturer - Aviation Education, Oklahoma State University, Stillwater Oklahoma 2007 – 2008; Teaching Assistant - Aviation Education, Oklahoma State University, Stillwater Oklahoma 2005-2007; Graduate Assistant - Aviation Education, Oklahoma State University, Stillwater Oklahoma 2005-2007.

Name: Chad L. Depperschmidt

Date of Degree: July, 2008

Institution: Oklahoma State University

Location: Stillwater, Oklahoma

Title of Study: COLLEGIATE AVIATION PROGRAMS AND THEIR UNDER
REPRESENTATION OF FEMALE STUDENTS: A NATIONAL STUDY
OF THE PERCEPTIONS OF FEMALE STUDENT PILOTS

Pages in Study: 105

Candidate for the Degree of Doctor Education

Major Field: Applied Educational Studies

Scope and Method of Study: The purpose of this study was to determine the existence and extent of barriers and biases against female flight students at collegiate flight programs. The researcher gathered data from female flight students related to their under representation and the existence of negative barriers or biases in collegiate aviation programs. Women have remained underutilized and underrepresented as professional pilots in the United States air carrier industry. If the trend of under representation of females in collegiate flight programs remains unchanged, women will continue to account for a decreased role within the aviation industry. While females constitute a small percentage of the commercial pilot force, they comprise a large resource pool for the commercial aviation industry. Therefore, the commercial aviation industry can significantly increase the amount of females seeking aviation careers if this trend of under representation can be reversed. The purpose of this study was to identify the barriers and other possible issues that propagate the under representation of females in collegiate aviation programs by focusing on female flight students' personal perceptions of their collegiate aviation programs. Four research questions were used to support the findings of the study using descriptive statistics. Data from the research instrument was analyzed using the statistical analysis software Statistical Package for the Social Sciences.

Findings and Conclusions: This study was guided by four research questions that related to the following areas; the under representation of female flight students of collegiate aviation programs, negative barriers or biases within collegiate aviation programs, internships and scholarships offered specifically for female flight students, and adequate numbers of female professionals employed at collegiate aviation programs. This study found; female flight students believed that the under representation of female flight students should be a primary concern for their collegiate aviation program, female flight students do not believe that negative remarks or biases due to gender exist within their collegiate flight program, female flight students do believe that both scholarships and internships specifically offered for female flight students are adequately available from their collegiate flight programs, and that there is not a sufficient number of female professionals employed at their collegiate flight program.

ADVISER'S APPROVAL: _____