

***A COMPARATIVE ANALYSIS OF PROPOSED IMPROVEMENTS
IN AVIATION EDUCATION:
NATIONWIDE AVIATION EDUCATION PROGRAMS
VERSUS
EMBRY-RIDDLE AERONAUTICAL UNIVERSITY***

by

**Robert M. Kuhns, Ed.D.
Adjunct Assistant Professor
Embry-Riddle Aeronautical University, McConnell AFB Center**

and

**Daniel E. Johnson, Ed.D.
Assistant Professor
Embry-Riddle Aeronautical University, Offutt AFB Center**

ABSTRACT

**A Comparative Analysis of Proposed Improvements
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This paper presents a comparison of findings related to a study of proposed improvements in four-year aviation education programs as indicated by nation-wide survey instruments conducted in the summer of 1993 and during a follow-on survey performed at Embry-Riddle Aeronautical University in early 1996. Aviation education program directors of four-year non-engineering collegiate aviation programs and faculty members throughout the Embry-Riddle Aeronautical University system were contacted to provide input as to methods of improving the quality of aviation education programs. Key information obtained was then paraphrased into a written instrument that was categorized in order of importance by the two different mailings. The "improvement of both faculty and teaching aids" and "to provide more student internships" were the most recommended improvements in this study. This paper provides multiple nationwide-ranked proposed improvements in aviation education, and describes peer-suggested methods of improving student attainment of knowledge, competency, and proficiency in aviation education.

Original Nationwide Aviation Education Study - 1993

Data were collected in the summer of 1993 to ascertain the perceived quality of four-year and higher aviation education programs throughout the nation. The following information was part of Robert Kuhns' doctoral thesis and additional research conducted by Daniel Johnson in 1996. The original study information was obtained from program coordinators, department heads, or similar individuals at the various institutions throughout the United States (N=68). The follow-on research was conducted throughout the Embry-Riddle Aeronautical University (ERAU) system consisting of regional faculty advisors and center directors (N=226). A copy of the telephone interview questionnaire is found in Appendix A. Objective and subjective data were obtained from program directors in this study. Demographics as well as opinions were acquired. Key factors concerning aviation education were then organized into a second instrument which may be found in Appendix B. Aviation department heads were mailed the instrument and asked to rank in importance the various key factors. This instrument became the basis for the ERAU study (see Appendix C).

The University Aviation Association (UAA) membership list was used to identify four-year and higher non-engineering aviation education programs offered in the United States. Aviation programs less than four years were not considered in this study. The UAA April 1992, Membership List contained the names of 106 member institutions of which 68 were found by the survey to offer four-year and greater aviation

programs (University Aviation Association, 1992). In the process of calling all 106 member institutions an updated number (68) of institutions that offer four year and higher aviation education programs was obtained.

The first questionnaire requested information of both a quantitative nature and a subjective nature. Student number, faculty demographics, future educational plans, aviation equipment and facilities, intrastate student accessibility, and student recruiting were surveyed. More difficult questions were asked of the program/department chairs and included the following areas: program quality, ranking against a national norm, current program status, factors contributing to quality aviation education, and which institution was considered to offer the best aviation education program in the United States.

The second questionnaire asked aviation program directors to rank key quality factors from the most important to the least important. These key factors were obtained from the most frequent responses in the telephone interview questionnaire.

Operational Procedures

All of the 68 identified member institutions were contacted by phone to conduct a structured phone interview. Confidentiality was assured to all participants. All institutions were contacted a minimum of four times to maximize responses. If a program director was unable

to respond after four attempts, the institution was deleted from the survey. This was strictly random with no bias on the part of the telephone interviewer.

A telephone questionnaire technique allowed subjects to be more open in their responses, and if needed, to ask for clarification concerning questions. The telephone technique also encouraged more detailed responses and provided for greater participation than the mailed format questionnaires. This procedure may be considered successful if it has the 55 percent or greater success rate generally accepted by research authorities (Perry, 1988).

The telephone questionnaire was written and submitted for evaluation to the researcher's doctoral committee. The recommended changes were incorporated into a second draft which was then presented to experts in questionnaire design. Their modifications were adopted. The questionnaire was also presented to experts in English and Grammar at Wichita State University. Next, it was presented to several program directors at member institutions for their review. The final draft was again presented to the doctoral committee. A small pilot group was then selected and a phone interview was conducted. After several interviews, small changes were adapted to clarify and to improve understanding of the questionnaire. One additional question was also added (number 21) as per the suggestion of a member of the pilot group. The second (written) instrument underwent a similar process and was approved by the doctoral committee before it was mailed.

The pilot group consisted of a former director of an aviation education program, a member of a nationwide aviation study, and several of the doctoral committee members. The revised final drafts were then presented to the researcher's committee chairman for final approval. Developmental and validation processes were completed for this instrument.

Research Design and Analysis

The findings of this study, drawing on its qualitative and quantitative data, are presented in a descriptive design. Findings included program age, curriculum offered, future curricular plans, faculty demographics, equipment and aviation facilities, student recruitment, CAA membership, and follow-up of graduates. This information although obtained will not be presented in this paper. Subjective responses recorded on aviation program quality, factors that constitute a high quality aviation education program, and methods of improving quality of aviation education will be presented in this paper. Findings were organized in a descriptive and summarizing format to assure confidentiality to all participants.

Factors Contributing to the Quality of Aviation Education

One question asked of program directors in this survey was, "What factors do you feel constitute to a good aviation program?" The question was completely open ended. For brevity, similar responses were combined. The following factors, in order of number of times mentioned, are listed on the next page:

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Factors Associated with the Quality of
Aviation Education

(Listed in order of number of times cited)

High Quality Faculty
Good Overall Program
High Quality Facilities
High Quality Students
Strong Flight Simulator Department
Academic Support
Concentration of Aviation Studies
Networking with Aviation Industry
Student Job Placement
Blend of Liberal Arts Curriculum
Student Oriented Faculty
Professional Program
General Business Background
Internships in Industry
Good Communication Skills
New Curriculum
Adequate Funding of Program
Program Safety
Other Factors*

*Eight other responses recorded in the survey were mentioned only once, and are not listed in the above factors.

The next survey question asked the respondent to comment on factors that comprise a high quality aviation education. The question was, "What do you feel is necessary in order to provide excellence in Aviation Education?" This is similar to the preceding question, however the word excellence was emphasized by the interviewer. Some of the same responses occur in the next list, however it is interesting to note that many different responses were obtained when excellence was in fact substituted for good.

Necessary Factors to provide
Excellence in Aviation Education

(Listed in order of number of times cited)

High Quality Faculty
High Quality Facilities
Networking with Aviation Industry
High Quality Aviation Program
Academic Support
Adequate Funding of Program
Professional Program
Conduct Research in Aviation
Program contain Interested Students

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Variety of Aviation Courses Offered	Increase number of Available Aircraft
Student Oriented Faculty	Improve Teaching Aids
Industry Involvement in Curriculum	Increase number of Aviation Programs
Provide Job Placement Services	Increase Student Recruitment
Greater Emphasis on Aviation Safety	Increase Marketing Budget
Promote Critical Thinking Skills in Students	Increase number of Hands On Activities
Provide Internships in Aviation Industry	Provide More Student Internships
Provide More Financial Aid To Students	Increase Faculty Travel
Other Factors*	Improve Student Placement System
	Increase Industry Involvement
*Seven other responses recorded in the survey were mentioned only once, and are not listed in the above factors.	Add Masters Degree Program In Aviation
	Increase Library Resources
Program directors were then asked, "If you had unlimited resources, what three changes would you make in the Aviation Education program at your institution?" The most answered response was to improve facilities. The following list describes the responses given:	Initiate Research Center
	Increase Number of Field Trips
	Offer Additional Scholarships
	Increase Faculty Development Programs

Proposed Improvements in Aviation Education

(Listed in order of number of times cited)

- Improvement of Facilities
- Improvement and Addition of Flight Simulators
- Increase Faculty Number

Other Factors*

*Five other responses recorded in the survey were mentioned only once, and are not listed in the above factors.

The top 12 responses of each of the three preceding lists were then organized

into a written questionnaire (see appendix B) which was mailed to the UAA member institutions with four-year degree programs. These three questions were considered to be of greatest importance to establishing the norm of quality aviation education throughout the United States. The top 12 responses were chosen to make the ranking by the program directors less difficult. All responses that were recorded more than twice on the original survey were included. The ranking of each of the top 12 groups of responses in a written format allowed for both a reaffirmation of previous oral responses and the opportunity to rank the other respondent's opinions. Forty-two program directors returned the original survey representing a response rate of 61.8 percent.

spreadsheet program Excel. The following table summarizes the responses (Table I).

Comparison of Original Study Results to the 1996 ERAU Survey

One hundred forty two Embry-Riddle faculty returned the second survey. This is a response rate of 62.8 percent. When asked to rank the factors of a high quality aviation education the following responses were obtained (see Table I). The following point system was employed to determine rank. When a factor was ranked first, twelve points were awarded to this factor. If that factor ranked second, eleven points were awarded. This system was applied down to the lowest rated factor, which received only one point. Using this method, rank can be established by noting the factor that obtains the highest number of points. The factors are also listed in order from highest to lowest as obtained in the original study. Responses were tabulated using the

TABLE I
 FACTORS OF HIGH QUALITY AVIATION EDUCATION PROGRAMS

Factors	Original Study	ERAU Study	
	Total Points in Rank Order	Total Points	Rank Order
High Quality Faculty	437	1460	1
Good Overall Program	350	1160	2
Student Oriented Faculty	334	1074	4
High Quality Students	319	1023	5
Academic Support	316	996	6 tie
Professional Program	272	1126	3
High Quality Facilities	260	740	8
Networking With Aviation Industry	258	893	7
Concentration Of Aviation Studies	204	996	6 tie
Student Job Placement	196	592	10
Blend Of Liberal Arts Curriculum	191	605	9
Strong Flight Simulator Department	143	411	11

The survey responses indicated that a high quality faculty is the number one response by a large factor in both studies. This was the most cited factor and was ranked by the mail survey also as the number one factor. A good overall program was the second highest cited response, and it was also second highest in the mail survey. Results of both surveys are as follows.

Factors of High Quality Aviation Education Programs

(Top Six Responses Original Study)

High Quality Faculty

Good Overall Program

Student Oriented Faculty

High Quality Students

Academic Support

Professional Program

Factors of High Quality Aviation Education Programs

(Top Six Responses ERAU Study)

High Quality Faculty

Good Overall Program

Professional Program

Student Oriented Faculty

High Quality Students

Academic Support

Survey respondents were then asked to rank the necessary factors to provide excellence in aviation education. The following table provides the results by the use of the point system as previously described (Table II).

TABLE II

NECESSARY FACTORS TO PROVIDE EXCELLENCE
 IN AVIATION EDUCATION

Factors	Original Study	ERAU Study	
	Total Points in Rank Order	Total Points	Rank Order
High Quality Faculty	430	1412	1
Student Oriented Faculty	372	1073	4
High Quality Aviation Program	333	1142	2
Adequate Funding Of Program	322	896	5
Academic Support	311	889	6
Professional Program	287	1113	3
Program Contains Interested Students	250	816	9
High Quality Facilities	220	643	11
Industry Involvement in Curriculum	213	818	8
Networking with Aviation Industry	206	792	10
Variety of Aviation Courses Offered	204	853	7
Conduct Research In Aviation	101	629	12

"High quality faculty" was the number one ranked response in both surveys. The second highest cited response "student oriented faculty" was ranked fourth in the second survey. ERAU ranked the third choice of the original survey as their second. The top six necessary factors to provide excellence in aviation education in both surveys are as follows:

Necessary Factors To Provide
Excellence In Aviation Education

(Top Six Responses Original Study)

High Quality faculty

Student Oriented Faculty

High Quality Aviation Program

Adequate Funding of Program

Academic Support

Professional Program

Necessary Factors To Provide
Excellence In Aviation Education

(Top Six Responses ERAU Study)

High Quality faculty

High Quality Aviation Program

Professional Program

Student Oriented Faculty

Adequate Funding of Program

Academic Support

Finally, program directors were asked to rank 12 proposed improvements in aviation education. The following table is based on the aforementioned point system and represents the rank order established by the mailed survey (see Table III).

TABLE III

RECOMMENDED IMPROVEMENTS IN AVIATION EDUCATION

Factors	Original Study	ERAU Study	
	Total Points in Rank Order	Total Points	Rank Order
Provide More Student Internships	348	947	5
Increase Faculty Number	345	751	9
Increase Number Of Hand On Activities	332	1265	2
Improve Teaching Aids	318	1278	1
Improve Student Placement System	302	890	7
Improvement Of Facilities	300	961	4
Increase Student Recruitment	274	1134	3
Improvement And Addition Of Flight Simulators	240	795	8
Increase Marketing Budget	233	961	4
Increase Number Of Available Aircraft	207	701	10
Increase Faculty Travel	168	488	11
Increase Number Of Aviation Programs	159	905	6

An unexpected outcome of this study was that the number one ranked response "provide more student internships" in the original study fell to fifth place in the second study. The second study showed "improvement of teaching aids" as the number one ranked factor. The following list represents the top six ranked proposed improvements in aviation education obtained in both studies:

RECOMMENDED IMPROVEMENTS IN AVIATION EDUCATION

(Top ranked six factors Original Study)

Provide More Student Internships

Increase Faculty Number

Increase Number of Hands on Activities

Improve Teaching Aids

Improve Student Placement System

Improvement of Facilities

RECOMMENDED IMPROVEMENTS IN AVIATION EDUCATION

(Top ranked six factors ERAU Study)

Improve Teaching Aids

Increase Number of Hands on Activities

Increase Student Recruitment

Improvement of Facilities

Increase Marketing Budget

Provide More Student Internships

This study provided two peer-referenced national-based groups of proposed improvements in collegiate aviation education. It is the hope of the authors that this work will provide a basis for such improvements. Obviously, some improvements are more practical to initiate than others, however with the priorities as established in this study the program director may be guided in decisions involving improvements in educational quality.

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APPENDIX A
AVIATION EDUCATION TELEPHONE SURVEY
Original Study (1993)

Institution name _____

Street Address _____

Contact person _____

Title _____ Phone _____

Date _____ Time _____

1. What is the size of your parent institution? _____

2. How many Aviation education students are currently enrolled?

AS _____, BS _____, MBA _____, MS _____,
Ed.D. _____, Ph.D. _____,
Other _____ (if so, please specify)

3. What is the highest aviation degree offered?

Circle one: AS BS MBA MS Ed.D Ph.D

4. Within the next two years, does your institution plan to offer any higher level Aviation education degrees than presently offered? Yes _____ No _____. If yes what? (circle) BS, MBA, MS, Ed. D., Ph. D., Other _____

5. What year was your aviation program established? _____

6. Faculty demographics:

Number of full time aviation faculty _____
Number of part time aviation faculty _____
Number of minority aviation faculty _____
Number of women aviation faculty _____
Number of aviation faculty with degree higher than baccalaureate _____
Number of aviation faculty with degree higher than masters _____

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7. Using a scale of 1 to 5 with 5 being highest quality how would you rate your aviation program as compared to other similar programs? 1 2 3 4 5

8. How do you feel your aviation program would rate against a nationwide norm?

- One of the best
- Better than most
- Average
- Somewhat below the norm
- One of the worst

9. Does your institution offer any aviation education scholarships? Yes No If so, what types?

10. Would you characterize your aviation education program as growing, remaining constant, or declining in student number? (circle one) What factors do you attribute this to?

11. What factors constitute a good Aviation Education program?

12. What do you feel is necessary in order to provide excellence in Aviation Education?

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13. If you had unlimited resources, what three changes would you make in the Aviation Education program at your institution?

14. What options are available in your Aviation Education program? (Check those that apply)

Aviation Management Program _____

Flight Training _____

Aircraft and Powerplant Training _____

Airway Science:

Airway Science Management _____

Airway Computer Science _____

Aircraft Systems Management _____

Airway Electronic Systems _____

Aviation Maintenance Management _____

Other _____

15. What institution in your opinion offers the best aviation education in the United States...

In four year programs? _____

At masters level or higher? _____

16. How would you rate your institution in relation to one or more of the preceding best institutions on a scale of 1-5 with 5 being the aforementioned institution? 1 2 3 4 5

17. How many of the following are available in your program?

Flight training aircraft _____

Flight training simulators _____

Certified Flight instructors _____

Certified Ground instructors _____

Aviation Scholarships _____

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18. Would you describe your program as being accessible to students from other states? Yes _____ or No _____. If yes, to what degree do you rate your institution's accessibility?

Very accessible _____
Somewhat accessible _____
Limited accessibility _____

19. Do you actively recruit students? Yes _____ No _____.

If so, how? _____

20. Do you follow-up on graduates? Yes _____ No _____.

If so, how frequently? _____

21. Is your institution currently a member of The Council on Aviation Accreditation? Yes _____ No _____ Do you plan to join in the future? Yes _____ No _____

APPENDIX B

FOLLOW-UP WRITTEN QUESTIONNAIRE
Original Study (1993)

Robert M. Kuhns
125 S. Hillside
Wichita, KS 67211
316 682-1921

February 26, 1993

Dear Colleague:

Early this summer I contacted you by phone to participate in my doctoral dissertation study about aviation education. Those of you that participated in the previous study provided me with some interesting results. Three key questions of the survey have been paraphrased below with their most frequent responses. Please rank (1-12) the responses in order of importance (1 being the most important) and return your response to me in the self addressed stamped envelope.

Statement: Factors of High Quality
Aviation Education Program

Rank (in order of importance)

- _____ Concentration of Aviation Studies
- _____ Blend of Liberal Arts Curriculum
- _____ High Quality Faculty
- _____ Professional Program
- _____ High Quality Facilities
- _____ High Quality Students
- _____ Strong Flight Simulator Department
- _____ Academic Support
- _____ Good Overall Program
- _____ Networking with Aviation Industry
- _____ Student Job Placement
- _____ Student Oriented Faculty

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Statement: Necessary Factors to provide
Excellence in Aviation Education

Rank (in order of importance)

- _____ Variety of Aviation Courses Offered
- _____ Professional Program
- _____ High Quality Facilities
- _____ Networking with Aviation Industry
- _____ High Quality Aviation Program
- _____ Academic Support
- _____ Adequate Funding of Program
- _____ Industry Involvement in Curriculum
- _____ Conduct Research in Aviation
- _____ Program contain Interested Students
- _____ High Quality Faculty
- _____ Student Oriented Faculty

Statement: Proposed Improvements in Aviation Education

Rank (in order of importance)

- _____ Increase number of Hands On Activities
- _____ Improve Teaching Aids
- _____ Improvement and Addition of Flight Simulators
- _____ Increase Faculty Number
- _____ Increase number of Available Aircraft
- _____ Improve Student Placement System
- _____ Increase number of Aviation Programs
- _____ Increase Student Recruitment
- _____ Increase Marketing Budget
- _____ Improvement of Facilities
- _____ Provide More Student Internships
- _____ Increase Faculty Travel

In order that I may complete my doctoral dissertation research in a timely manner please respond as quickly as possible. A control number has been assigned so that I may track responses. Your response will be kept confidential.

Thank you,

Robert M. Kuhns

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APPENDIX C
ERAU Survey (1996)

Dr. Daniel E. Johnson
North Central Regional Faculty Advisor
Embry-Riddle Aeronautical University
55 MSS/DPE, 106 Peacekeeper Drive, Ste 806
Offutt AFB, NE 68113-3214

December 26, 1995

Dear Colleague:

During the Third Annual Symposium on Teaching Effectiveness at the Extended Campus World-wide meeting last November, Dr. Rob Kuhns presented a paper entitled "Proposed Improvements in Collegiate Aviation Education." The study was based on a 1993 nation-wide survey of aviation education program directors of four-year non-engineering collegiate aviation programs. The research was divided into two primary parts. The first portion was the survey of aviation program directors mentioned above. The second part of the research project involved the ranking of various factors derived from the survey that comprise a quality aviation education. Dr. Flancher felt ERAU could benefit from this research and requested we replicate the second portion of the study in the Extended Campus and present the results at the 1996 World-wide Conference.

From the initial nation-wide survey of aviation education program directors, three key questions provided the data for the second part of the research. The most frequent responses from these key questions are paraphrased below. Please rank (1-12) the responses in order of importance (1 being the most important) and return your response to us in the enclosed self-addressed stamped envelope.

Statement: Factors of High Quality
Aviation Education Program

Rank (in order of importance)

- _____ Concentration of Aviation Studies
- _____ Blend of Liberal Arts Curriculum
- _____ High Quality Faculty
- _____ Professional Program
- _____ High Quality Facilities
- _____ High Quality Students
- _____ Strong Flight Simulator Department
- _____ Academic Support
- _____ Good Overall Program
- _____ Networking with Aviation Industry
- _____ Student Job Placement
- _____ Student Oriented Faculty

Statement: Necessary Factors to Provide
Excellence in Aviation Education

Rank (in order of importance)

- _____ Variety of Aviation Courses Offered
- _____ Professional Program
- _____ High Quality Facilities
- _____ Networking with Aviation Industry
- _____ High Quality Aviation Program
- _____ Academic Support
- _____ Adequate Funding of Program
- _____ Industry Involvement in Curriculum
- _____ Conduct Research in Aviation
- _____ Program Contain Interested Students
- _____ High Quality Faculty
- _____ Student Oriented Faculty

Statement: Proposed Improvements in Aviation Education

Rank (in order of importance)

- _____ Increase number of Hands On Activities
- _____ Improve Teaching Aids
- _____ Improvement and Addition of Flight Simulators
- _____ Increase Faculty Number
- _____ Increase Number of Available Aircraft
- _____ Improve Student Placement System

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- _____ Increase Number of Aviation Programs
- _____ Increase Student Recruitment
- _____ Increase Marketing Budget
- _____ Improvement of Facilities
- _____ Provide More Student Internships
- _____ Increase Faculty Travel

In order that we can complete the analysis of the data in a timely manner, please respond as soon as possible. A control number has been assigned so that we can track responses. Your response will be kept confidential.

Thank you,

Robert M. Kuhns, Ed.D.

Daniel E. Johnson, Ed.D.