

## HIGHER EDUCATION PROFESSIONAL PILOT FACULTY QUALIFICATIONS – ARE THE STAKES RISING?

David C Ison  
Rocky Mountain College

### Abstract

Within the aviation research literature there have been numerous studies that have either included or focused upon the attributes of associated faculty. Although such studies provide compelling data about these individuals, trends or changes in requirements for faculty are not easily identified within the findings. Of particular concern is the fact that credentialization, the escalation of required educational attainment and certification, has been permeating throughout higher education in the United States. It is of interest to see if such pressures are also infiltrating the collegiate aviation environment. Further, data about trends can help future faculty prepare for possible employment, it can assist present faculty to remain competitive and to insure their retention and tenure efforts are fruitful, and can also assist administrators to assess how their faculty compare to others, evaluate faculty for retention, promotion, and tenure, and to set reasonable hiring expectations for new faculty. This quantitative study sought to identify trends by evaluating employment advertisements for professional pilot program faculty over a 32 month period. Among the 32 advertisements that were found to fit the confines of this study, 23 (71.9%) stated that the minimum educational requirement was the master's degree, 8 (25.0%) required a doctorate degree, and 1 (3.1%) required only a bachelor's degree. Of the announcements that did not require the doctorate, 16 (66.7%) stated that the doctorate was preferred. Prevalent certification qualifications included 15 (46.8%) advertisements that required some sort of Federal Aviation Administration (FAA) pilot-related certification whilst 12 (37.5%) specifically called for a flight instructor certification. Also, 20 (62.5%) advertisements necessitated previous aviation experience and 12 (37.5%) stated that prospective faculty should have experience in research and scholarly activities including publication in peer-reviewed journals. Comparisons between the educational requirements outlined in the advertisements and the actual qualifications of faculty

working at the institutions sponsoring the announcements indicated no significant differences between the groups ( $\chi^2 [1, n= 145] = 0.160, p > 0.10$ ). However, when such comparisons were made including the preferences for an earned doctorate, significant differences were found to exist ( $\chi^2 [1, n= 146] = 17.708, p < 0.001$ ). Contrasts were also evaluated between the findings in previous studies and the data collected in this study. No significant differences were noted when only taking into account the advertisements requiring the doctorate ( $\chi^2 [2, n = 254] = 1.315, p > 0.10$ ) yet differences were noted when preferences for the doctorate were considered ( $\chi^2 [2, n= 279] = 23.12, p < 0.001$ ). Lastly, the certification requirements found in this study were compared to a previous study of faculty attributes which revealed no significant differences between these two groups ( $\chi^2 [1, n= 360] = 0.00, p > 0.10$ ). Evidence from this study indicates that there is a preference for educational attainment that exceeds that of currently employed faculty and faculty that were surveyed in previous studies. This indicates that professional pilot faculty presently face some level of credentialization. Suggestions for future research are included.

*Keywords:* aviation, pilot, faculty, qualifications, education, advertisement, credentialization, Marascuilo

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Although the U.S. aviation industry recently experienced a retraction during the recessionary economy from 2009 to 2011, the overall consensus among aviation forecasts indicate that tremendous growth over the next twenty years is expected. The Federal Aviation Administration (FAA) has forecasted that in 2011, system capacity will grow 4.5% while passenger demand is projected to grow by 4.9%. From 2011 through 2031, the estimated capacity growth is expected to be 3.6% a year and by 2031, the U.S. airline industry is expected to carry 1.3 billion passengers, up from approximately 700 million carried in 2010 (FAA, 2010). Aircraft manufacturers are also predicting large growth patterns through 2029. Boeing (2010) predicted that from 2010 to 2029, there will be a demand for 7,200 new commercial aircraft in North America. Embraer (2010) concurs, though their estimated number of new North American deliveries by 2029 was 7,770. With this projected industry growth, there is clearly an increased demand for pilots. Boeing (2010) estimated that there will be a need for 97,350 pilots in North America alone and the worldwide requirement for pilots will nearly double from the population in 2010. Further, Hughes (2010), Michels (2008), and Twombly (2009) indicated that a variety of factors that are occurring or likely to occur in the industry environment make a pilot shortage probable in the near future. With this increased demand for pilots comes the need for their training. Therefore pilot training pipelines will likely feel pressure to grow.

While there are many ways for an individual to become a professional pilot, one common pathway is to gain both academic and flight qualifications through a collegiate aviation program. One reason why individuals may be steered towards this choice is that a college degree has essentially become a mandatory pre-requisite to be hired by an airline in the U.S. (Brown, 2007, Echaore-McDavid, 2005). Further, in 2010 the U.S. Congress has pressured the FAA to raise pilot qualification standards in response to an air carrier accident that received a tremendous amount of publicity. Included in this legislation was a provision for special credit towards individuals who receive certain

academic training, potentially giving persons attending collegiate aviation programs a tremendous advantage by having to accumulate fewer flight hours in order to be eligible to act as a pilot for an air carrier (Airline Safety and Federal Aviation Administration Act of 2010, 2010). According to the Aviation Accreditation Board International (AABI) (2010a), the accrediting body for collegiate aviation programs in North America, the new regulations will likely include a “sliding scale” (p. 1) that will give the most beneficial credit for collegiate aviation programs that are accredited and less for those that solely meet FAA standards. Providing evidence to support this credit system was a study by Smith, Bjerke, NewMyer, Niemczyk, and Hamilton (2010) which found that among 2,156 new-hire pilots, those that graduated from accredited collegiate flight programs with an aviation-related degree and received their flight training in this same environment performed statistically significantly better than those that did not.

Due to the aforementioned dynamics, there will clearly be higher demands placed upon the resources of collegiate flight programs. One key resource is, of course, is the faculty as they provide a significant portion of the instruction aviation students receive outside the cockpit. Several studies have indicated that a primary indicator of the excellence of an individual collegiate aviation program is the presence of quality faculty (Brown, 2007; Hankins, 2007; Lindseth, 1996). Unfortunately, there is little research available as to what qualifications are deemed necessary to be a member of this critical professional pilot faculty group. The available literature has focused on the attributes of existing faculty but has all but ignored the qualifications currently sought by collegiate aviation programs (Ison, 2009; Johnson, 1999). By looking at the credentials of faculty that are currently employed, it is impossible to identify trends in qualification standards as well as the ability to see what the collegiate environment is presently seeking from faculty applicants. Several researchers have noted this deficiency in the literature and have called for further investigation into the qualifications necessary to be a professional pilot educator in the collegiate environment (Brown, 2007; Ison, 2009; Johnson, 1999).

### Purpose of the Study

The purpose of this study was to examine the contents of job advertisements distributed by the *Chronicle of Higher Education*, HigherEdJobs.com, and the University Aviation Association in order to determine required and preferred professional pilot faculty qualifications. A secondary purpose of the study was to identify trends in qualification requirements by making comparisons between the findings of this study and the findings of previous studies. To further identify trends, the qualifications of faculty currently holding positions in programs that placed job advertisements were compared to the requirements of the apposite advertisements.

### Research Objective and Research Questions

This research sought to determine the professional pilot faculty qualifications that are currently required and preferred by collegiate aviation programs. In addition, this study sought to identify any trends in the data. This research was guided by the following research questions:

1. What are the required and preferred qualifications in job advertisements for professional pilot faculty?
2. Do the qualifications outlined in the advertisements differ from the qualifications of faculty currently employed at the programs sponsoring open positions?
3. To what extent do the educational qualifications outlined in the advertisements differ from previous findings?
4. To what extent do the certification qualifications outlined in the advertisements differ from previous findings?

### Significance of the Study

There are many ways that the findings of this study can be considered significant to the aviation field. This study explored what Ryan and Martinson (1996) stated “is an academic unit’s most important activity. Without efficient, knowledgeable, articulate faculty members, a unit cannot fulfill its potential, even if it boasts the best students and the most outstanding facilities” (p. 4). Collison (1990) reported that the findings of such a study “should allow an individual program to compare itself against a nationwide sample of programs” (p. 44) thus providing administrators and faculty with a benchmark for the qualifications demanded by similar programs. Not only can this data better guide departments as to what standards they should demand for new faculty candidates it can also provide deliberate standards for promotion and tenure decisions (Brunn, 1990; Fleet et al., 2006; Murphy & Hawkey, 2010). Evaluations of faculty qualifications requirements also yields information that helps present and future faculty to insure that they gain the appropriate attributes to be marketable in the professional pilot higher education environment (Barrow & Germann, 2006; Brown, 2007; Brunn, 1990; Collison, 1990; Ison, 2009). Lastly, the qualifications data uncovered in this study can guide searches to seek realistic criteria with which to screen applicants potentially saving time and money associated with the faculty hiring process (Ison, 2009; Merskin & Huberlie, 1995).

### Review of Literature

#### Qualifications of Higher Education Faculty

Although most academic fields do not have “official” educational qualification requirements, the generally accepted minimum educational standards are a master’s degree for those teaching undergraduate courses and a doctorate degree for those teaching graduate level courses (Commission on Colleges – Southern Association of Colleges and Schools [SACS], 2001; Twombly, Wolf-Wendel, Williams, & Green, 2006). It seems, though, that there is a preference for higher education faculty to hold a doctorate, in general. Supporting the existence of de facto faculty criteria is the most recent data from the National Center for Education Statistics (2004) which noted that 90.0% of male faculty and 77.2% of female faculty employed at four-year doctoral institutions had a doctoral degree in contrast to 75.9% of male faculty and 62.5% of female faculty held doctoral degrees at four-year non-doctoral institutions. Most compelling is that at two-year institutions, only 22.5% of male faculty and 16.0% of female faculty held doctoral degrees.

Each individual discipline has standards for the acceptable subject area(s) in which faculty hold their degrees. The hard sciences, such as biology and chemistry, have a sequential and focused degree accumulation. Thus, for example, a biology faculty will receive a master's degree in some biological science and then proceed to the doctoral level degree in a closely related subject (Clark, 1987; Fleet et al., 2006; Murphy & Hawkey, 2010). Other disciplines such as those associated with the liberal arts faculty "may stagger in and out, weaving their way among subjects, often choosing some of this and some of that, even fashioning a liberal education by accident as much as by choice" (Clark, 1987, p. 194).

Individual schools may have unique qualification requirements. Research intensive universities may seek individuals that have a proven track record in research or in the ability to gain funding. Some institutions require faculty to make significant contributions to their field, to participate in professional development activities, to publish their work, or a combination of any or all of the previous and expect faculty candidates to have a record of performing such tasks (Koys, 2008).

#### Accreditation and Certification Requirements for Qualifications

Outside the "norms" associated with faculty hiring practices and preferences outlined above, there are often fixed requirements or recommendations that are demanded or requested by accrediting bodies that supervise an individual institution or program. The Council for Higher Education Accreditation (CHEA) (2008) is charged with determining which accrediting bodies meet exacting standards that advance academic quality and insure a systematic means of progressive improvement. The U.S. Department of Education (USDE) (n.d.) also plays a critical role in accreditation as only those institutions with USDE recognized accreditation are eligible for federal loan funding for students.

Perhaps the most visible form of institutional accreditation is at the regional level. There are six regional accrediting bodies recognized by the CHEA: the New England Association of Schools and Colleges, the North Central Association of Schools and Colleges Higher Education Learning Commission, the Middle States Commission on Higher Education, the Western Association of Schools and Colleges, the Northwest Commission on Colleges and Universities, and the Southern Association of Schools and Colleges (CHEA, 2008). Among these entities, the faculty qualification requirements for accreditation are generally nonspecific. For example, the New England Association of Schools and Colleges (2005) simply requires that "the preparation and qualifications of all faculty are appropriate to the field and level of their assignments. Qualifications are measured by advanced degrees held" (p. 14). Further, there should be an adequate number of faculty on staff to handle the teaching loads demanded by enrollment and the expectations of qualifications of graduate faculty should simply be higher than that at the undergraduate level (New England Association of Schools and Colleges, 2005). The Middle States Commission on Higher Education (2006) stated that "there should be an adequate core of faculty and other qualified professionals [...] Faculty and other professionals [should be] appropriately prepared and qualified for the positions they hold" (p. 37). Similarly lax are the accreditation requirements outlined by the Western Association of Schools and Colleges (2001) whereas "the institution [should] employ[]

personnel sufficient in number and professional qualifications to maintain its operations and to support its academic programs” (p. 35). The only exception to such vagueness is the Southern Association of Colleges and Schools (2001) which explicitly stated the following qualification requirements for

faculty teaching baccalaureate courses: doctor’s or master’s degree in the teaching discipline or master’s degree with a concentration in the teaching discipline[...]. At least 25 percent of the discipline course hours in each undergraduate major are taught by faculty members holding the terminal degree – usually the earned doctorate – in the discipline (p. 16).

With the overall undefined nature of faculty qualification standards necessary for accreditation, it is up to the individual institution, school, department, or even the program to determine what is the minimum criteria for an “acceptable” faculty member.

For some programs, institutional accreditation is only one level from which guidance concerning faculty resides. Professional programs (e.g. nursing, business, pharmacy, aviation) often have a form of programmatic accreditation to which they must answer or participate in for prestige or marketing or both (Ison, 2009; Koys, 2008; Murphy & Hawkey, 2010; Prather, 2006). Some program accreditations have stringent imperatives relating to qualifications that far exceed the requirements of regional accreditors. The Association to Advance Collegiate Schools of Business International (AACSB), with prestigious members such as Harvard Business School and Stanford University School of Business, require that the

initial academic qualification [] normally [be] obtained via a PhD in the field in which one teaches. This initial qualification lasts for 5 years. After that, one must show intellectual contributions to maintain one’s academic qualification. The standards include more than a dozen examples of intellectual contributions [such as] peer-reviewed journal articles (Koys, 2008, p. 208).

As is often the case among AACSB schools, the receipt of an advanced degree is not enough – applicants must have received this degree from an AACSB accredited institution (Black Hills State University, 2011; Virginia Commonwealth University, 2011). However, even some programmatic accreditations do not specify definite qualifications or criteria for faculty. The Aviation Accrediting Board International (2010b) stated that

full-time and adjunct faculty directly involved in an aviation program **MUST** meet at least the minimum standards for academic credentials specified by the institution and required by the regional or national accrediting agency. [...] The overall qualifications of the faculty may include such factors as education, diversity of backgrounds, applicable experience, teaching performance, ability to communicate, enthusiasm for developing more effective programs, level of scholarship, participation in professional societies, and applicable certifications, registrations, or licenses (p. 8).

Again, it is clear that individual institutions and programs are often given a tremendous amount of flexibility in terms of the qualifications that are necessary for initial or continued employment and perhaps also for the purposes of tenure and promotion (Brunn, 1990; Collison, 1990; Fleet et al., 2006; Ison, 2009).

### Professional Pilot Faculty Qualifications

In the case of professional pilot faculty, however, there are some minimum qualification requirements that are set forth for those teaching pilot certification courses. These criteria emanate not from accreditors but from the FAA. Although there are some limited exceptions, generally “each instructor who is assigned to a ground training course must hold a flight or ground instructor certificate” (FAA, 1997).

Even in light of no specific academic credentials being required by most regional accrediting bodies and by AABI (if the institution is even accredited by this board), there are some commonly accepted standards that appear to exist. Johnson (1999) discovered that among University Aviation Association member schools, 62.5% indicated the minimum standard for hiring was the master’s degree whilst only 12.5% indicated the threshold as the doctorate degree. Reinforcing this assumed standard, Ison (2009) found that the majority (35.6%) of professional pilot faculty held a master’s degree whilst a close 31.0% held a bachelor’s degree. Only 12.1% of these faculty held a doctorate or first professional (e.g. Juris Doctor [J.D.] or Medical Doctor [M.D.]) degree. In terms of flight qualifications, the most prominent was the commercial pilot certificate (58.5%) followed by the Airline Transport Pilot (ATP) certificate (29.3%). Seventy-eight percent of these faculty members held one or more ground or flight instructor certifications (Ison, 2009).

### Credentialization

A concerning trend for both higher education administrators and faculty is the escalation of minimally acceptable faculty credentials. This increase in qualification standards is often referred to as “credentialization” (Barone & Van de Werfhorst, 2008). Such trends have been identified throughout postsecondary academic fields. The general shift has been to require increasingly higher educational achievement with a clear movement toward making a doctorate degree an obligatory prerequisite (Schuster & Finkelstein, 2006). Perhaps seeing pressures to pursue advanced education themselves, Lewis and Smith (2003) investigated the preferred qualifications of aviation faculty from the perspective of students. It was clearly evident in this study that the researchers were objecting to the looming reality of credentialization in aviation higher education. A letter written by Marshall (2002) noted the need for an aviation graduate program so that faculty could experience and conduct research to keep up with escalating demands of the Illinois state higher education system. With graduate students and the prospect of research, it should also be expected that demands for advanced degrees, e.g. beyond the master’s level, would eventually become the preference for new faculty, if not a requirement. In light of recent aviation program closures and cutbacks as well as budgetary stresses within the collegiate environment, it is likely that these events will result in an acceleration of credentialization as competition for faculty positions will

likely become more rigorous. Moreover, administrators will expectedly review these increasingly escalating criteria when evaluating faculty for possible retention, promotion, and tenure (Barrow & Germann, 2006; Fleet et al., 2006; Koys, 2008).

### Assessing Qualifications Through Employment Advertisements

There are, of course, a variety of ways to investigate the qualification requirements for faculty. Several researchers have utilized a reflective view by collecting the various attributes of postsecondary faculty that are currently employed (Ison, 2009; Johnson, 1999; Schuster & Finkelstein, 2006). In order to identify the most current faculty qualifications criteria and to recognize trends in such standards, it is necessary to examine this data from a more contemporary perspective. Analysis of faculty employment advertisements has been used by several researchers to collect existing occupational standards.

Merskin and Huberlie (1995) performed a content analysis of faculty position announcements to assist administrators to find the highest quality personnel with the most competitive credentials, to maximize the fiscal efficiency of the process, and to better inform applicants for which jobs they should apply. An analysis of recruiting activities conducted by Ryan and Martinson (1996), which included advertising faculty openings, aimed to insure the most solid applicants were attracted to the available positions. This study identified that importance of having realistic hiring standards which can be best examined through viewing announcements for similar positions. In order to survey the job market and necessary qualifications for mathematics education faculty positions, Reys (2002) analyzed related employment advertisements appearing in national publications over a year period. Barrow and Germann (2006) followed position openings in the *Chronicle of Higher Education*, also over a year period, to determine the hiring practices and current standards for science education faculty. Another study of training, certification, and experience requirements of pharmacy clinical faculty utilized advertisements to access the requisite data (Murphy & Hawkey, 2010). Clearly, the utility of faculty employment advertisements to assess current hiring criteria, most notably qualifications and experience, was demonstrated among these aforementioned studies.

## Method

### Participants

The unit of analysis for this study was each discrete faculty employment advertisement. Only advertisements seeking professional pilot program faculty were included in this study, thus those announcements for aviation management, maintenance, and air traffic control positions were omitted. Advertisements for professional pilot program faculty openings were collected over a 32 month period from August 2008 to March 2011. Announcements were collected from three sources to insure comprehensive coverage of openings: the *Chronicle of Higher Education*, HigherEdJobs.com, and the University Aviation Association website. Additionally, a Google search was regularly conducted using the keywords “aviation” and “faculty” with the addition of the keyword “position” as needed to insure capture of any additional position openings. Multiple advertisements for the same position were identified to insure there was no duplication of



findings. A total of 36 advertisements were collected. Three were excluded because they did not include qualification standards. Another announcement was excluded because it was not for a full-time position. Therefore a total of 32 advertisements were available for analysis.

## Procedure

The advertisements were printed on individual pages for easier identification of key data. The required educational, certification, and experiential qualifications were identified and highlighted. Next, the preferred educational, certification, and experiential qualifications were identified and highlighted using a different color for differentiation purposes. Each category of criteria was then quantified. For the purposes of analysis, both types of doctorate degrees (PhD and EdD) were placed in the same category “doctorate degree.” Associate’s, Bachelor’s, and professional degrees, such as the MD (Medical Doctor) and JD (Juris Doctor), were included in the “other” category.

Once the quantification of the results was complete, the findings of this study were compared to the attributes of faculty employed at the institution sponsoring the advertisement. Next, the prevalence of educational qualifications was compared to previous findings by Johnson (1999) and Ison (2009). Lastly, the prevalence of certification requirements was compared to previous findings by Ison (2009). Due to the nature of the data, namely its non-parametric attributes, all statistical analyses were conducted using Chi-square tests for independence (Fleiss, 1981; Pallant, 2007). Both PASW Version 18 and PHStat2 software were used to conduct these analyses. In the case of the multiple comparisons of educational qualifications, the Marascuilo procedure was conducted to determine which pairs, if any, were significantly different (Berenson, Levine, & Krehbiel, 2008). All analyses were conducted with  $\alpha = 0.10$ . This alpha level was selected as no major fiscal or safety related issues rely on the results of this study. Also, this alpha level was utilized in an attempt to improve statistical power.

## Results

The 32 articles containing the required information necessary for analysis yielded data to address the research questions of this study. For clarity, the results section was subdivided into sections addressing each of these questions.

**Research Question 1: What are the required and preferred qualifications in job advertisements for professional pilot faculty?**

Among the 32 professional pilot program faculty position opening announcements, 8 (25.0%) required an earned doctorate degree and 23 (71.9%) indicated that a master’s degree was required. One (3.1%) advertisement required only a bachelor’s degree (see Table 1). Of the 24 advertisements that did not designate a doctorate as a requirement, 16 (66.7%) indicated that a doctorate was “preferred.”

Fifteen (46.8%) openings explicitly required FAA pilot-related certification with 3 (9.4%) of these specifically requiring an Airline Transport Pilot certification whilst another 3 (9.4%) stated that a commercial certificate was necessary. Additionally, 12

(37.5%) advertisements mentioned the requirement for a flight instructor certification and 1 (3.1%) stated that a ground instructor certificate could be substituted for the flight instructor certification. Three (9.4%) outlined specific flight time experience requirements with a mean value of 1,833 flight hours.

Table 1  
*Degree Requirements in Faculty Openings Advertisements*

<b>Degree Requirement</b>	<b>Number of Advertisements (%)</b>
Doctorate	8 (25.0)
Master's	23 (71.9)
Bachelor's	1 (3.1)

Twenty (62.5%) of the announcements listed that an individual must have previous aviation industry experience. Although the types of experiences that were listed varied, the premise was that a prospective faculty should have familiarity with flight operations in the corporate, airline, military, or flight training environment. Only 4 (12.5%) advertisements specified the amount of industry experience required. The mean experience level listed was 5 years. Among the openings, 16 (50.0%) had previous college teaching experience as a prerequisite. Twelve (37.5%) required that the prospective faculty member be involved in research and/or scholarly activities. Some advertisements elaborated to state that applying faculty should have a research agenda, grant writing abilities, have published in peer reviewed journals, or have made peer reviewed presentations. A summary of the typical hiring criteria found in the announcements is provided in Table 2.

Table 2  
*Summary of Required Hiring Criteria Found in Faculty Openings Advertisements*

<b>Type of Requirement</b>	<b>Top Two Requirements (%)</b>
Education	1. Master's degree (71.9) 2. Doctorate degree (25.0)
FAA Certification	1. Nonspecific (46.8) 2. Flight Instructor (37.5)
Aviation Experience	1. Nonspecific (62.5) 2. Minimum 5 years (12.5)
Other Experience	1. College Teaching (50.0) 2. Research/Scholarly (37.5)

Research Question 2: Do the qualifications outlined in the advertisements differ from the qualifications of faculty currently employed at the programs sponsoring open positions?

To address research question 2, it was necessary to compile the attributes of professional pilot program faculty employed at the institutions that had advertised position openings. Program and institutional websites were mined for the applicable data. The only details that were ascertainable from this process were the educational attributes as it was not possible to garner other characteristics in sufficient numbers to conduct a comparison. Among the institutions that advertised faculty openings, 78 (68.4%) of faculty held a master's degree as their highest level of educational attainment and 36 (31.6%) held a doctorate degree. A Chi-square test for independence (with Yates' Continuity Correction) indicated no significant difference between the advertised education requirements and the highest degree attained by faculty at the institutions advertising openings ( $\chi^2 [1, n= 145] = 0.160, p > 0.10, \phi = 0.051$ ) (note: the one case in which a bachelor's degree was the minimum requirement was omitted from this analysis).

The institutional expectations for faculty candidates to meet desired qualifications cannot be underestimated. Therefore it was considered of interest to determine if there were any differences between the requirements in the advertisements, including "preferred" items, and the faculty employed at the institutions that had faculty openings. Under these conditions, there were 24 (75.0%) advertisements that required or preferred the doctorate whilst only 8 (25.0%) that required or preferred the master's. The difference was found to be significant with  $\chi^2 (1, n= 146) = 17.708, p < 0.001, \phi = -0.365$  (with Yates' Continuity Correction).

Research Question 3: To what extent do the educational qualifications outlined in the advertisements differ from previous findings?

The data discovered in this study was compared to the findings of Johnson (1999) and Ison (2009). A summary of the percentages of educational attainment reported in previous studies and those found in the examined advertisements are shown in Figure 1. Differences among these groups, excluding "other" degrees, was found to be insignificant ( $\chi^2 [2, n = 254] = 1.315, p > 0.10, \text{Cramer's } V = 0.072$ ). With "other" degrees included, there were also no significant differences found ( $\chi^2 [4, n= 279] = 3.756, p > 0.10, \text{Cramer's } V = 0.082$ ) (note: when including the "other" degrees, 20% of the expected frequencies were less than 5, however, upon the guidance Bradley, Bradley, McGrath, and Cutcomb [1979], Camilli & Hopkins [1978], Cochran [1954], and Yarnold [1970], under the conditions of this study, it was still deemed acceptable to use Chi-square analysis). Although it is unlikely to discover significant differences among pairs using the Marascuilo procedure when the whole model differences are not significant, there is a rare chance that this can occur. Thus the Marascuilo procedure was utilized to analyze independence of individual pairs of data. No significant differences were discovered. A summary of the findings from the Marascuilo analysis is displayed in Table 3.

When assuming “preferred” qualifications as “required” the result,  $\chi^2(2, n=279) = 23.12, p < 0.001$ , Cramer’s  $V = 0.288$ , was opposite of the aforementioned results (note: in this instance, “other” degrees had to be combined with master’s for congruence of data for Chi square analysis). The Marascuilo procedure was used to identify which pairs, if any, were significantly different. Although there were no differences identified between the studies by Johnson (1999) and Ison (2009), there were differences identified between the current findings, including the “preferred” qualifications as “required,” and both the Johnson (1999) and Ison (2009) studies (see Table 4).

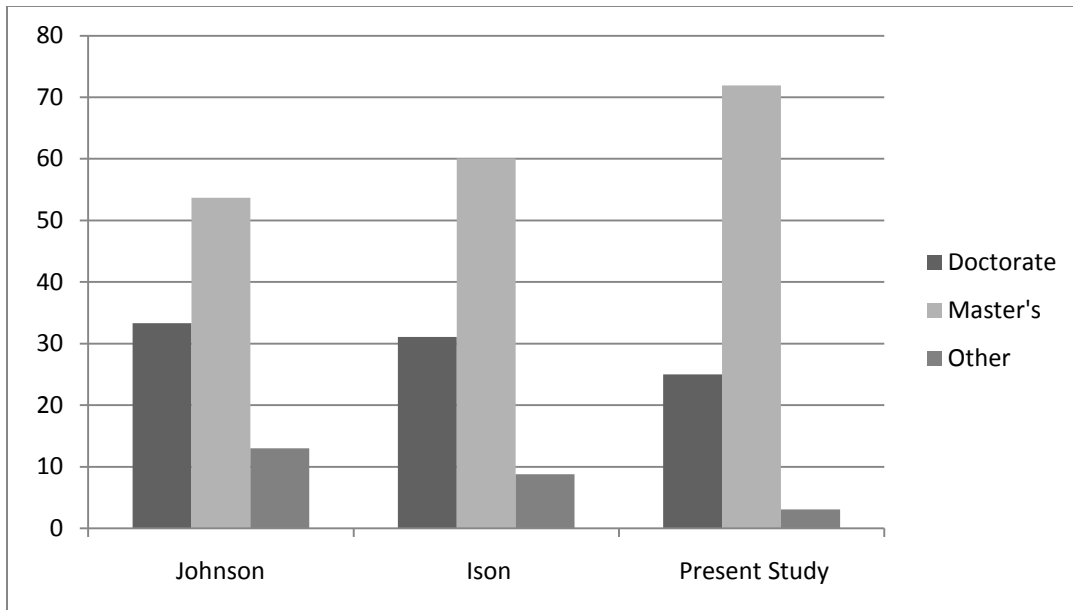


Figure 1. Prevalence Percentage of Educational Attainment/Requirements.

Table 3  
Summary of Marascuilo Analyses

Analysis Parameter	Groups	Absolute Differences	Critical Range	Significance
Doctorate Degree	Johnson v. Ison	0.042	0.259	No
	Ison v. Current	0.125	0.211	No
	Johnson v. Current	0.083	0.194	No
Master's Degree	Johnson v. Ison	0.042	0.209	No
	Ison v. Current	0.125	0.211	No
	Johnson v. Current	0.083	0.148	No
Other Degree	Johnson v. Ison	0.041	0.154	No
	Ison v. Current	0.098	0.169	No
	Johnson v. Current	0.057	0.113	No

Table 4  
*Summary of Marascuilo Analyses (Including “Preferred” Data)*

<b>Analysis Parameter</b>	<b>Groups</b>	<b>Absolute Differences</b>	<b>Critical Range</b>	<b>Significance</b>
Doctorate Degree	Johnson v. Ison	0.022	0.155	No
	Ison v. Current	0.417	0.214	Yes
	Johnson v. Current	0.439	0.179	Yes

Research Question 4: To what extent do the certification qualifications outlined in the advertisements differ from previous findings?

The certification requirements found in Ison (2009) were compared to the requirements in the advertisements. The analysis examined the prevalence of FAA pilot-related certifications in general and the levels of instructor certification were also evaluated. The results,  $\chi^2 (1, n= 360) = 0.00, p > 0.10, \phi = 0.002$  (with Yates’ Continuity Correction), indicates that there are no significant differences between these groups.

#### Discussion

The principal goal of this study was to examine the contents of advertisements for professional pilot program faculty positions in order to determine the required and preferred qualifications for employment. Peripheral purposes of the study were to identify trends in qualification requirements by making comparisons between the findings of this study and the findings of previous studies as well as comparing the qualifications of faculty currently holding positions in programs that placed job advertisements with the requirements noted in the collected advertisements. This study successfully met these goals.

The predominant educational criterion for professional pilot program faculty was found to be the master’s degree yet there was a strong preference for individuals to have an earned doctorate. When taking these preferences into account, the requirements of the advertisements were significantly different from faculty currently working in professional pilot program faculty positions. Although the doctoral degree was not explicitly mandated, it is evident that there is potentially a trend of educational credentialization that is occurring among professional pilot programs. This appears to be in line with the trends identified by Barrow and Germann (2006), Fleet et al. (2006), and Koys (2008).

Surprisingly, less than half of the advertisements required FAA pilot-related credentials and even fewer were required to hold any sort of FAA instructor certification. Considering that these faculty are providing instruction in subjects related to flying and are often conducted under the confines of Code of Federal Regulations Part 141 which requires specific qualification standards, it was remarkable that FAA pilot-related certification were not provided more significance among the hiring criteria. However, this data was found to be quite similar to findings in previous research, so any inclinations of a shift away from preference for hiring faculty that have flight experience

and certifications are not well supported. The marginal prevalence of faculty with FAA certifications can perhaps be explained by the fact that faculty in Part 141 programs only need to be overseen by an individual who has the necessary qualifications for the instruction to be approved by the FAA. Therefore faculty could be hired based on other preferences and still have a high level of utility in a collegiate professional pilot program.

Other qualification measures that appeared frequently in the studied advertisements were those alluding to aviation, teaching, and scholarly experience. Almost two-thirds of the openings required aviation industry experience. Among those mentioning this specific criterion, the mean experience required was five years. The need for experience coupled with a threshold preference above simply “any” level of experience agrees with the findings of Lewis and Smith (2003) that recognize the importance of faculty having more than just academic qualifications. Half of the advertisements stated the need for college teaching experience, so while involvement in the aviation industry is clearly paramount, familiarity with the collegiate environment is expected of potential faculty. Just over one-third of the advertisements mentioned the need to be involved in or familiar with research, scholarly activities, or both. Research experience was classified in different ways such as knowledge of research methods, conducting research, the ability to gain funding for research, and the seeking of collaborative research agendas. Scholarly activities generally centered on peer-reviewed journal article writing. These research and scholarly activities are generally expected by higher education faculty in many fields of study although this seems to be a newer, but ever more demanded, requirement for aviation faculty (Barrow & Germann, 2006; Koys, 2008; Marshall, 2002).

To investigate potential trends in professional pilot program faculty qualifications and in an attempt to evaluate possible credentialization, the criteria spelled out in the examined announcements were compared to the qualifications of faculty working at the institutions that advertised openings. Certainly, if the institutions with job openings had expectations for new faculty that were higher than the qualifications of currently employed faculty, there was apparent evidence of an escalation of credential requirements. The results of this comparison yielded no significant difference between the minimum required educational expectations published in the openings and the educational attainment of current faculty. However, when the preferred qualifications were taken into account, the expectations for future faculty significantly exceeded that of current faculty. While this evidently indicates the presence of credentialization, it can be argued that it is still somewhat muted due to the fact that these advanced expectations are only preferred at this point. This required-preferred qualification disconnect is perhaps due to the fact that advertising administrators are apprehensive about demanding too much from future aviation faculty as the overwhelming majority of the applicant pool likely has attained only a master’s degree (Ison, 2009).

Perhaps a more accurate means to inquire into the presence of credentialization is to alter the measures of analysis. In the case of investigating credentialization among professional pilot faculty, what is truly of interest is the preference or requirement of a doctorate degree whilst assuming all other degrees essentially being inconsequential. This is a logical means of exploration due to the fact that majority of these faculty already hold a master’s degree (or even fewer with lower degrees). When probing in this manner, it

was discovered that there were statistically significant differences between the qualifications of currently employed faculty and that found in advertisements when combining preferred criteria in with required standards.

The educational attainment requirements in this study were also compared to the findings of studies conducted in 1999 and 2009 to further identify any changes or trends. There were no significant differences found, thus the expectations for education credentials have apparently remained stable. Yet when analyzing the data with preferred qualifications as the indicator of degree required, there were differences found between both the 1999 study and the present findings as well as when the 2009 study was compared with the current data. Interestingly, there was no difference noted between the 1999 and 2009 studies. This tends to indicate the actual qualifications of aviation faculty have remained even, yet expectations for new faculty lean towards upgraded educational attainment. Again, it should be of little surprise that there is at least a preference for credentialization due to pressures similar to those indicated by Koys (2008) and Marshall (2002).

Lastly, certification requirements were compared across the two previous studies and the current data. No significant differences were discovered. Considering the typical professional pathways identified by Ison (2009), it is not entirely surprising that these attributes would not change as they are essential, obligatory prerequisites for professional pilot program faculty positions. This also provides some evidence that whilst institutions are leaning towards demanding higher educational attainment among new faculty, these bodies are not compromising the need for pilot-related certifications.

It is important to disclose the delimitations of this study. This inquiry did not seek to investigate faculty hiring criteria for all types of aviation faculty as it was limited to the advertisements for professional pilot program faculty. The reasoning behind this delimitation is that the requirements for faculty teaching the subjects of maintenance, air traffic control, and aviation management may vary significantly making analysis more problematic. Also, the importance of professional pilot faculty, as indicated by Ison (2009), supported the focus of research on this particular group.

There are also limitations that affected this study. During the research design stage, an *a priori* power analysis was conducted. Assuming a medium effect size, the power of all proposed tests was expected to exceed the generally accepted minimum threshold of 0.80 (Cohen, 1988). However, due to small actual effect sizes, *post hoc* power analyses indicated that the majority of tests conducted in this study failed to meet the 0.80 threshold. Even when taking into account the revised standards for effect size recommended by Pallant (2007), the average power among all of the statistical analyses presented was  $1-\beta = 0.46$ . Only two tests were adequately powered (both were  $1-\beta < 0.99$ ), the comparison of faculty qualifications at institutions that advertised employment openings with the employment criteria in the advertisements when including preferred qualifications and the comparison of the findings of this study and previous studies when assuming that preferred education requirements were instead required. Although on initial inspection this appears to be discouraging, it does, however, point to the need for more research in this area to gather a larger sample to enhance the results (Alberson, 2010).

Another potential limitation to be considered is that the faculty in the Johnson (1999) study were not specifically employed in an professional pilot program, i.e. this study likely included individuals outside this focus. In light of this, there are two potential conclusions to make from the lack of significant differences found. One is that aviation faculty, regardless of area of specialty, have similar educational backgrounds. The other is that within aviation programs, it is possible that the dominant area of specialization among faculty is professional pilot or flight-related. Of course it could also be a combination of these two factors. More study is required to determine attributes of other types of aviation faculty to provide improved insight into this area.

### Conclusions

This study was able to successfully provide answers for the outlined research questions. The most prevalent employment prerequisites for professional pilot program faculty were discovered and quantified. A comparison between the criteria outlined in employment advertisements for professional pilot faculty openings were compared to the actual qualifications of faculty working at the institutions that placed the advertisements. Contrasts were also made among educational requirements listed in these advertisements and two previous studies. Lastly, distinctions between the certification requirements listed in the advertisements and one previous study were investigated. Depending upon the perspective of analysis, the level of education credentialization in the collegiate professional pilot program environment is moderate to strong.

Up to this point, the job qualifications of professional pilot faculty has been framed in terms of the past and present. Advertisements, of course, seek future employees. Trends identified among past, present, and the findings in these advertisements can provide insight as to what might hold for the future of this grouping of faculty. It appears likely that future faculty will have expectations of college teaching experience, aviation industry experience, and perhaps some type of pilot-related FAA certification. Between the evidence in the literature and that uncovered in this study, it is obvious that educational qualifications expectations for future aviation faculty are migrating upwards. Regardless of whether one looks at the data in terms of what qualifications are preferred or required, the key point is that, at the very least, the preferences exceed the qualifications of those faculty that are currently employed. It is also critical to note that indications of an upswing in expectations for educational attainment which included preferences for employment had high statistical power (in excess of 0.99). As more faculty either attain doctoral degrees or additional new faculty who actually hold a doctoral degree are hired, it is likely that this trend will continue to accelerate. Additionally, pressures to publish and conduct research are trickling down into the once immune, or somewhat insusceptible, aviation departments for various reasons that are outside the scope of this study. In short, the future for professional pilot faculty will likely include mandates for a doctoral degree. Moreover, these faculty will most probably also be expected to pursue research or perform other scholarly activities, or both.



### Recommendations for Future Research

Based upon the findings of this study, there are some recommendations for future research that could build upon the conclusions made here. These are:

1. Conduct an expanded analysis of aviation faculty employment announcements to provide a larger sample and thus greater statistical power.
2. Survey aviation faculty to determine if there is an increased pressure to pursue a doctoral degree, conduct research, write grants or other similar activities. Also of interest is if these are requirements for promotion, tenure, or both. An additional overarching inquiry would be if any or all of these expectations have changed over recent years.
3. An investigation into the need to conduct Marascuilo procedure *post hoc* tests even in light of core-test results which are not significant. This will help researcher identify differences between individual pairs of data even when, upon initial inspection, there are no such differences.

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