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**ANALYSIS AND RESULTS OF NATIONAL STUDY
ON WOMEN IN COLLEGIATE AVIATION**

Jacqueline R. Luedtke

This research investigation collected and analyzed information that can be used to examine the reasons for the seemingly low number of women in the U.S. collegiate aviation educational system. With ever-increasing global competition, it is vital to assist all qualified persons in the aviation field to succeed in their chosen areas of this profession. Only by using all trained persons, men and women, will the United States remain competitive in aviation. With women constituting such a large percentage of the workforce, it is only logical to employ the best and brightest of both genders to accomplish this goal.

BACKGROUND

Women make up less than one-fourth of college and university faculty members across all disciplines and professional areas and are concentrated in the lower ranks in nonladdered, untenured positions, working primarily in traditionally female fields with predominantly female students. Women are conspicuously absent from the power structure in administration and are barely represented as deans, presidents, and chancellors (Nadelson, 1989).

For this report, data were collected to determine the present status of participation of women in collegiate aviation education. Primary data on female faculty in collegiate aviation programs were obtained through a survey of current University Aviation Association member institutions that offer a baccalaureate degree in aviation education. Due to size limitations, the survey instrument is not included in this report. Survey development used input from female aviation educators and students. Each of the 67 UAA-member institutions that listed some sort of baccalaureate-degree program in aviation was contacted (UAA membership list, 1993) and

was requested to report the number of full-time aviation faculty, distinguishing the total number of men and the total number of women, the highest degrees and flight ratings held by each full-time female faculty member, and so on. Although faculty in aviation don't necessarily need to be pilots to teach nonflight aviation courses, more and more institutions are recognizing the Certificated Flight Instructor, along with the doctorate, as the two terminal degrees needed in aviation education. Presented here are the tentative conclusions and recommendations on how to increase and maximize female faculty's participation in collegiate aviation education.

FINDINGS

One of the goals of this research was to collect constructive opinions and perceptions about the representation of female faculty in collegiate aviation education and how to maximize the participation of those women. Discovery of the needs and opinions of aviation directors, chairs, and faculty could add insight into how the institutions can best maximize the representation of female faculty in higher aviation education.

Besides the primary opinion data, the interview instrument contained demographic questions that were used to provide a basis for understanding the variety of institutions in the response group. **Table 1** describes the gender distribution of aviation faculty of the 42 responding universities of this survey. Of the total 47 interviewees, 13 were women, including four female program coordinators.

Student enrollments in aviation education majors at responding institutions ranged from 12 to 1,060, with

Table 1
Gender Distribution of Aviation Faculty

Gender	Number	Percentage
Female	25	10.5%
Male	212	89.5%
Total	237	100.0%

Table 2
Number of Students in 4-Year Degree
Aviation Education Programs

AS	705
BS/BA	10,149
MS/MBA	195
Doctorate	5
Total	11,054

a mean of 263.7. Table 2 indicates the total number of aviation education students of the responding 42 institutions enrolled in each degree area (AS, BS/BA, master's, doctorate) during the Spring 1993 semester. Only eight of the 42 responding institutions plan to offer a higher-level aviation degree within the next two years in addition to current offerings; seven will offer a master's degree, and one will offer a doctorate in aviation education. The percentage of female students in these aviation-degree programs ranged from five to 50%, with the average being around 14% of the total students in aviation. Twenty-one institutions incorporated a minor in aviation in their curriculum, while 21 universities did not include an aviation minor in their program.

Thirty-two institutions characterized their aviation programs as growing, three indicated their programs as declining, and seven believed their programs would stay fairly constant in the near future. Growth projections ranged from 2% to 200%. Only one institution reported that an administrative cap had been placed on enrollment so that its program was not allowed to grow at the present time. Table 3 indicates the projected growth of the 32 institutions that are forecasting increased enrollments in their aviation programs in the near future.

As stated previously, more institutions are recognizing the CFI and the doctorate as the two terminal degrees needed in aviation education. Table 4 is included to display the number of highest degrees and ratings held by the full-time female aviation faculty employed at the 42 responding universities. Of the 33 institutions that indicated they employed CFIs, 350

(86%) were men and 57 (14%) were women. Likewise, of the 36 institutions indicating they used Certificated Ground Instructors, 192 (86%) were men and 31 (14%) were women. Of the 25 colleges and universities that offered aviation scholarships, 112 were available for men or women, with five scholarships being available for women only.

Perhaps the most significant finding is that the majority of the colleges and universities projected notable growth for their aviation programs in the future. That is especially surprising in today's troubled economic times. However, it has been demonstrated that slow or difficult economic periods are opportune times for students to stay in or return to school to complete their degrees.

A series of yes/no and scaled-rating items were used to examine the subjective opinions of the aviation directors, chairs, and faculty members. Table 5 provides

Table 3
Projected Increase in Enrollments in Near Future

Expected Growth Reported	Frequency
200%	1
100	2
75	2
50	1
40	1
30	1
25	2
20	4
15	3
10	5
5	7
Rapid	2
Slow	1

Table 4
Highest Degrees/Ratings of Female Faculty in 42 Institutions

Degree	Frequency	Rating	Frequency	Rating	Frequency
Bachelor's	6	Private	2	CFII	2
Master's	7	Instrument	1	GI	1
Doctorate	9	Commercial	1	A&P	1
		ATP	5	ME	1
		CFI	3	MEI	1

a listing of yes/no questions asked and the totals for each.

Table 6 lists the responses to the questions, which asked the respondents to rate their opinions of a particular item on a scale of 1 to 7, with 1 being Strongly Disagree and 7 being Strongly Agree.

DISCUSSION OF FINDINGS

Thirty-nine respondents indicated they believed that female faculty or students are underrepresented in collegiate aviation education. Their reactions suggested that reasons probably include: the "good ole boy" network keeps women out of the field; a lack of role models for women; women do not see aviation as a viable career for themselves; it is a struggle for women to be accepted in a nontraditional field; women do not know the opportunities available in aviation; and there is a shortage of qualified or available women. These opinions indicate that, although women have made inroads in collegiate aviation, there is a way to go, especially concerning people's perceptions. One respondent stated that the rewards are stronger in industry versus education and that this

disparity also contributed to the underrep-resentation of women in collegiate aviation education.

The majority of respondents felt it was unsatisfactory that only 6% percent of U.S. certified pilots are women. A few remarked that this number might be small because of industry norms, a lack of interest, or the responsibilities of raising children. The response on child-care provisions to attract and retain female students in nontraditional professions led to a middle-of-the-road rating of 3.74. However, this question prompted polar replies compared with the other scaled questions; that is, those in favor of child-care provisions were strongly in favor of it, and those opposed were

Table 5
Yes/No Questions Responses

Question	Yes	No	Don't know	Maybe
Do you have a minor in an aviation discipline?	21	21	0	0
Do you feel women faculty and/or students are under-represented in collegiate aviation education?	39	6	2	0
Will you be hiring any new faculty in the next two years?	26	12	0	7

Table 6
Rating Response

Question	Average Response 7-Point Scale
The fact that 6% of U.S. certified pilots are female is a satisfactory number.	2.3
In order to attract and retain female students in nontraditional professions, universities should provide child care.	3.7
The FAA promotes the participation of females in collegiate aviation education.	4.3
The University Aviation Association promotes the participation of females in collegiate aviation education.	5.3
The FAA's Airway Science Program assists in recruiting female aviation students.	3.8
There are barriers to female faculty in aviation education in general.	3.2

Scale: Strongly agree: 7; Strongly disagree: 1.

vehemently opposed.

People were neutral when assessing whether the FAA assists female participation in collegiate aviation education or whether the FAA's Airway Science Program aids in recruiting female aviation students. However, some comments indicated the respondents do not believe the FAA is doing as much as it should and is primarily just giving lip service in promoting women in aviation education. The majority of respondents indicated they thought the UAA is doing a pretty good job in assisting the participation of women in collegiate aviation education. The one question that was perhaps the most sensitive pertained to the respondents' beliefs on barriers to female faculty in aviation education. The majority believed there were few barriers to women in aviation education, although female respondents thought there were more barriers than did male respondents. The respondents who believed that barriers exist thought it was from the following reasons: male dominance in attitudes; the makeup of faculty (that is, in the past, institutions have hired retired military men for their

positions; attitudes toward women; the "macho" syndrome; women did not possess the combination of experience (ratings) and degrees needed; and the difficulty for female pilots to get enough general aviation experience for serious consideration. Both female and male respondents cited these examples. The male respondents in the southern and eastern parts of the country were more negative on women in aviation and in aviation education than male respondents in the rest of the United States.

Significant subjective findings include men's common, recurring opinions about the role of women in higher education and, especially, in aviation education. According to the survey respondents, the biggest obstacle to women in collegiate aviation education is the gender-based network. Women must constantly break through this network of predominantly white men and their attitudes toward women — that is, women do not belong in the cockpit, they cannot do the job as well as men, and so on.

The popularity of aviation programs in higher education can be identified from information displayed in Table 3. Seventy-six percent of the institutions surveyed indicated their programs were growing and were projected to keep growing in the near future. Increased enrollment projections ranged from a maximum of 200% to a minimum of 2%, with one institution reporting little growth. Only 7% percent of the institutions indicated declining enrollments, while 17% stated their enrollments would probably remain constant.

The information obtained from the survey results

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offers two sets of descriptive data about the status of baccalaureate-level aviation programs. First, the data provide a measurement of the overall size of the faculty in these programs. Secondly, the data provide the gender distribution of the aviation faculty.

CONCLUSIONS

The relatively short history of aviation education has progressed from a few schools offering an aviation course to universities offering many courses. One has only to look to see the profound effect aviation has on the world around us. There is no doubt that the need for aviation education will continue in the future. Deans, educators, chairpersons, and university departments must be prepared to meet the future challenges of a growing aviation industry.

Today, colleges and universities are facing difficult times with overall shrinking student enrollments, the slow economy, and cutbacks. In addition, institutions have unique problems regarding academic credibility and accreditation policies. However, in order to regain and retain the competitive edge, it is critical that colleges and universities use all available talent. It is absolutely mandatory to employ the best and brightest minds — whether male or female. By ignoring or under-utilizing 51% of the U.S. population, industry and universities alike are misusing a great natural resource.

This research analysis attempted to gain insight from collegiate male and female aviation educators to determine ways to increase and maximize participation of women in the aviation educational field. Information gathered through this research should allow aviation-education departments, their institutions, the UAA, and the FAA to better understand the needs of aviation-oriented students and faculty members. Additionally, it provides knowledge to enhance women's roles in collegiate aviation education, as well as the aviation programs themselves and the departments and institutions in which they are housed. Such information also should be useful to the aviation industry at large as attitudes and roles change for women and men, both in the collegiate setting and in industry. Recommendations for action on how to augment this endeavor are presented.

The survey instrument employed in this research

allowed some insight into the magnitude of this problem. History has shown that it always has been a struggle for women to break into a male-dominated field and aviation has been no exception. This research has demonstrated that, just as in other nontraditional areas, women are slowly making inroads into the aviation arena. More and more research is being conducted in this area; for example, one respondent indicated that research is being done on sexual harassment in the cockpit in an effort to tear down some of the barriers to women in aviation.

Responses from numerous male interviewees were encouraging because their views on women in aviation and aviation education seem to be changing. The majority of men indicated they were in favor of more female participation in this area; this changing attitude should aid women in advancing in this field in the future.

Even though women have been involved in aviation since its beginning, most Americans know very little of women's history in this area. Little, if anything, is taught in schools on the contributions women have made in aviation, the aviation-related jobs they took over when men went to war, and the educational advances women have championed. If attitudes are to change, girls as well as boys in the lower grades must be taught the history of women in aviation and that women can and should be involved in aviation and aviation education.

As has been shown through this study, women are underrepresented in higher education, especially in the more prestigious jobs in academia. Because women are still breaking into higher education, it will be a slower process still in male-dominated fields such as aviation. Responses from the 13 women interviewees indicated that the majority of them became involved in the aviation profession by accident. For example, they took flying lessons because a husband or father was a pilot, or someone took them for an airplane ride.

Six of the 13 female respondents stated that a mentor had helped them in their careers; seven had no mentor. However, when asked for suggestions for women who want to become involved in collegiate aviation education, several of the 13 indicated that mentoring is important in a woman's career. Other suggestions included networking with men and women, joining organizations such as the Ninety-Nines, participating in

Women in Aviation conferences, acquiring higher degrees in education and as many flight ratings as possible, becoming more aggressive, seeking leadership from women, and being a role model for other women.

This survey demonstrated that, although attitudes are changing, the stamp of societal upbringing still has a strong hold on men, as well as on women. Women generally are raised to be polite, to pursue a feminine career, not to interrupt, not to be aggressive. This upbringing handicaps women competing in a male-dominated field.

One of the most significant findings in the survey is that the majority of the colleges and universities expect notable growth for their programs in the future. This is a good sign that institutions will be hiring additional faculty in the near future — and women should make up a higher percentage of new faculty hired.

RECOMMENDATIONS

Aviation/aerospace departments, as well as universities as a whole, must contemplate alternative solutions to the growing problem of underrepresentation of women in collegiate aviation education to competently meet the future. The recommendations offered here are not comprehensive toward the resolution of the problem considered here; however, they should offer insight toward possible solutions of this problem of underrepresentation.

Some of the same barriers that women face in any male-dominated field occur in aviation as well. According to survey respondents, institutions must decrease stereotypical barriers women face in aviation. They must sensitize the aviation public to the problems women encounter and investigate means to solve those problems.

It is essential that everyone involved in aviation, whether in education, business, or government, encourage industry to hire more women in aviation. We have Equal Employment Opportunity laws, but they are not enough. Women must be hired and promoted in industry (as well as in academia) by formal methods if informal means do not work. It is critical to integrate women into all aspects of aviation to use all the talented workforce and to stay competitive.

The bottom line seems to be that working women need more than equal treatment. In the 1970s, it was

thought that all that had to be done was to outlaw discrimination; supposedly, that would automatically break down the barriers so women could fully participate in the labor market. However, equal treatment in the workplace must be supplemented by family support systems if women are to improve their economic position (Hewlett, 1986).

Colleges and universities, as well as the UAA and the FAA, must encourage and help more women in becoming pilots. Some suggestions from survey respondents as a means of accomplishing this goal included sponsorship of women's aviation organizations and marketing to younger female students to inform these potential students of the opportunities available in aviation. As demonstrated, it is important to solicit assistance from women's aviation organizations; they offer a wealth of information and assistance. They also provide scholarships for worthy female pilots or aspiring pilots.

Previously addressed were reasons why women have not achieved proportional representation in aviation. One reason cited was that young women do not have an adequate number of role models. This is especially true for women who choose to become pilots or aviation educators. Colleges and universities should recruit more female aviation faculty to foster role models. It has been proven that when NASA, businesses, or universities employ women, those women provide good role models for both students and for up-and-coming female executives and faculty alike. Institutions must increase female students in their aviation programs. Likewise, they must develop more coordinated graduate programs in aviation, whether as an actual master's program in aviation education or as an emphasis in this field of study. By enlarging female student enrollments, a certain percentage will eventually infiltrate the academic ranks. Perhaps as more women enter male-dominated careers, their presence as role models for girls and women will further serve to demonstrate the appropriateness of nontraditional career choices.

Respondents also suggested that colleges and universities use available talent in their institutions and structure mentor relationships with senior faculty recognized for excellence in teaching, research,

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publishing, and service — areas critical for new faculty in meeting tenure expectations. These efforts may reduce the entry shock of new female faculty, contribute to their socialization into the professorate, improve their chances of successfully competing for tenure track appointments, and improve retention figures.

Institutions also should consider consolidating part-time and adjunct faculty and creating new tenure track lines filled by female and minority faculty and supported by additional institutional resources (Bjork & Thompson, 1989).

One solution to the glass ceiling problem might be to degenderize occupations by increasing qualified but underrepresented personnel. This goal can be accomplished through a deliberate attempt to train women specifically to increase the availability of competent women in different areas. Improvements should occur over time, aided by the elimination of tokenism, increased competence of applicants, and the redistribution of opportunity and power within organizations (Leventhal & Garcia, 1991).

It is evident that our society is in the middle of a paradigm shift. Although the United States has women at various levels of leadership, our society as a whole has not yet made the shift necessary to allow women to compete equally with men (Nubson, 1991).

Because colleges and universities are supposed to be the forerunners in new, progressive ideas, these

institutions must demonstrate that they have acknowledged and embraced this new paradigm. The majority of participants in the survey responded that they believe it is important to address these issues for women to make greater inroads into the aviation education arena. With women constituting the majority of the U.S. population and becoming an ever-increasing influence in enrollments in the collegiate system, it only makes sense that the underrepresentation of women in all areas be addressed. As previously discussed, the majority of aviation directors and faculty believe this to be an important issue in higher aviation education.

For institutions that are experiencing growth in their aviation programs, female students constitute a larger and larger component of the growth. Thus, it is essential to understand this problem and discover the solutions that will effectively deal with it so that all persons, whether female or male, are encouraged to reach their highest potential.

As the number of women in aviation education expands, it is hoped that the ingrained attitudes of men and women regarding women's place in aviation will slowly change. With more and more research being conducted in this area, more people will become aware of the problem. As this research endeavor has shown, people are becoming aware of the underrepresentation of women in collegiate aviation education.□

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