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THE FUTURE OF WOMEN IN AVIATION: TRENDS IN PARTICIPATION IN POSTSECONDARY AVIATION EDUCATION

David C. Ison

Abstract

The purpose of this research was to evaluate the trends in participation by women in postsecondary aviation programs in the United States both at the student and faculty levels. Data concerning the number of students who completed baccalaureate degrees in aviation was collected via the Integrated Postsecondary Education Data System (IPEDS). It was found that 560 (10.5%) students among the 5,355 total that completed a degree in an aviation related field in 2007 were female. Also, of 434 full-time aviation faculty members employed at 74 different aviation programs meeting the criteria of this study, 35 (8.1%) were found to be female. 84 faculty were identified in an academic leadership positions and of these individuals, 10 (11.9%) were women. These participation rates were found to be higher than those found among the aircraft pilot population and in the aviation industry in general. The level of involvement of women in aviation higher education in recent years has shown no significant improvement among students, however, there has been a small increase among faculty in comparison to the findings of four out of five previous studies.

Over the past three decades, the enrollments of women in postsecondary education have grown significantly. According to the National Center for Education Statistics, the percentage of undergraduate students who are women grew from 42.3 in 1970 to 56.1 in 2000 (U.S. Department of Education, 2004). By 2005 this number had risen further to 57.4% (National Center for Education Statistics, 2008). These figures, however, are averages across all majors and fields of study. Historically, though, there have been certain subjects in which women have lagged such as in the science, technology, engineering and mathematics (STEM) fields (Turney, 2004; Babco, 2003). In particular, women have consistently been underrepresented throughout the aviation industry (Hedge, 2007).

The importance of diversity in higher education has been highlighted by a variety of research (Fassinger, 2008; Umbach, 2006; Lockwood, 2005; Turney, et al, 2002; Willdorf, 2000; Brinson and Kottler, 1993; Luedtke, 1993). Thus an assortment of programs and initiatives has been undertaken over the years to improve women and minority representation in general and in specific fields (American Council on Education, 2008; The Sallie Mae Fund, 2008; The White House, 2003; W.K. Kellogg Foundations, n.d.). Significant effort has also been put forth to raise the number of women and minorities in the STEM fields (Burke and Mattis, 2007; Commission on Professionals in Science and Technology, 2006; Committee on Equal Opportunity in Science and Engineering, 2004; Babco, 2003). Furthermore, the Federal government and several private organizations have made concerted efforts to improve participation rates by women and minorities in the aviation industry (Federal Aviation Administration, 2008; The Wolf Aviation Fund, 2008; Federal Aviation Administration, 2007a; Women in Aviation, 2007).

Unfortunately, little research exists that investigates whether there has been any improvement in the quantity of women moving through the aviation industry

supply pipeline, i.e. aviation higher education. This lack of complete and current data exists for all aspects of participation by women in postsecondary aviation. The critical importance of identifying participation rates of women in postsecondary aviation is exemplified by the fact that college degrees have essentially become a gatekeeper to the world of professional aviation as the industry in general has come to favor or require this level of education for employment (Hamilton, 2008; U.S. Department of Labor Bureau of Labor Statistics, 2007; Hanson and Oster, 1997). Of course this data is also critical to aviation human resources managers because as population demographics continue to change, the industry will have to increasingly rely on the employment of women and minority college graduates (Turney and Maxtant, 2004; Hanson and Oster, 1997; Villazon, 1992). Considering the lack of available data, the efforts that have been put forth to help increase the participation rates of women in aviation, and the importance of diversity to the future of the industry, there is a significant need to quantify and analyze the participation rates of women in aviation higher education.

Diversity in the Classroom: Women in Higher Education

Although women have never faced the virulent opposition to their inclusion in higher education like that which occurred during desegregation, they were not always welcome in the postsecondary world. In the colonial era, "women were excluded from colleges by statute" (Thelin, 2004, p. 30). However, following the creation of the United States, women began to make limited progress towards participating in higher education. "Between 1800 and 1860 at least fourteen institutions enrolled women for advanced studies in what is thought to have been 'college-level' work" (Thelin, 2004, p. 55). This was followed by the opening of the first women's colleges during the mid 19th century. Yet much of women's education during this period took place in normal schools which were designed primarily to produce educators for the nation's youth (Thelin, 2004).

The next significant change for women in higher education did not take place until after the Civil War when they were finally allowed to attend institutions side-by-side with men. Yet, according to Thelin (2004), even though women were accepted in a coeducational habitat, the education they received was not always equal. Even in light of these challenges, women attended schools in record numbers vastly helping the growth and support of women's colleges as well as laying the foundations for both curricular and extracurricular focuses related to women's interests at other institutions (Thelin, 2004). During the early part of the 20th century, the "proportion of women students grew slowly, from 32 to 37 percent (1890-1913), but the proportion of women in coeducational institutions nearly doubled to 68 percent" (Geiger, 2005, pp. 54-55).

From the pre-World War period through these conflicts, women continued to enjoy favorable participation rates. In 1940, Thelin (2004) reported that women "constituted 40 percent of the undergraduate enrollment" (p. 226). Oddly, in the 1950's there was an interruption to the progress being made by women in higher education. Fass (1997) refers to this fissure as the "female paradox" because societal pressures expressed some resentment about the amount of education women were receiving versus the perceived need for their edification. During this period, "the proportion of women in institutions of higher learning plummeted to 30 percent" (Fass, 1997, p. 700). However, the postsecondary participation by women rejoined its upward track within the next decade.

More recently, women have enjoyed significant gains in participation. In 1970, 42.3% of undergraduate students were women. By 1980, this percentage had grown to 52.3. Ten years later, 55.0% of undergrads were female and by 2000, participation had grown to 56.1%. According to the 2007 Integrated Postsecondary Education Data System (IPEDS) data, the unduplicated 12 month undergraduate headcount was 56.8% women (see Figure 1) (National Center for Education Statistics, 2008). Further, women have shown a greater persistence to graduate and have higher educational attainment rates for those aged 25-39 (U.S. Department of Education, 2004).

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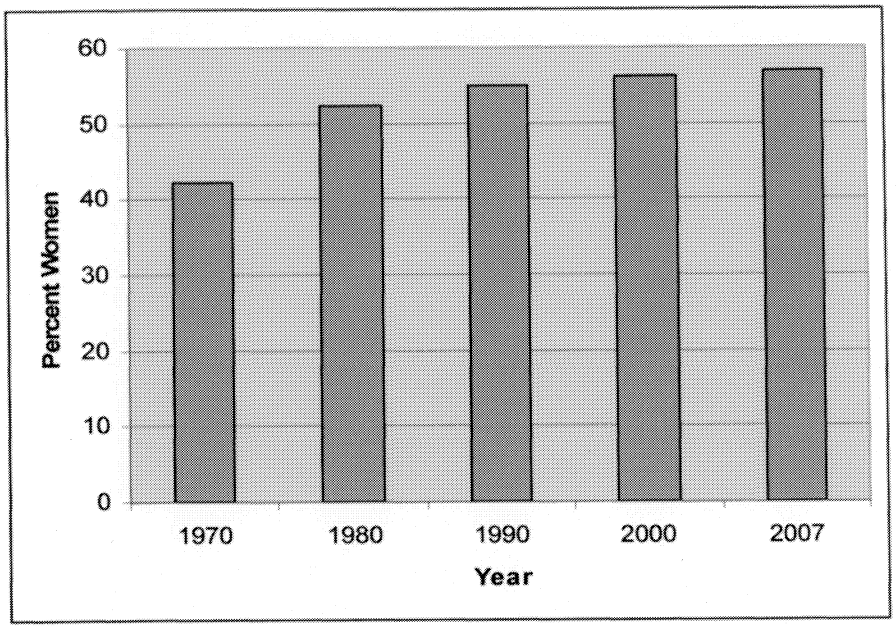

Figure 1. Percentage of women college students: Trends from 1970 to 2007.

Yet while these changes in the construct of the higher education student population have taken place, the distribution of this diversification has not been evenly distributed among all areas of study. "[G]ender differences in majors still exist, with female bachelor's degree recipients much less likely than their male peers to major in computer science, engineering, and physical sciences" (National Center for Education Statistics, 2004, p. 9). Women have consistently been underrepresented in the sciences, technology, engineering, and mathematics (STEM) fields. However, there recently have been consistent gains made in the participation rates of women in these areas. According to the U.S. Department of Education (2004), only 29.7% of undergraduate degrees awarded in the life sciences in 1970. Yet in 2001, women received 59.5% of these degrees. In engineering, the percentage of women baccalaureate degree recipients was 0.7 in 1970 and blossomed to 19.9 by 2001. Among mathematics graduates, 37.4% were women in 1970, while in 2001 this statistic had grown to 47.7%.

Of course, after years of underrepresentation of women in the STEM fields this discrepancy cannot be expected to change overnight. Numbers of female students must pass through the pipeline into industry for an extended period of time to impart change. However, recent improvements do provide hope for a future of enhanced participation rates (Holbeche, 2006). Fassinger (2008) notes that women now outnumber men in the number of bachelor's degrees awarded in the STEM fields. Even though the STEM workforce is still dominated by men, evidence of progress can be seen in recent strides made by minorities identified by Babco (2003) and Fassinger (2008).

In addition to gains made at the student level, the number of women faculty in all of higher education has been increasing at a marked pace. The 1993 National Study of Postsecondary Faculty (NSOPF) reported that the participation by women in higher education faculty was 38.6%. By 2004, this value had grown to 42.5% (National Center for Education Statistics, 2004). This trend has apparently been fueled by the rise in the number of women receiving doctoral degrees. In 2006, Smallwood (2006) reported that, "For the fourth year in a row, the majority of U.S. citizens earning doctorates were women. [... Including

non-citizens], women earned 45 percent of the doctorates. They accounted for 39 percent of the doctorates in science and engineering fields and 57 percent in other fields," (p. A12). Thus women in all areas, but notably in the STEM fields, are steadily gaining the requisite education to participate as faculty.

Aviatrix et al: A Historical Perspective of Women in Aviation

Contrary to the way that the involvement of women in aviation is typically presented, their participation in this vocation is not novel or contemporary. As early as the late 18th century, women were involved in taking to the skies. Genevieve Labrosse made the first parachute jump by a woman (from a balloon) in 1797 (Think Quest, n.d.). Another first was captured by Sophie Blanchard who piloted a hydrogen balloon above France in 1805 (Lienhard, 1999). Mary Myers is credited as being the first U.S. aeronaut in 1880, making many flights in balloons. Although not often mentioned, Katherine Wright, sister of the Wright brothers, lent financial support to her brothers' efforts. Soon after the Wrights took to the air, Blanche Scott became the first woman to fly a powered aircraft in 1910. A year later, Harriet Quimby earned the title of the first woman to earn a pilot certification in the U.S (Oaks, 1992).

Interestingly, women had to support each other in these neophyte years of aviation. Few men wanted to instruct women to fly and as a result women became involved in flight instruction to help others join the aviatrix ranks. Amelia Earhart received much of her aviation training from a woman named Neta Snook. Of course Earhart herself earned a significant spot in aviation history breaking many records that were impressive regardless of the sex of the pilot (Oaks, 1992). Also quite intriguing was the fact that women of ethnic minorities became involved in aviation early on, probably the most famous being the first African American (both male and female) pilot to earn a license, Bessie Coleman. Women also designed aircraft (1906), broke many records (1911), performed aerobatics (1915), began to deliver airmail (1918), and became aircraft mechanics (1925) (Women in Aviation International, n.d.).

The involvement of women in aviation heightened during World War II as the demands on the U.S. aviation system became strained. Women became more involved in aviation education mostly through flight instruction. They also made significant contributions to the war effort through their efforts as Women Air Force Service Pilots (WASPs). In 1964, women had made circumnavigation flights and had been in orbit. Within the next decade, women gained access to the cockpit of jet airline aircraft. By 1974, the U.S. Armed Forces began to train woman as "official" military pilots (Oaks, 1992; Women in Aviation, n.d.).

Since the true infiltration of women into the highest levels of professional aviation, i.e. airline and military flying, they have made steady strides in participation rates. In 1998, there were 681,103 total pilots in the U.S. Among these individuals, 34,679, or 5.1%, were women. In 2008, the aggregate number of pilots had declined to 648,960, however, the number of women pilots grew to 35,784 or 5.5%. Women have gained ground at all pilot certificate levels from private to airline transport pilot (ATP). They have also made consistent improvements in participation rates among flight instructor certificate holders (see Figure 2) (Federal Aviation Administration, 2007b; Federal Aviation Administration, 2007c).

The improved participation by women in aviation has not been limited to the operation of aircraft: "the number of women in the [aviation] industry is growing steadily, if not dramatically" *Aviation Week and Space Technology* (2002). Among non-pilot job functions (excluding flight attendants), e.g. ground instructors, aircraft dispatchers, aircraft maintenance personnel, and flight engineers, the participation rate among women has grown from 2.8% in 1998 to 3.9% in 2007. Among flight attendants, a statistic first reported by the Federal Aviation Administration only recently, women made up 80.6% of this group in 2007. This particular subset is clearly the exception to what is found in all other components of the industry (Federal Aviation Administration, 2007b; Federal Aviation Administration, 2007c).

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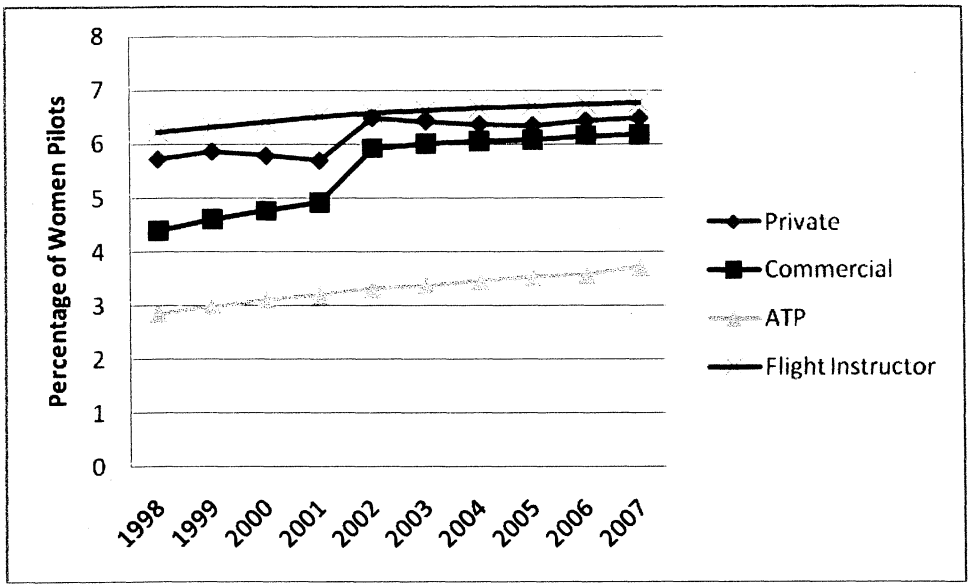

Figure 2. Percentage of women pilots: Trends from 1998 to 2007.

Women in the Aviation Classroom

Within the past decade, there have also been increases in the numbers of women who a participating as students in aviation higher education. According to the U.S. Department of Education (1995; 2005a), 373 (10.8%) four year aviation program graduates were women in 1995 and by 2005 this number had grown to 545, or 11.7%. These statistics are encouraging because the participation rate increased and that these rates exceeded those found in the industry. As Babco (2003) and Fassinger (2008) noted, such statistical imbalances between the participation rates of higher education graduates and those found in industry likely favor improvements in representation of underrepresented groups in the field. Beyond this snapshot, however, little data exists about the trends in participation rates by women within aviation undergraduate programs.

Women Among Aviation Faculty

Unfortunately, there is no current data on the status of women postsecondary in aviation faculty positions. Johnson conducted three studies that collected faculty demographics as a peripheral component of the research. In his 1993 study (n = 79), Johnson found that only 6.4% of aviation faculty were found to be female. In 1997, Johnson repeated the gender inquiry yielding 1 (1.3%) female among 75 total positions. Two years later, Johnson (1999) (n = 56) reported that 7.1% of aviation faculty were women. In a much larger study (n = 237), Luedtke (1993) discovered that 25 or 10.5% of aviation faculty were female. The largest study, conducted by Bowen (1990) (n = 481), indicated that 25, or 5.2%, of aviation faculty were female (see Table 1).

Bowen (1990) and Luedtke (1993) both hypothesized that the limited number of female faculty members was due to the low numbers of women pilots and the lack of participation by women in the STEM fields. Clearly, these arguments are less compelling today than years ago as the numbers of women pilots have been on the rise and women are now earning a significant portion of the doctoral degrees in the STEM fields. Further, the number of women collegiate aviation students was never taken into consideration. As the numbers these particular students have increased, it should be expected that such changes favorably influence the quantity of female aviation faculty members.

Table 1.
Summary of studies of women among aviation faculty.

Year Of Study	Sample Size (n)	Percent Women Students
1990 (Bowen)	481	5.2
1993 (Luedtke)	237	10.5
1993 (Johnson)	79	6.4
1999 (Johnson)	56	7.1

Research shows that improved participation of women among aviation faculty is critical to the support of fellow women in aviation higher education. Luedtke (1993) stated that female faculty in aviation act as leaders and mentors for future generations of women aviation professionals. Turney, et al (2002) found that women aviation college students reported higher confidence and better educational experiences when in contact with female faculty. Other studies indicate that a diverse set of faculty mentors is conducive to supporting a diverse set of students (Umbach, 2005; Brinson and Kottler, 1993). The retention and success of new professors from underrepresented groups has been found to improve with the guidance by a diverse set of fellow faculty, thus helping to insure long-term faculty diversity (Willdorf, 2000). Also, the presence of women in academic leadership positions enhance this support, at the very least psychologically, fellow female aviation faculty as well as women students.

Diversity in Aviation: Importance and Efforts

A variety of findings indicate the importance of insuring that the aviation workforce is of a diverse set of individuals, with the obvious inclusion of women. "Given the need for a highly technically skilled workforce, the aviation industry seeks to attract and retain the best and brightest talent for its future and growth. And that of necessity means drawing from a diverse talent pool" (Turney and Maxtant, 2004, p. 5). Moreover, "to ensure that aviation has the future workforce it needs to ensure that aviation jobs are open to all members of society. There is clearly untapped potential in groups that have been historically underrepresented in the industry" (Hanson and Oster, 1997, p. 114). Fassinger (2008) stated that it is essential to have employees from a wide range of backgrounds to deal with the increasingly global and highly competitive economic environment. In fact, considering the changing demographics, Fassinger (2008) commented that the future economic status of the United States will depend on this seeking of diversity.

Because of the obvious importance of diversity in aviation, a variety of Federal, industry, and private organizations have adopted initiatives to promote participation by women and minorities in aviation. In 1992, Congress became interested in developing programs and initiatives to improve the participation rates by women within the aviation industry (U.S. Department of Education, 2005b). The Federal Aviation Administration now has specific regulations that guide its affirmative action standards and requirements (U.S. Department of Transportation, 2008). Both the Federal Aviation Administration and a number of private entities have also put forth significant effort to improve diversity in aviation. "A number of aviation education programs undertake such efforts, including the FAA's Aviation Career Education Academies as well as more targeted programs sponsored by groups such as the Organization of Black Airline Pilots, the Ninety-Nines, and Women in Aviation International" (Hanson and Oster, Jr., 1997, p. 121). Numerous airlines, as well as other types of aerospace companies, have formalized their efforts to seek a more diverse employee population (Henderson, 1995, p. 43).

Although it appears that women have enjoyed an improved level of participation in aviation in recent years, current research paints an incomplete picture of what is occurring in this field of study. Since the future generations of aviation professionals are cultivated in collegiate aviation programs, it is necessary to investigate the completions of such programs by women to bring to light whether or not these individuals are likely to make continued progress in this field. But even more importantly, this data sheds light on what is to come in the future for women in aviation. Furthermore, there has been little research into the participation of women in aviation faculty positions and academic leadership positions. Because of the support that

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these individuals provide to female aviation students, particularly when it comes to recruitment and retainment, it is critical to investigate trends among these individuals.

Methodology

Purpose

The purpose of this study was to quantify the historical number of women students who have completed a collegiate aviation baccalaureate degree program in the United States to ascertain if they have made statistically significant gains in participation rates in postsecondary aviation in recent years. This study also sought to quantify the number of women in aviation faculty positions and compare them to the findings of previous research. Further, this study aimed to evaluate the number of women in academic leadership positions in aviation programs. Lastly, this study intended to provide baseline data for future studies in this area.

Participants

Women Aviation Postsecondary Students

The population for the student component of this study was all students who have completed a baccalaureate degree in an aviation program at degree-granting institution in the U.S. that reports student statistics to the Integrated Postsecondary Education Data System (IPEDS). The IPEDS universe of schools included institutions in any area or sector of the United States and of all sizes and classifications. Results were restricted to the number of students who completed a degree as IPEDS only reports specific fields of study in this subset. This was deemed a logical confinement due to the fact that the resultant numbers best reflect those who will have the necessary education to competitively enter the aviation workforce. Within this degree completion data, the results were further refined through the selection of the subset "Awards/degrees conferred by program (6-digit CIP code), award level and gender" (National Center for Education Statistics, 2008) along with the following selections:

- Award level: bachelor's degrees
- First major (in years selectable)
- Grand total of students, total; female
- 49-Transporation and Material Moving Workers
    - 49.01-Air Transportation Workers

From the year 2003 to 2007, an additional area of study code under the Air Transportation Workers category, 49.0108-Flight Instructor, was made available and was included in the analysis. There were no significant differences noted in the numbers of participants based on the inclusion of this category (National Center for Education Statistics, 2008).

Women Postsecondary Faculty and Administrators

The target population for this component of the study was all full-time aviation faculty who are employed at each postsecondary aviation program that awards baccalaureate degrees. For the purposes of this study, the designation of "full-time aviation faculty" included only those fully-appointed (non-adjunct/non-visiting) faculty who teach non-engineering related aviation subjects. Specifically excluded from this study were flight operations personnel (flight instructors and flight operations administrators).

A sample of aviation schools was gathered from the 2008 version of the University Aviation Association (UAA) *Collegiate Aviation Guide*. Both UAA and non-UAA member schools were investigated. Although a comprehensive guide to postsecondary aviation programs, the sample collected from this guide cannot be assumed to represent all collegiate aviation programs in the U.S (University Aviation Association, 2008). To insure proper coverage, the fall 2008 collegiate aviation program produced by the Aircraft Owner's and Pilot's Association (2008) was referenced. All institutions that offered bachelor's degrees that were missing from the UAA listing were mined for data.

Procedure

The IPEDS dataset cutting tool was utilized to extract the necessary data on participation rates by women in postsecondary aviation based upon the parameters outlined previously. For each year between 1997 to 2007 the total number of aviation program students and the number of women aviation program students completing baccalaureate degrees were collected and stored as an individual Microsoft Excel file (National Center for Education Statistics, 2008; Microsoft, 2007). Participation rates for each year were then calculated by dividing the number of female students by the total number of students.

These results were then placed into a separate Excel spreadsheet for comparison and analysis. The participation rates of all reported groups were analyzed using the Dimensions Research (2005) *z*-test for two proportions. This method of analysis was selected following a thorough review of statistical tools (Gravetter and Wallnau, 2007; Stephens, 2006; Blommers and Lindquist, 1960) and through consultation with senior faculty in the Educational Psychology Department at the University of Nebraska – Lincoln (C. Ansorge, personal communication, October 22, 2008). Because this component of the research aimed to identify statistically significant change in participation rates, a two-tailed test method was utilized. A confidence interval of 95% was selected as the standard for this study (Clark-Carter, 1997).

For the female aviation faculty component of this study, each program website fitting the parameters of the study was mined for faculty data. This method was chosen so as to avoid the reliance on responses to a survey insuring a broad, random sample of data. During the mining process, there was little difficulty in identifying genders of faculty members through this methodology. Of the few problems that were encountered, further investigation into the program website confirmed the gender of the individual in question. From each website, the total number of full-time aviation faculty and the gender of each faculty member were identified. Next, those individuals in the position of program director, chair, dean or their equivalent, along with their gender, were collected. These findings were then converted into participation rates by dividing the number of women in a particular position by the total number of individuals in the same position. The resultant data was compared to that uncovered in previous research.

Results

Analysis of the aviation programs completion IPEDS data yielded a fairly stable participation rate by women averaging 11.5% between 1997 and 2007. There were some fluctuations in percentages during this period with the most significant occurring in 2003 and 2007 (see Figure 3). To determine change over time, the statistics available from 1997 were compared to the most current numbers reported for 2007. In 1997, the total number of aviation related degree completions was 3,287 and in 2007 this number had increased to 5,355. During this same period, the participation rate of women in aviation program completions dropped from 11.8% (388 students) to 10.5% (560 students) (National Center for Education Statistics, 2008). This change was found to be statistically insignificant (z = 1.90, p = 0.057). The significances of change in participation rates for each year were also calculated to evaluate general trends (see Table 2). There were no statistically significant differences in participation rates year-to-year during the period investigated.

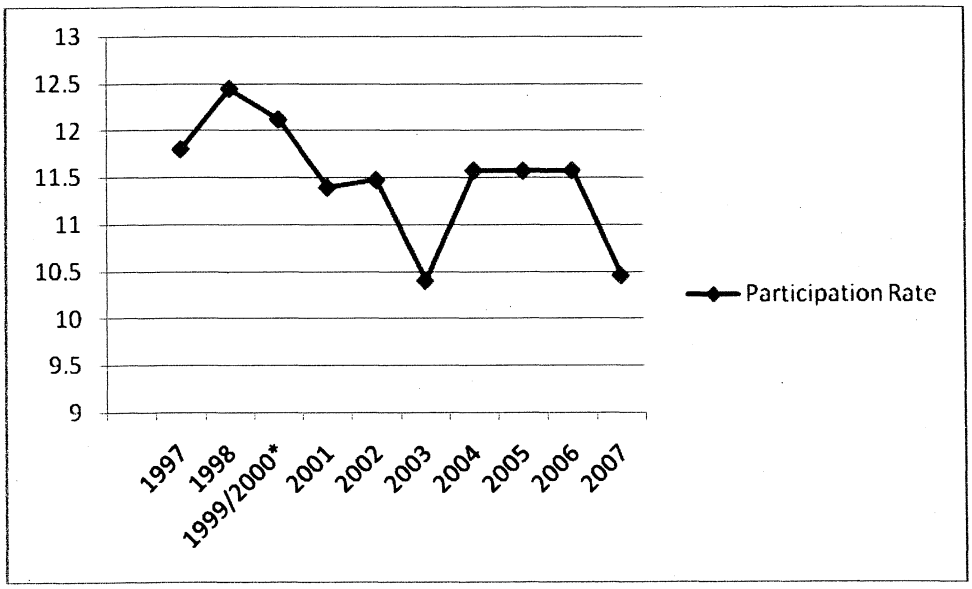

Figure 3. Participation rates of women in aviation higher education from 1997 to 2007. * IPEDS changed the year report convention at this time. Instead of being reporting data during this period as 1999-2000, it was changed to 2000. This model has been used since.

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Table 2.
Statistical significance of changes in aviation program completion rates by women: 1997 to 2007.

Year Ranges Of Change	Change During Period %	z Score	Statistically Significant? $\alpha = .05$
1997-1998	+0.65	0.747	No
1998-1999	-0.33	0.355	No
2000-2001*	-0.73	0.877	No
2001-2002	+0.08	0.07	No
2002-2003	-1.08	1.53	No
2003-2004	+1.18	1.74	No
2004-2005	-0.003	-0.018	No
2005-2006	+0.005	-0.017	No
2006-2007	-1.12	1.77	No

* IPEDS changed the year report convention at this time. Instead of being reporting data during this period as 1999-2000, it was changed to 2000. This model has been used since.

For the component of this research exploring women aviation faculty, data was collected from a total of 74 baccalaureate institutions which provided data for 434 full-time aviation faculty members of which 35 (8.1%) were found to be female. Due to the inability of the researcher to insure compatibility of this data with previous studies in this area, tests for statistical significance of changes in participation rates were deemed to be inappropriate. Lastly, among the individuals analyzed 84 faculty were titled in an academic leadership position such as chair, dean, program director, etc. Within this group of faculty leaders, 10 (11.9%) were women.

Discussion

When evaluating the future of the status of women in aviation, it is necessary to investigate what is occurring in the primary pipeline that feeds the industry. Clearly, aviation higher education is a primary source of aviation professionals for the industry. Upon evaluating this supplier of workers, it is necessary to employ basic logic to determine how current supplies may be able increase the participation rates of individual groups within a workforce. Simply, if more women are moving through the aviation higher education pipeline than are currently in the workforce, there is bound to be some eventual improvement in the participation by such individuals in industry. Although this is not guaranteed, such is a plausible and encouraging scenario.

Women have averaged a participation rate of 11.5% in aviation higher education in the last ten years. During the same general time period, only 5.1 to 5.5% of all pilots were women. Today, there are still less than 4.0% of non-pilot aviation workers that are women. Thus the fact that women continue to hold a participation rate in the pipeline to the industry that is higher than what is found in that workforce appears to be favorable. And the influences of this higher rate can be seen in the gradual increases in participation rates in industry. Within the past decade, the number of women professional pilots, those with Airline Transport Pilot (ATP) certificates, has increased over 40%. Furthermore, the numbers of non-pilot worker have jumped over 35% (Federal Aviation Administration, 2007b; 2007c).

While these movements within the industry are encouraging, the fact that the participation rate of women in higher education has not improved within the last ten years is disconcerting. It is obvious that more women are entering the industry, but it appears that the numbers in the supply line have leveled off. Considering the rapid rise in the number of women in higher education and in the workforce, one would hope that these improvements may trickle into the aviation field.

In contrast, it is encouraging that women now occupy 8.1% of faculty positions in aviation programs considering that industry participation rates are generally lower than that value. Even more promising is that 11.9% of individuals in aviation education leadership positions are women. Both of these statistics lay the foundation for continued and improved recruitment, retainment, and mentoring of female postsecondary aviation students and faculty. Another reassuring trend is that the participation rates of women among aviation faculty have risen in comparison to all but one previous study in this area. Yet again, the participation by women among aviation faculty

still lags behind that found in higher education in general

While on the surface all of this data may appear to be cause for disappointment, such statistics must be put into perspective in relation to the industry in question. The aviation industry has had historically low participation rates by women. Yet within the industry, these numbers have been rising contemporarily. The fact that female student, faculty, and academic leadership participation rates are higher than found within the industry provides hope for future improvements by women in aviation. Although such gains will be slow coming without an acceleration of participation levels, steady progress is certainly better than stagnation or regression.

Summary

The purpose of this study was to investigate the status of women in aviation higher education. Women currently make up 10.5% of the aviation higher education student body. They also hold 8.1% of faculty positions within aviation higher education. Within these programs, 11.9% of individuals holding academic leadership positions are women. In comparison to an industry that has participation rates of 3.9% in non-flying positions and 5.5% among pilots, the status of women in aviation higher education is acclamatory.

However, there should still be some concern about the participation by women in aviation. While the trends in the participation rates by women in aviation higher education faculty positions are mostly positive, there have been no recent improvements by women at the student level. Moreover, the overall participation rates of women in aviation are still unimpressive. It is therefore more critical than ever that efforts are put forth to encourage and support women enter and complete aviation higher education programs to help boost the numbers of these individuals among the aviation profession. Thankfully, one large step towards this goal, the involvement of women in faculty and academic leadership positions, has already taken place.

Recommendations

This study only provides foundational data on the current status of women in aviation higher education and on their potential future participation within the industry. Although women are generally making gradual improvements in aviation, more effort needs to be put forth to encourage higher participation rates, particularly through the higher education pipeline. Based upon these observations, the following recommendations are made:

1. Enhance efforts to recruit, mentor, and retain women aviation students.
2. Encourage and foster the efforts by private, industry, and government groups that guide and support women to pursue postsecondary aviation education.
3. Monitor the status of women in aviation higher education through follow up studies.
4. Investigate how to improve participation rates of women by exploring the motivations, persons, decisions, and influences that guided them to enter aviation higher education.✈

David C. Ison has been involved in the aviation industry for over 23 years during which he flew as a flight instructor and for both regional and major airlines. He has experience in a wide variety of aircraft from general aviation types to heavy transport aircraft. While flying for a major airline, David was assigned to fly missions all over the world in a Lockheed L-1011. Most recently, he flew Boeing 737-800 aircraft throughout North and Central America. His true dream was to become an aviation educator which led him to a position as assistant professor of aviation at Rocky Mountain College where he has been working for four and a half years. David has conducted extensive research concerning the participation of women and minorities in aviation. His previous work has been published in refereed journals and was presented at a major university conference. He has also worked on similar projects with senior faculty at the University of Nebraska – Lincoln and the University of Nebraska – Omaha. He recently completed his Ph.D. is educational studies from the University of Nebraska – Lincoln.

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